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APPROVAL & DISTRIBUTION

	NAME	SIGNATURE & DATE
PREPARED	J Cronje HVAC Specialist	
Checked	S Mngoma Chief Mechanical Engineer	
Checked	K Moodley Chief Process Engineer	
Checked	G Manuel Chief Engineer: C&I/Electronics	
Checked	H Bisset Chief Scientist	
Checked	D Van Der Westhuizen Acting Senior Manager: Applied Chemistry	
Approved	S Mosinki General Manager: Engineering Services	
Distribution	Department and SharePoint Records	

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1. PURPOSE

The purpose of this document is to provide detailed technical specifications for the HVAC system, to be installed in the PTFE PlasGas demonstration facility. This will enable a HVAC contractor to provide Necsa with a commercial offer for the detailed design, equipment selection, installation and commissioning of the PTFE PlasGas HVAC system.

2. REFERENCES

This document refers to the following documents:		
[1]	HVAC Functional Description for the PTFE PlasGas Demonstration Facility	ENS-FDP-DGM-24001
[2]	HVAC Block Flow Diagram	ENS-FDP-BFD-24002 Rev 8
[3]	PTFE PlasGas Layout Drawing	ENS-FDP-DWG-24001
[4]	Air-conditioning ductwork	SANS 1238
[5]	The installation, testing and balancing of air-conditioning ductwork	SANS 10173
[6]	Welding of thermoplastics – Welding processes	SANS 10268
[7]	Containment enclosures — Part 2: Classification according to leak tightness and associated checking methods	ISO 10648-2
[8]	Quality management systems — Requirements	ISO 9001
[9]	Quality Assurance Requirements for Nuclear Facility Applications	ASME NQA-1
[10]	Code on Nuclear Air and Gas Treatment	ASME AG-1
[11]	Atomic Energy Standard Specification	AESS 30

3. ABBREVIATIONS

Abbreviation	Description
AHU	Air-Handling Unit
AOO	Anticipated Operational Occurrence
BIBO	Bag-In-Bag-Out
HVAC	Heating Ventilation and Air Conditioning
ISO	International Standard Organisation
OBD	Opposed Blade Damper
PTFE PlasGas	Plasma Gasification
PTFE	Polytetrafluoroethylene

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4. SCOPE OF WORK

The HVAC contract works to be carried out within the scope of this specification, consisting of the engineering, supply, delivery, off-loading, erection testing, setting into operation, commissioning, testing and balancing, guarantee and maintenance, complete with Operating & Maintenance manuals and “as built” drawings of the mechanical services as described herein.

The HVAC contractor shall fulfil the role of a main contractor, unless expressly excluded, and is responsible for all activities to successfully complete the work.

The engineering, quality control and inspections, equipment selections, preparation of installation drawings, testing, balancing, commissioning and the preparation of operating and maintenance manuals, shall be executed in a systematic manner, in accordance with an agreed program, under Necsa’s general supervision for approval by Necsa for:

- a) Programming the works.
- b) Equipment selection.
- c) Installation drawings.
- d) Procurement of equipment to be installed.
- e) Installation.
- f) Testing, balancing and commissioning documentation.
- g) Operating, instructions and maintenance manuals.
- h) Inspections and check lists.

The scope of work contained in this document covers the following:

- Installation of a new AHU complete with supply air and return air ducting, dampers & controls.
- Installation of a process off-gas ventilation system, complete with a safe-change (BIBO) filter housing, filters, polypropylene ducting and an exhaust air fan.
- Modifications to the existing building exhaust ducting.
- Installation of various transfer and control dampers.
- Removal and make good of the existing HVAC equipment located in the existing plant room.

5. FORMAL AGREEMENT

It shall be expected from the successful contractor to enter into a formal agreement/Service Level Agreement with Necsa. Necsa shall provide the basis for the agreement/Service Level Agreement.

Items within the agreement will be mutually agreed upon before signature.

Annexure 1 contains the Standard Terms and Conditions of such a contract for reference purposes.

6. PROGRAM

The HVAC contractor shall submit to Necsa, within two weeks of his appointment a practical work program. This practical work program shall provide the following minimum information:

- a) Required access date.
- b) Long-lead item procurement schedule.
- c) Installation plan, detailing the sequence of installation activities.
- d) A project schedule for the submission of structural, installation, equipment selections, inspections

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report or completed portions of the Works, Operating & Maintenance Manuals, testing, balancing and commissioning.

- e) Health and safety file.

Sufficient time shall be allowed for re-submission of rejected documentation and Engineer's review/approval.

On a regular basis, the HVAC contractor shall submit updates of the practical work program should amendments be required. All such amendments are to be subject to Necsa's approval and shall not amend the project's completion date, unless official extension to the contract period has been granted.

Should the HVAC contractor fall behind the practical work program, the HVAC contractor shall take such steps as may be necessary to recover lost time.

This may require additional shifts, overtime, or additional plant and manpower, and to submit for approval by Necsa, revised practical work programs to demonstrate the manner in which the required rate of progress will be achieved, all without additional cost to the client.

Regular meetings to monitor progress will be held. These meetings must be attended by as many representatives as is required. In addition, the meeting will be attended by the various Professionals at their own option and solely in their consulting capacity.

Progress meetings shall be held on a regular basis as determined by the Necsa Project Manager. Allowance shall be made to attend such meetings on a weekly basis for tendering purposes.

The meeting shall be attended by as many representatives from the contractor side as is required to provide accurate and informed feedback on the project progress, status and challenges experienced. As a minimum the meeting shall be attended by the contractor's appointed responsible person.

7. DRAWINGS

7.1. NECSA'S DRAWINGS AND SPECIFICATION

Drawings prepared by Necsa, as part of this document, show only the general layout of all equipment and distribution systems, complete with schematic arrangements. These together with this specification, will give sufficient information to enable the HVAC contractor to determine the cost and to establish how the system must be installed, tested, balanced, inspected, operated, serviced and maintained. These drawings are not to be used as installation drawings and therefore cannot be used as construction/installation drawings. Dimensions and locations shown are only guides to the routes and zones in which the service must be installed.

Design, selection and construction details, and/or installation arrangements for equipment and distribution systems are available from either the manufacturer or the supplier in their officially published literature/documentation, design/application manuals, or other authoritative sources of information such as:

- a) South African Bureau of Standards (SABS)
- b) Chartered Institute of Building Services Engineers. (CIBSE)
- c) American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE)

Information issued shall be used as a basis for development of detailed design, manufacturing, and installation drawings. The specific source to be clearly identified when making submissions.

Where the information contained in the equipment quality specifications do not provide sufficient details, reference must be made to one of the above sources.

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7.2. STRUCTURAL DRAWINGS

Where applicable the HVAC contractor shall supply Necsa with a set of structural drawings and or other drawings, showing requirements to fit equipment apparatus and materials to be installed by him. It will be the HVAC contractor's responsibility to ensure that sufficient installation, maintenance and operation clearance is provided into the building space provided. Such drawings shall be accepted by an approved Necsa responsible person before implementation can take place.

7.3. INSTALLATION DRAWINGS SUBMISSION

Installation drawings shall indicate all equipment, distribution systems, testing, inspection, instrumentation positions, access requirements and work to be carried out by others. Installation drawings shall be based on the information as supplied during tender stages such as this document, diagrams and drawings supplied as well as approved equipment selection and approved samples. The installation drawings shall have been checked and passed by a responsible member of the HVAC contractor's staff, such as the Project Engineer/ Manager. Copies of the installation drawings of all parts of the ventilation contract works shall be submitted to Necsa for approval by an approved Necsa responsible person.

7.4. "AS-BUILT" DRAWINGS

"As-Built" drawings shall comprise the installation drawings as specified above, updated with indicating all terminals and equipment controller position and further system diagrams, indicating the intended functioning capacity data and control functioning of all systems.

8. EQUIPMENT SELECTION SUBMISSIONS

The details contained in the Equipment Quality Specification, as listed under item 16 – Schedule of Equipment, are guidelines based on which the HVAC contractor should select the equipment. These selections shall be submitted to Necsa for approval.

No equipment shall form part of this contract until the equipment selection submission has been approved by Necsa. All equipment selection submissions shall be stamped and signed by a HVAC contractor's responsible person, such as Project Engineer/Manager, signifying that all the requirements of this specification have been complied with. Any deviation shall be highlighted in the equipment selection submission.

Pre-ordered equipment shall be handled in the same manner, with the HVAC contractor submitting equipment selection submissions. It is the responsibility of the HVAC contractor to ensure that the pre-ordered equipment complies fully with the requirements of this specification.

8.1. SAMPLE SUBMISSIONS

Samples required by Necsa, are physical examples required to illustrate materials finished, equipment or workmanship, and /or to assist with the onsite co-ordination, and/or to set standards by which the works may be judged. Where applicable certification, indication compliance with statutory and regulatory compliance must accompany such a submission. The approved samples will be retained by Necsa until the relevant component is supplied and delivered as per samples but will then be returned to the HVAC contractor for incorporation in the works.

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8.2. SUBMISSION PROCEDURES

Submission of installation drawings and equipment selections shall consist of the following activities carried out by the HVAC contractor and the other involved /interested parties:

- a) The HVAC contractor shall prepare his submission in a manner and format agreed with Necsa. All submissions shall be dated and signed by the HVAC contractor's responsible person and shall be submitted in any orderly sequence and timeously as not delay the works, giving the approving parties sufficient time to proper approval procedures.
- b) All submissions shall clearly indicate, and Necsa shall be informed in writing of all deviations from the requirements of this specification.
- c) All equipment selection submissions shall be accompanied by a copy of the applicable Quality Specification, as indicated under item 16 – Schedule of Equipment, with each clause clearly marked "Complies" or does not comply". Motivation for the noncompliance shall be supplied with equipment selection submission duty countersigned by the HVAC contractor's Project Engineer/Manager.
- d) Equipment selection submissions shall be indexed in a manner to conform with the indexing of the Operating and Maintenance Manual, to allow direct incorporation.
- e) At least 3 copies of all Installation drawings, diagrams and Equipment selections shall be submitted to Necsa for approval. By submitting drawings, diagrams, Equipment selections and/or samples, the HVAC contractor confirms that he has determined and verified all site measurements, site instruction criteria, materials, catalogue numbers, and that he has checked and coordinated with all available drawings issued for compliance with the requirements of the works and that of this specification.
- f) Necsa shall approve the HVAC contractor's submissions with reasonable promptness for conformance with the design concept of the ventilation contract works and with the information given in this specification. Necsa's approval of a separate item shall not indicate the approval of the assembly in which the item functions.
- g) The HVAC contractor shall make all corrections to the submissions required by Necsa and shall re-submit the required and corrected copies for re-approval until approved by Necsa. This process is to take place with reasonable promptness so as not to cause any delay to the works. The HVAC contractor shall highlight any revisions on the re-submitted documents, other than corrections required by Necsa on previous submissions.

9. OPERATING AND MAINTENANCE MANUALS, WIRING AND CONTROL DIAGRAMS

The HVAC contractor shall prepare a draft operation and maintenance (O&M) manual and submit this to Necsa for approval. The manual must be typed in English on A4 paper with consecutively numbered pages and shall contain the following information arranged in sections in the order stated below:

- Section 1: System Description (this section shall contain a brief description of the system, what its function is and how it operates. A list of any abbreviations used in the O & M manuals shall be included.)
- Section 2: Operating Instructions (this section should describe how to start and stop the systems, any special procedures after a power failure, how to change system parameters, etc. This can cross-reference to the control section for more detailed information.)
- Section 3: Trouble Shooting (this section shall provide schedules of procedures to follow to find faults in event of a system malfunction.)
- Section 4: Commissioning Data (this section shall contain all the final measurements of the installation as commissioned and shall also include full details of the design parameters specified.)
- Section 5: Maintenance Instructions (this section shall detail maintenance operations to be carried out on a daily, weekly, monthly, etc. In addition, it should detail which daily/weekly activities should be carried out by the Client during the guarantee period.)
- Section 6: List of Equipment Suppliers (this section should list all the equipment, with make, model no., and serial no. as well as full particulars of the suppliers contact details.)
- Section 7: Spare Parts List (this section shall detail the recommended spare parts, differentiating

which should be held on site and which could be ordered as required. Details of all lubricating oils and greases required must be included.)

- Section 8: Equipment Data Schedules (this section shall contain schedules giving the full particulars of each item of equipment and its subcomponents e.g. Size, mass, flow rates, current ratings, safety devices, gas charge, motor/fan rpm, etc.)
- Section 9: Supplier's Literature (this section shall all the relevant catalogues, performance curves and pamphlets of the equipment installed.)
- Section 10: Control System (this section shall contain details on the operation of the control system, control philosophy, block logic diagrams, etc.)
- Section 11: Electrical Drawings (this section shall contain the panel layout drawings and the wiring diagrams.)
- Section 12: As-built Drawings (this section shall contain all the as-built and detail drawings of the installation. Separate as-built drawings indicating the positions of all control devices and sensors must be included)

After approval of the draft described above, a soft copy of this manual as well as two sets bound in hard covers, shall be handed to Necsa.

The Final Certificate of Completion will not be issued until this manual has been supplied and the wiring diagrams installed.

10. GUARANTEE

The contractor shall guarantee the entire installation (materials, equipment and workmanship) for a period of 12 months. The guarantee shall cover patent and latent defects and all items that become defective during the 12-month guarantee period shall be replaced and installed free of charge.

Any equipment in need of replacement but came into contact with radioactive substances shall not be removed from site and cannot be recovered by the contractor.

The guarantee period shall commence at the date when the installation is put into beneficial use to the satisfaction of Necsa. Beneficial use may take place before or after the official completion and hand-over date and beneficial use shall mean full time operation of the system by the Client or at the request of the Client.

Equipment purchased well in advance of the completion of the project, shall still carry the 12-month guarantee from date of handover or date of beneficial use. Where the installation is handed over in phases, the guarantee for equipment of that particular phase shall commence on handover of that phase.

The guarantee shall only commence once the following criteria have been met:

- Practical completion has been achieved.
- All commissioning data submitted and approved.
- O & M Manuals approved and issued to the Client Validation data issued and approved.
- Client training has been carried out.

11. PRACTICAL COMPLETION

Practical completion shall mean the following:

- All remedial items within the facility and any items which may affect the continued operation of the installation, shall be completed.
- Commissioning data shall have been submitted for approval.
- O & M manuals shall be made available. The guarantee will not commence until O & M manuals are submitted.

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12. FACILITY DESCRIPTION

The PTFE PlasGas demonstration facility is located in Laboratory 131H in building V-H2 on the Necsa site and consists of three major areas:

- The control room.
 - The laboratory area, housing the feed receival and preparation processes and equipment.
 - The secondary enclosure, housing the PlasGas reactor, KOH Scrubber, processes and equipment.
- A passage is located outside the entrance door in proximity of the control room.

13. SYSTEM DESCRIPTION

The HVAC system for the PTFE PlasGas process is made up of the following sub-systems:

- Supply air system.
- Building exhaust air system (existing).
- Process ventilation or off-gas system.

Block flow diagram [x] provide an overview of the above-mentioned systems and it's configuration.

The supply air system supplies air into the control room, laboratory area as well as the secondary enclosure. Air from the laboratory area is returned to the supply air-handling unit under normal operating conditions.

The existing building exhaust air system keeps the laboratory area under a negative pressure in relation to the passage.

The process off-gas system extracts air from process equipment as well as the secondary enclosure keeping the enclosure under a negative pressure in relation to the laboratory.

Transfer of air takes place between the different area via regulated routes as well as leak-paths between the areas.

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14. FUNCTIONAL DESCRIPTION .

The complete functional description is contained in [1]

An updated diagram is contained in [2]

15. ALARMS & INTERLOCKS .

Alarms and Interlocks are contained in the functional description document [1]

16. SCHEDULE OF EQUIPMENT

With reference to [3]

16.1. AIR-HANDLING UNIT (AHU1)

The AHU shall be a factory assembled and tested unit complete with primary filtration upstream of the supply air fan as well as secondary- and HEPA filtration, downstream of the supply air fan.

The AHU casing shall be of double skin insulated construction with a Chromadek or powder coated finish suitable for outdoor application. The insulation shall either be 50 mm thick polystyrene, polyurethane or phenolic resin. The floor shall be suitably strengthened where the fan is located. The steel base frames shall have additional cross members for strengthening at critical positions where equipment is placed. The proposed system shall be approved by the Engineer. The units shall be sealed air-tight in accordance with high pressure duct standards. The AHU casings shall be able to withstand the full positive or negative no flow pressure of the fan. The AHU shall be individually pressure tested on site to establish the air tightness thereof.

Filter mounting frames shall be sufficiently rigid to withstand a pressure differential equivalent to the filter bursting pressure, without distortion.

Access doors shall be suitable for the removal of the largest component from the AHU's. Access doors shall be hinged and shall have lockable cam-lock door handles and shall open in a direction such that the fan pressure holds the doors closed. Door handles shall have a marked indication of opening and closing direction and all handles shall operate the same.

Provision shall be made for a fresh air intake of suitable size to allow 2,100 m³/h outside air into the AHU, upstream of the primary filter bank. The intake shall be fitted with a manually adjustable, opposed blade damper.

The AHU shall be fitted with a DX type cooling/heating coil capable of providing a minimum of 86kW sensible cooling capacity. The AHU can be fitted with integral condenser and compressor/s or external condenser & LEV kit from a reputable supplier.

All filters shall be fitted with a magnehelic gauge of suitable range for the application, clearly indicating filter washing/replacing ranges. Gauges shall be housed in weatherproof enclosures. All gauges shall be supplied with a valid calibration certificate.

16.2. DAMPERS

EG01 shall be fitted with a motorised, opposed blade damper to regulate the secondary enclosure pressure around a setpoint as indicated in [1]

DA2 and AP820-145 shall be a motorised, opposed blade low leakage damper to fail into the position as indicated in [1]

DA6 shall be a manually adjustable opposed blade damper fitted within the control room wall.

DA7,8,9 & 10 shall be a manually adjustable opposed blade damper fitted within the AHU ducting.

Dampers indicated ad BD shall be butterfly type manually adjustable dampers.

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16.3. SUPPLY AIR GRILLES

All supply air grilles shall be of the adjustable double deflection type, complete with manually adjustable opposed blade dampers from a reputable manufacturer.

16.4. RETURN AIR GRILLES

All return air grilles shall be of the horizontally fixed blade type, complete with manually adjustable opposed blade dampers from a reputable manufacturer.

16.5. FANS

16.5.1. AHU Fan

The AHU fan shall be a high-efficiency plug fan (EC motor preferred) or centrifugal fan with variable speed drive. The duty point of the fan shall be 17,100 m³/h at 250 Pa external static pressure. The fan shall be selected within 5% of the maximum efficiency as indicated on the supplier's literature. The design pressure shall be achieved at 85% of the maximum fan r.p.m. as indicated on the manufacture's fan curves. Fans, excluding EC plug fans, shall be mounted on anti-vibration spring mountings. Centrifugal fans shall be fitted with fan discharge protection screens, inlet protection screens and all belt drives shall be fitted with belt guards. The fan discharge protection shall incorporate a deflector to prevent high velocity air impinging on the filters. Fan belts shall be positioned on the same side as the access doors for easy maintenance. Fans and motors which are exposed to ambient conditions shall be weatherproof.

16.5.2. Process Off-gas Fan

The process off-gas fan shall consist of a variable speed driven, single fan, installed, downstream of the HEPA filter housing.

The fan duty shall be 1 800m³/h at 2 500Pa at an altitude of 1350 meters above sea level and a temperature of 40°C. The fan shall be selected within 5% of the maximum efficiency as indicated on the supplier's literature. The design pressure shall be achieved at 85% of the maximum fan r.p.m. as indicated on the manufacture's fan curves. The fan shall be a direct or belt drive, floor standing, gas tight, single inlet, backward or forward curved centrifugal fans. Fan motors, pulleys, bearings and belts shall not be located within the airstream.

The fans shall be skid-mounted, complete with anti-vibration mountings and constructed from mild steel with continuously welded seams and shall be gas tight, with painted or galvanised finish. Suitable belt guards shall be installed if applicable.

The fan shall be selected for continuous operation.

16.6. PRE/PRIMARY FILTERS

All pre-filters supplied shall be supplied by a reputable manufacturer holding a valid ISO 9001 certificate. Filter case shall be constructed as a minimum from galvanised sheet steel with an external dimension of 595mm x 595mm.

Faces of the filter case shall be flat and parallel to within a total allowance of 5 mm. The filter case shall be square to within a total allowance of 10 mm when measured diagonally across the corners of both faces.

Gaskets shall be a closed cell, oil resistant, low swell, expanded cellular elastomer. The gasket shall be sealed to the filter frame to ensure no leak path is possible. The edge of the gasket shall not project

beyond the outside of the frame.

If gasket joints are required, they shall be formed in such a way as to eliminate leak paths through the joint. There shall be no more than four gasket joints per filter.

The filter element shall be a pleated element manufactured from non-woven synthetic fibres.

Filter media shall be tested in accordance with EN 779: 2012 and shall meet the requirements for a G4 classification.

Filters shall be packed in cartons with shock absorbing properties to prevent damage during shipping and handling.

Each filter shall be labelled clearly showing the following information as a minimum:

- Manufacturer's name or company logo
- Model Number
- Serial Number
- Manufacturing Batch Number
- Rated flow capacity
- Direction of air flow

At least one filter per batch shall be tested for resistance to air flow in accordance with ISO 9053 / DIN EN 29053 and a certificate to this effect shall be provided to Necsa for acceptance.

At least one filter per batch shall be tested in accordance with EN 779: 2012 providing proof of filter efficiency meeting G4 requirements and a certificate to this effect issued to Necsa for acceptance.

The test certificate shall at least include the following:

Model

Individual filter serial number and test result

Name and address of laboratory/facility

Name and address of client

Name and signature of person(s) who checked the results

Name and signature of person(s) that performed the test

16.7. SECONDARY FILTERS

The filter element shall be filter pockets manufactured from non-woven synthetic fibres. Filter media forming pockets shall be fully welded along all the edges.

Each filter shall have a minimum nominal volume flow rate of 3400 m³/h. Filter media shall be tested in accordance with EN 779: 2012 and shall meet the requirements for a F6 classification.

The filter case shall be constructed from plastic or corrosion resistant metal

The frame sides shall have returned edges of at least 10mm for extra strength and safety when handled.

Filter frames shall be square

The inside periphery of the enclosing frame shall be permanently bonded to the media pack with expanded urethane thus eliminating the possibility of air bypass..

The faces of the filter case shall be flat and parallel to within a total allowance of 5 mm. The filter case shall be square to within a total allowance of 5 mm when measured diagonally across the corners of both faces.

The acceptance criteria for the filters are:

- No structural damage shall be evident by visual examination.
- Test certificate indicating resistance to air flow of at least one filter per manufactured batch
- Test certificate indicating filter efficiency of at least one filter per manufactured batch
- The filter shall be free from foreign matter (dirt, oil or viscous material) and damage such as distorted or cracked frame, deformation or sagging of media, cracks in adhesive and cracks or holes in exposed portions of the media.

Each filter shall be labelled clearly showing the following information as a minimum:

- Manufacturer's name or company logo
- Model Number
- Serial Number
- Manufacturing Batch Number

- Rated flow capacity
- Direction of air flow

At least one filter per batch shall be tested for resistance to air flow in accordance with ISO 9053 / DIN EN 29053 and a certificate to this effect shall be provided to NTP for acceptance.

At least one filter per batch shall be tested in accordance with EN 779: 2012 providing proof of filter efficiency meeting F6 requirements and a certificate to this effect issued to NTP for acceptance.

The test certificate shall at least include the following:

- Model
- Individual filter serial number and test result
- Name and address of laboratory/facility
- Name and address of client
- Name and signature of person(s) who checked the results
- Name and signature of person(s) that performed the test

16.8. HEPA FILTERS

HEPA filters shall have a minimum efficiency of 99.995% (H14) in accordance with EN1822 and shall be readily commercially available off the shelf. Dimensions of HEPA filters shall be 610mm x 610mm x 295mm.

All HEPA filters supplied shall be supplied by a reputable manufacturer holding a valid ISO 9001 certificate.

All filters shall be individually tested after manufacturing, and an inspection and test certificate (Certificate of Filter Efficiency) shall be provided.

The test certificate shall at least include the following:

- Model
- Individual filter serial number and test result
- Name and address of laboratory/facility
- Name and address of client
- Name and signature of person(s) who checked the results
- Name and signature of person(s) that performed the test

Filter casings shall be constructed from galvanised sheet steel or powder coated sheet steel.

The faces of the filter case shall be flat and parallel to within a total allowance of 1.6 mm. The filter case shall be square to within a total allowance of 3 mm when measured diagonally across the corners of both faces.

The filter casing shall have a dimensional tolerance of +0, -3 mm on outside dimensions and +1.6, -0 mm on the filter depth dimensions. These tolerances are taken excluding gaskets.

All filter case joints shall be sealed.

Filter gaskets shall be a closed cell, oil resistant, low swell, expanded cellular elastomer which deflects 25 % in height under a compression force of between 0.6 kg/cm² to 1.2 kg/cm² (Grade 2C3 and 2C4 in accordance with ASTM D 1056)

The gasket shall be sealed to the filter frame. The edge of the gasket shall not project beyond the outside of the frame.

If gasket joints are required, they shall be notched or dovetailed and the edges glued in a manner that assures no leakage. There shall be no more than four gasket joints per HEPA filter.

After installation of the HEPA filters an in-place filter test shall be conducted to verify the installation meet or exceed the filter efficiency specified.

Filters supplied shall be free from contamination, thick or thin spots, wrinkles and damage, such as tears, cracks, holes, abrasions and punctures.

There shall be no more than one splice in the filter pack and no patches shall be allowed.

Filters shall be individually packed. Cartons shall have shock absorbing properties. Filters shall be packed with pleats in a vertical position and packaging material marked accordingly for proper identification.

Stacking of filters more than three high shall not be acceptable.

Labelling of each filter shall be on the top of the filter when the pleats are vertical, of such size and legibility that it can be read at a distance of 0.9 m. As a minimum the following information shall be provided:

- Manufacturer's name or company logo
- Model Number
- Serial Number
- Rated flow capacity
- Direction of air flow for penetration and pressure drop test
- Pressure drop in Pa at rated flow
- Overall penetration or efficiency at rated flow

Labelling of each carton containing one filter shall be of such a size and legibility that it can be read at a distance of 0.9 m.

As a minimum the following information shall be provided:

- Manufacturer's name or company logo
- Arrows and "THIS SIDE UP" indicating orientation for shipping and storage and "FRAGILE" in clearly visible letters
- Filter model and number

16.9. SAFE CHANGE FILTER HOUSING

The quantity of safe change filter housings shall be determined by the filtration equipment selected by the ventilation contractor and in line with the filter manufacturer's maximum air flow volume. Safe change filter housings to be supplied and installed, each with pre- filter sections to house a F9 secondary filters and main sections to house a HEPA filter as specified above.

Filter housing shall be a safe change (Bag-In Bag-Out) type filter housing.

Filter housings shall be installed with a tapered plenum at the top and bottom to combine all individual housings together for connection to the ducting.

A suitable support structure shall be provided to ensure level placement as well as possible elevation required for the connection of the exhaust duct and connection with the exhaust fan.

The housings shall be manufactured from 2mm minimum, epoxy coated mild steel. Proof of airtightness of the housing shall be supplied against a recognised test method such as ISO 10648-2 or others.

Filter clamping devices shall be manufactured from stainless steel and shall be of the cam lock type only.

Sub-frames manually tightened by bolts to keep the filters in place shall not be acceptable.

The Filter housing shall be manufactured in accordance with an approved quality management system such as ISO 9001, ASME NQA-1 and shall conform to standards such as ASME AG-1 or AESS 30.

The filter housing shall be supplied with all accessories included but not limited to rubber ring as well as pre and main filter change bags. A total of three complete sets (enough to service all installed HEPA filter housings) of rubber rings and filter change bags shall be supplied.

16.10. DUCTING

All ducting shall be earthed to prevent static electricity build-up. It shall be the responsibility of the HVAC contractor to supply and install ducting support work to all ducting installed.

16.10.1. AHU ducting

All ducting (supply and return) shall be insulated, double skinned metal ductwork the requirements of SANS 1238-1979 medium pressure duct standards. Duct dimensions specified are internal dimensions.

Ducting layout as per [3] is indicative for tender purposes only. Shop drawings and manufacturing shall be done after taking site conditions and measurements into consideration.

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All ducting shall be tested in accordance with SANS10173.

16.10.2. Process off-gas ducting

Process off-gas ducting shall be round polypropylene ducting of the size and quantity as specified in the bills of quantity. It shall be the responsibility of the contractor to take final site measurements for quantifying the total length of ducting required.

Welders performing welding work on Polyethylene (PE), Polypropylene (PP), Polyvinylchloride (PVC), Polyvinylidene fluoride (PVDF) and Ethylene-chlorotrifluoroethylene (E-CTFE) shall produce proof of a valid and up to date, accredited qualification to perform such welding operation from a certified body such as the Plastic Federation of South Africa (PFSA).

All thermoplastic welding work shall be performed in accordance with the relevant SANS 10268 standard.

All materials supplied shall as a minimum be approved by the South African Plastic Pipe Manufacturers Association (SAPPMA) or similar accredited international organisation.

BILLS OF QUANTITIES

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Preambles

- a) These bills of quantities contain pages numbered consecutively in each bill as indicated in the index. Before the tenderer submits his tender he should check the number of pages, and if any are found missing or duplicated or the figures or writing indistinct, or the bills of quantities contain any obvious errors, he should apply to Necsa at once and have same rectified, as no liability whatsoever will be admitted by Necsa in respect of errors in tender due to the foregoing.
- b) The bills of quantities form part of and must be read in conjunction with the specifications and drawings which contain the full description of the work to be done and material and equipment to be used.
- c) Tenders shall be submitted for initial consideration on the declaration of the total value of the bills. The fully priced and completed bills will be submitted with the tenders.
- d) The total tender sum in the tender form shall constitute the contract price of the successful tenderer. Tenderers are advised to check their item extensions and total additions, as no claim for arithmetical errors will be considered.
- e) No alteration, erasure or addition is to be made in the text of the bills of quantities. Should any alteration, erasure or addition be made, it will not be recognized but the original wording of the bills of quantities will be adhered to.
- f) The priced bills of quantities of the successful tenderer will be checked and Necsa reserves the right to call for reasonable adjustments to any individual price and to rectify any discrepancy whilst the total tender price, as submitted, remains unaltered.
- g) The responsibility for the accuracy of the quantities written into the bills remains with the party who prepared the bills. The tenderer shall be relieved of responsibility of measuring quantities at the tender stage, and the tender submitted shall be in respect of the quantities set out in the bills, although he will be required to make his assessment of items such as fixings, etc from details stated in the bills and shall include in the item prices for such small installation materials as are required for the complete installation in accordance with the specification.
- h) The contractor and the employer or his agent may agree that the total of any bill(s), including any variations by way of additions there to or deductions there from, represents a fair and accurate quantification of the items set out in the bills and the parties may agree final payment on that basis. In the event any dispute as to the quantities, then the disputed item(s) shall be adjusted where necessary.
- i) The quantities in these bills of quantities are not to be used for ordering purposes.
- j) Variations in the scope and extent of the work included in the bills shall be allowed to meet the employers' requirements. The rules governing the extent and valuation of variations shall be those provided for in the conditions of contract.
- k) Unless separate rates for the supply and for the installation of any item is specifically called for, the supply and installation costs of any items shall be fully included in the unit price. The description of each item shall, unless otherwise stated herein, be held to include making, conveying and delivering, unloading, storing, unpacking, hosting, setting, fitting and fixing in position, cutting and waste, patterns, models and templates, plant, temporary works, return of packing, establishment charges, profit and all other obligations arising out of the conditions of contract.
- l) All provisional sums shall be expended as directed by Necsa and any balance remaining shall be deducted from the amount of the contract sum.

WSRF Ventilation System

1. Preliminaries & General

Item	Description	Unit	QTY	Unit Price	Total
1.1	Preparing and keeping to date of the manufacturing drawings up to and including the as built drawings inclusive of all duplicating of drawings as required.	Item	1		
1.2	Operating and maintenance manuals inclusive of duplicating Commissioning of the new installation	Item	1		
1.3	Training of the maintenance staff in the operation of the new installation	Item	1		
1.4	One-year guarantee of the new installation	Item	1		
1.5	Scaffolding	Item	1		
1.6	Rigging & Crane Hire	Item	1		
1.7	Occupational Health & Safety	Item	1		
1.8	Engineering (Detailed Design & Equipment Selection)	Item	1		
1.9	Training of Personnel – Necsa Specific Courses such as: Scaffolding Erector Scaffold Awareness Safety Harness Training First Aid Officer Necsa Orientation Compulsory Training – Emergency, Waste Management, PDO induction	PC	1	R25000	R25000
1.10	Breaking of openings in walls for grilles & ducting inclusive of make good	Item	1		
1.11	Removal of existing HVAC equipment & handover to Necsa	Item	1		
1.12	Other P&G Items (List in Cover Letter)	Item	1		
Sub-total Preliminaries & General, to be carried over to Summary					

2. Air-Handling Unit 1

Item	Description	Unit	QTY	Unit Price	Total
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2.1	Supply install & commission AHU as per Item 16.1	Item	1		
2.2	Steel reinforced concrete plinth, 100mm minimum thickness for all floor standing exterior HVAC equipment. Drawings to be supplied as per 7.2	Item	1		
2.3	Fire signal Interface	Item	1		
2.4	COC for electrical installation	Item	1		
Sub-total Air-Handling Unit 1, to be carried over to Summary					

3. Control system					
Item	Description	Unit	QTY	Unit Price	Total
3.1	Complete control system inclusive of wiring, instrumentation and controller/PLC to establish controls as per [1]	Item	1		
Sub-total Control system, to be carried over to Summary					

4. Dampers & Grilles					
Item	Description	Unit	QTY	Unit Price	Total
4.1	DA8 & 9: 600 x 400, manually adjustable OBD	Item	2		
4.2	DA 10: 900 x 400, manually adjustable OBD	Item	1		
4.3	DA 2: 200 x 200, actuated low leakage OBD	Item	1		
4.4	AP820-145: actuated low leakage OBD	Item	1		
4.5	DA 6: 200 x 200, manually adjustable OBD	Item	1		
4.6	BD: Ø50mm Polypropylene butterfly damper	Item	3		
4.7	DA7: 850 x 850 manually adjustable OBD	Item	1		
4.8	SG02: 1000 x 1000 double deflection supply air grille	Item	2		
4.9	SG01: 1500 x 1000 double deflection supply air grille	Item	1		

4.10	SG03: 350 x 100 double deflection supply air grille complete with OBD	Item	1		
4.11	SG04: 300 x 200 double deflection supply air grille complete with OBD	Item	2		
4.12	EG 01: 500 x 250 fixed blade exhaust air grill, complete with OBD	Item	1		
4.13	RG01: 10200 x 1200 fixed blade exhaust air grill, complete with OBD	Item	1		
Sub-total Dampers & Grilles, to be carried over to Summary					

5. Filters					
Item	Description	Unit	QTY	Unit Price	Total
5.1	Complete set of Pre-Filters for AHU1 complete with certification.	Set	3		
5.2	Complete set of Secondary Filters for AHU1 complete with certification.	Set	3		
5.3	Complete set of HEPA Filters for AHU1 complete with certification.	Set	3		
5.4	Complete set of Secondary Filters for AHU1 complete with certification.	Set	3		
5.5	Complete set of HEPA Filters for AHU1 complete with certification.	Set	3		
Sub-total Filters, to be carried over to Summary					

6. Safe Change Filter Housing					
Item	Description	Unit	QTY	Unit Price	Total
6.1	Safe change filter bank housing as described in Item 16.9 complete with secondary and HEPA filters	Item	2		
6.2	Certification, testing & compliance documentation as per Item 16.9	Item	1		
6.3	Filter Differential pressure indicating complete with calibration certification for pressure gauges.	Item	1		
6.4	Complete set of rubber rings and filter change bags for each filter bank	sets	3		
Sub-total Safe Change Filter Housing, to be carried over to Summary					

7. Galvanised Ducting as per 16.10.1

Item	Description	Unit	QTY	Unit Price	Total
7.1	AHU1 to 800 x 1000 transformation piece	Item	1		
7.2	800 x 800 ducting	m	10		
7.3	800 x 800 90° Bend	Item	5		
7.4	850 x 850 Ducting	m	15		
7.5	1 200 x 1 200 90° Bend	Item	1		
7.6	1 200 x 1 200 Plenum	Item	1		
7.7	1 200 x 1 200 to 850 x 850 transformation piece	Item	1		
7.8	AHU1 to 850 x 850 transformation piece	Item	1		
7.9	600 x 400 shoe	Item	2		
7.10	900 x 400 shoe	Item	1		
7.11	1 000 x 1 000 x 300 plenum	Item	2		
7.12	1 500 x 1 000 x 300 plenum	Item	1		
7.13	200 x 200 ducting	m	3		
7.14	200 x 200 shoe	Item	1		
7.15	100 x 150 ducting	m	8		
7.16	100 x 150 shoe	Item	1		
7.17	100 x 150 90° bend	Item	1		
Sub-total Galvanised Ducting, to be carried over to Summary					

8. Polypropylene Ducting as per 16.10.2

Item	Description	Unit	QTY	Unit Price	Total
8.1	Ø 350 ducting	m	150		
8.2	Ø 350 90° Bend	Item	15		
8.3	Ø 350 to BIBA filter housing transformation piece	Item	2		
8.4	Ø 350 to fan transformation piece	Item	2		
8.5	Provisional Sum – Building exhaust ducting modifications	Item	1	R50 000-00	R50 000-00
Sub-total Polypropylene Ducting, to be carried over to Summary					

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2	Air-Handling Unit 1	
3	Control System	
4	Dampers & Grilles	
5	Filters	
6	Safe Change Filter Housing	
7	Galvanised Ducting	
8	Polypropylene Ducting	
9	Contingency Provision – to be expended only as directed by Necsa and any balance remaining shall be deducted from the amount of the contract sum.	R150 000-00
Sub-Total		
Vat		
Total		

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17. REVISION HISTORY

This document has been revised in accordance with the following schedule:

Rev. No.	Date approved	Nature of Revision	Prepared
1.0	See title page	First issue.	J. Cronje

Annexure 1:

Terms and Conditions of Contract

THE SOUTH AFRICAN NUCLEAR ENERGY
CORPORATION SOC LTD

TERMS AND CONDITIONS OF CONTRACT

June 2017

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TERMS AND CONDITIONS OF CONTRACT

These TERMS AND CONDITIONS OF CONTRACT are applicable to all bids, contracts and orders issued by the South African Nuclear Energy Corporation to service providers for the supply of goods or works or rendering of services

1. DEFINITIONS AND INTERPRETATION

- 1.1 Clause headings in this *Agreement* are for convenience and reference purposes only and shall not affect the interpretation of the Agreement.
- 1.2 Where the context requires words implying the singular only shall also include the plural and vice versa and words signifying one gender shall signify all genders.
- 1.3 In this *Agreement* the following words and expressions shall have the meanings hereby assigned to them except where the context otherwise requires:
 - 1.3.1 **“Agreement”** means these Terms and Conditions of Contract including all attachments and appendices hereto and all documents incorporated by reference therein and, where applicable, special conditions of contract.
 - 1.3.2 **“Bid Documents”** means Bid Specification, Request for Proposal, Request for Quotation documents, or any other document, used by NECSA to solicit the supply of goods or works or services.
 - 1.3.3 **“Fees”** means the contract price(s) as set out in the Pricing Schedule, attached as Annexure “E” in the accompanying SLA, which are payable to the Service Provider under this Agreement for the full and proper performance of the Service Provider’s contractual obligations.
 - 1.3.4 **“Order”** means an official written Purchase Order issued for the supply of goods or works or for the rendering of a service. A copy of the Order must be attached in the accompanying SLA as Annexure “C”.
 - 1.3.5 **“The South African Nuclear Energy Corporation SOC Ltd”** hereinafter referred to as NECSA
 - 1.3.6 **“NECSA Data”** means information, reports or data and related matter, whether of a confidential or proprietary nature or not, belonging to NECSA or in the possession, or under the control of NECSA provided by NECSA to Service Provider pursuant to the Service Provider providing the Services.
 - 1.3.7 **“Party”** means either NECSA or the Service Provider and **“Parties”** means NECSA and the Service Provider jointly.
 - 1.3.8 **“Project Plan and Schedule of Deliverables”** means a document addressing how and when the Services are to be achieved by showing activities to be performed, the deliverables to be achieved and the milestones/timelines to achieve the deliverables, attached in the accompanying SLA as Annexure “B”.

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1.3.9 **“Proposal”** means a document, in the form of a business proposal, quotation or other document, setting out the Service Provider’s proposed course of action or plan, with proposed solutions to address the Service needs of NECSA and the resources required, in response to the Bid Documents, attached hereto as Annexure “A” (or where Proposal is voluminous, sufficiently referenced in Annexure “A”).

1.3.10 **“Service Level Agreement or SLA”** means the special conditions of contract entered into by the Parties to address specific conditions applicable to specific *Services* with the purpose of either amplifying or amending these Terms and Conditions of Contract.

1.3.11 **“Services”** means those functional services ancillary and incidental to the supply of goods, works or rendering of services and other such obligations of the Service Provider covered under this Agreement or any document purporting to engage the professional services of the Service Provider.

1.3.12 **“Service Provider”** means a service provider, consultant or contractor engaged by NECSA to supply goods or works or render services.

1.3.13 **“Service Provider’s Intellectual Property/Technology”** means know-how, techniques, concepts, ideas, methods, methodologies, procedures, models, processes, templates; generalised features of the structure, sequence and organisation of software, user interfaces and screen designs; general purpose consulting and software tools, utilities and routines and logic, coherence and methods of operation systems, created or acquired by the Service Provider or where the Service Provider otherwise obtained rights in.

1.4 All terms referred to or defined in the Service Level Agreement shall have the meanings assigned to them therein.

1.5 Any reference to days, months or years shall be a reference to calendar days, months or years as the case may be.

2. APPLICATION

2.1. These Terms and Conditions of Contract are applicable to all bids, contracts and orders issued by NECSA to service providers for the supply of goods or works or rendering of services.

2.2. Where applicable, Service Level Agreements may be provided to address specific *Services*. Such SLA shall, by reference therein, incorporate these Terms and Conditions of Contract.

2.3. Where there is a conflict between the provisions of such Service Level Agreement and the provisions of these Terms and Conditions of Contract, the Service Level Agreement shall, to the extent of the conflicting provisions, supersede these Terms and Conditions of Contract.

3. AGENCY

This Agreement does not constitute either of the Parties as the agent of the other for any purposes whatsoever and neither party will be entitled to act on behalf of, or to represent the other unless duly

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authorised thereto in writing.

4. ASSIGNMENT

Neither Party may assign, transfer, subcontract or otherwise part with this Agreement or any part thereof or any right or obligation there under, without obtaining the other Party's prior written consent thereto.

5. SUBCONTRACTING

In the event of subcontracting any of the work the *Service Provider* shall give preference to Black Empowerment Companies as subcontractors. The *Service Provider* shall notify NECSA in writing of all subcontracts awarded under the *Agreement* if not already specified in the *Bid Documents*. Such notification, in the *Bid Documents* or later, shall not relieve the *Service Provider* from any liability of obligation under the *Agreement*.

6. INDEMNITY AND LIMITATION OF LIABILITY

- 6.1. The *Service Provider* hereby indemnifies NECSA and undertakes to hold NECSA harmless against all loss or damage, from any cause arising, which the *Service Provider* and/or its employees may sustain as a result of the performance of the *Services* under this *Agreement*.
- 6.2. The *Service Provider* indemnifies NECSA against all third-party claims of infringement of patent, trademark or industrial design rights arising from use of the goods, works or rendered services or any part thereof by NECSA.
- 6.3. The *Service Provider* further indemnifies NECSA against any loss, damage, expenses, legal costs, including attorneys and own client costs, which NECSA may incur as a result of the *Service Provider's* breach of any of the warranties and representations as may have been provided.
- 6.4. Except in cases of criminal, negligence or wilful misconduct, neither *Party* shall be liable to the other, whether in contract, tort or otherwise, for any indirect or consequential loss or damage in any way arising out of or in connection with this *Agreement*.

7. INSURANCE

- 7.1. The goods supplied under the contract shall be fully insured in a freely convertible currency against loss or damage incidental to manufacture or acquisition, transportation, storage and delivery in the manner specified in the Service Level Agreement.
- 7.2. Each *Party* hereby accepts its own legal liabilities resulting from its culpable actions and shall ensure that it has sufficient insurance cover to cover its liabilities so arising.

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8. FEES AND PAYMENT TERMS

- 8.1. Subject to the provisions of clause 11 (Penalties), where applicable, NECSA shall pay the *Service Provider Fees* as set out in the Pricing Schedule in the manner specified in the SLA as an Annexure "E" for full and complete performance of the *Services*.
- 8.2. NECSA shall pay the *Fees* only after the *Services* have been fully performed and completed and the reports/deliverables as per Annexure "B" concerning the performance and completion of such *Services* have been accepted in accordance with the provisions of clause 9 (Reports/Deliverables).
- 8.3. The *Service Provider* shall submit a monthly statement no later than the last day of the month, along with an original invoice and associated documents, in a format acceptable to NECSA, for the *Fees* due after completion and acceptance of the deliverables.
- 8.4. If the documents mentioned in 8.3 are correct, payments shall be effected within thirty (30) days after date of statement. All payments will be made by NECSA only through electronic bank transfer into a banking account nominated by the *Service Provider*.
- 8.5. Where travel, accommodation and disbursement expenses are not included in the *Fees* and NECSA has agreed to reimburse the *Service Provider* for reasonable expenses incurred, the *Service Provider* shall, in accordance with, and subject to, the provisions of 8.3 submit an invoice for payment of such expenses.
- 8.6. Where deemed necessary, Necsa shall be entitles to a Retention Fee of 10% of the contract value. Such fees will be paid to the Service Provider within three (3) months of receipt of all Goods and/or Services and the issue of a certificate of acceptance.
- 8.7. Should the Service Provider render services and be entitled to labour costs for installation or erection on a recovery basis, a monthly statement shall be provided to Necsa no later than the last day of the month and Necsa will, if the statement is correct, effect payment within thirty (30) days. Should the monthly statement be in error, Necsa will be entitled to make the adjustment at the next payment or on payment of the retention fees.

9. REPORTS/DELIVERABLES

- 9.1. Where the carrying out of the *Services* requires reports to be submitted as deliverables, interim and final reports in connection therewith must be furnished to NECSA at its *domicilium*, within the stages set out by the *Parties* and attached as a Schedule in the Service Level Agreement.
- 9.2. Acceptance of Reports/Deliverables:
 - 9.2.1. NECSA shall have a period of **seven (7) days** (the "**Evaluation Period**") after furnishing of the Reports/Deliverables, or any part thereof provided in stages in accordance with the agreed to Schedule, to verify that such Reports/Deliverables, or part thereof, conform in all material respects with NECSA requirements.

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9.2.2. Should there be a non-conformity with NECSA requirements, NECSA must notify the *Service Provider*, in writing, prior to the expiration of the relevant Evaluation Period that such Reports/Deliverables, or part thereof, fail in any material respect to conform with such specifications (a "**Nonconformity**"), the *Service Provider* shall, at its expense, promptly correct such

*Nonconformity, whereupon NECSA shall receive an additional **seven (7) day period** ("the **Verification Period**") commencing upon NECSA's receipt of the corrected Reports/Deliverables, or part thereof, to verify that the previously reported Nonconformity has been corrected.*

9.2.3. NECSA shall provide the *Service Provider* with such assistance as the *Service Provider* may reasonably require to enable the *Service Provider* to verify the existence of, and correct, a reported Nonconformity.

9.2.4. Should NECSA not inform the *Service Provider* of its acceptance of the Report/Deliverables, NECSA agrees that the Reports/Deliverables, or any part thereof, which has been provided to NECSA shall be deemed accepted by NECSA upon the expiration of the Evaluation Period or, in the event that NECSA has notified the *Service Provider* of a Nonconformity as provided above, upon expiration of the relevant Verification Period.

9.2.5. Upon full and final payment to the *Service Provider* of amounts due to the *Service Provider* for fully performed and completed *Services* and accepted Reports/Deliverables, all Reports/Deliverables shall, subject to the provisions of clause 17 (Ownership and Intellectual Property), become the property of NECSA .

10. CONTRACT AMENDMENTS

No variation in or modification of the terms of the contract shall be made except by written amendment signed by the parties concerned.

11. PENALTIES

If the Service Provider fails to deliver any or all of the deliverable(s) or to perform the Services within the period(s) specified in this Agreement, NECSA shall, without prejudice to its other remedies under this Agreement, deduct from the Fees, as a penalty, a sum calculated in accordance with a formula specified in the Penalty Formula attached hereto as Annexure "D" of the Service Level Agreement, for each day of the delay until actual delivery or performance. NECSA may also consider termination of the contract pursuant to clause 19 (Breach of Agreement).

12. IMPOSSIBILITY OF PERFORMANCE

12.1. In the event of a failure or delay in performance by either *Party* arising from a cause beyond its reasonable control or unforeseeable with reasonable foresight at the time of execution of this

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Agreement, such failure or delay shall not be deemed to be a breach of the Agreement.

- 12.2. If either *Party* is affected by such failure or delay, it shall give to the other *Party* notice in writing thereof within five (5) days after its existence has manifested. A *Party* shall be entitled to rely on the provisions of clause 12.1 above only if it has given such notice.
- 12.3. Should either *Party*, after having given the notice in clause 12.2, be unable to rectify its impossibility of performance within fourteen (14) days of the occurrence thereof, the other *Party* may cancel this *Agreement* without any further notice.

13. PROJECT PLAN AND VARIATION

- 13.1. The *Services* shall be completed in accordance with the stages/phases set out in the Project Plan and Schedule of Deliverables attached hereto in the SLA as Annexure "B".
- 13.2. If, however, there arises a need to vary and/or add the *Services* and the Project Plan and Schedule of Deliverables as a result of matters, circumstances and/or necessary additional procedures that were not reasonably foreseen at the onset or if there are delays in obtaining the required documentation and there arises a need to vary and/or extend the delivery time frames, either *Party* will notify the other in writing, as soon as they become aware of this fact and the *Parties* shall agree on the variation of the Project Plan and Schedule of Deliverables and, where applicable, *Fees*.

14. DELAYS IN THE SERVICE PROVIDER'S PERFORMANCE

Notwithstanding the provisions of clauses 12 (Impossibility of Performance), 13 (Variation of Project Plan) and 19 (Breach of Agreement), in the event of a delay in the Service Provider's performance beyond the essential delivery time period, NECSA shall, without cancelling the Agreement, be entitled to obtain the services of another service provider at the Service Provider's expense or to cancel the Agreement and procure the services of another service provider as may be required to complete the Agreement and without prejudice to NECSA 's other rights.

15. FORCE MAJEURE

Neither Party shall be liable, whether direct or consequential, to fulfil its obligations in terms of this Agreement if such failure is caused by any circumstance or event beyond the reasonable control of such Party which shall without limitation include any act of God, riot, strike action, civil commotion, war, civil war, public disorder, any form of labour disturbances, acts of terrorism, insurrection, rebellion or revolution and/or any other event or activity beyond their reasonable control.

16. CONFIDENTIALITY

- 16.1. It is envisaged that pursuant to this *Agreement* information, reports or data and related matter,

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whether of a confidential or proprietary nature or not, belonging to either *Party* may be disclosed or otherwise become available to the other *Party*. Each *Party* agrees to:

- 16.1.1. Accept such information, reports or data and related matter in confidence and not to copy, disclose, reproduce or make such information, reports or data and related matter available to any third party, unless authorised thereto in writing by the other *Party*, and
- 16.1.2. Use such information, reports or data and related matter solely in connection with the performance of its obligations in terms of this *Agreement*, and
- 16.1.3. Restrict the use of such information, reports or data and related matter exclusively to the purpose directed by the other *Party*.
- 16.1.4. The *Service Provider* undertakes, upon signing hereof, to ensure that all its Employees or agents (as the case may be) who may be privy to any information, reports, data and related matter, process or any other information whatsoever emanating from this process, are well informed and aware of the contents and legal implications of Section 51 of Nuclear Energy Act, 1999 (Act No. 47 of 1999) and have signed confidentiality agreements to hold *NECSA* information in confidence.

16.2. Use of contract documents and information; inspection:

- 16.2.1. The *Service Provider* shall not, without *NECSA*'s prior written consent, disclose the contract, or any provision thereof, or any specification, plan, drawing, pattern, sample, or information furnished by or on behalf of *NECSA* in connection therewith, to any person other than a person employed by the *Service Provider* in the performance of the contract. Disclosure to any such employed person shall be made in confidence and shall extend only so far as may be necessary for purposes of such performance.
- 16.2.2. The *Service Provider* shall not, without *NECSA*'s prior written consent, make use of any document or information mentioned in the *Service Level Agreement* except for purposes of performing the contract.
- 16.2.3. Any document, other than the contract itself shall remain the property of *NECSA* and shall be returned (all copies) to *NECSA* on completion of the *Service Provider*'s performance under the contract if so required by *NECSA*.
- 16.2.4. *NECSA* shall permit the *Service Provider* to inspect *NECSA*'s records relating to the performance of the *Service Provider* and to have them audited by auditors appointed by *NECSA* at its own cost, if so required by *NECSA*.

17. OWNERSHIP AND INTELLECTUAL PROPERTY

- 17.1. All *NECSA Data* and *Service Provider's Intellectual Property/Technology* and any other intellectual property rights, including but not limited to copyright, in and to the original material supplied by one *Party* to the other *Party* shall vest in the *Party* supplying the material.
- 17.2. Ownership in all *NECSA Data* belonging to *NECSA*, whether under its control or not, shall continue, to vest in *NECSA*, and the *Service Provider* shall not obtain any proprietary rights in such data. Any

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improvements to NECSA Data resulting from this Agreement shall remain the property of NECSA.

- 17.3. Where the *Service Provider* utilizes any of its property including the *Service Provider's Intellectual Property/Technology* in connection with the *Services* provided in terms of this Agreement, such property shall remain the property of the *Service Provider* and any improvements to the *Service Provider's Intellectual Property/Technology* resulting from this Agreement will remain the property of *Service Provider*.
- 17.4. The *Service Provider* warrants that no aspect of the *Service Provider's Intellectual Property/Technology* utilised by NECSA in terms of this Agreement will infringe any patent, design, copyright, trade secret or other proprietary right of any third party ("**third party proprietary rights**"), and the *Service Provider* shall, at its cost, defend NECSA against any claim that the use of the Deliverables infringe any such third party proprietary rights: Provided that NECSA gives prompt notice to the *Service Provider* of such claim, the *Service Provider* controls the defence thereof and NECSA does not jeopardise the claim in any way.
- 17.5. To the extent that there are any components of the *Service Provider's Intellectual Property/Technology* included in the Deliverables, the *Service Provider* grants to NECSA, a royalty-free, perpetual, non-exclusive, non-transferable licence to use such *Service Provider's Intellectual Property/Technology* solely in connection with such Deliverables.
- 17.6. In the event of NECSA requesting the use of any *Service Provider's Intellectual Property/Technology* outside the scope of this Agreement, this would be subject to the *Parties* agreeing to a written licence agreement for such use.

18. SETTLEMENT OF DISPUTES

- 18.1. If any dispute or difference of any kind whatsoever arises between the *Parties* in connection with or arising out of the Agreement, the *Parties* shall make every effort to resolve amicably such dispute or difference by mutual consultation. Either *Party* shall in writing notify the other of the dispute, providing the details of the dispute.
- 18.2. The dispute shall first be referred to the respective project managers of each *Party*, who must use their best endeavours to resolve the dispute within **seven (7) days** of the dispute having been referred to them, or such other time frame agreed between the *Parties*.
- 18.3. Should the project managers of the *Parties* be unable to resolve the dispute in accordance with the foregoing, the dispute shall be escalated to the respective executive managers/managing directors (or equivalent officers) of the *Parties*, who must use their best endeavours to resolve the dispute within **ten (10) days** of the dispute having been referred to them, or such other time frame agreed between the *Parties*.
- 18.4. Should it not be possible to settle a dispute by means of mutual consultation, then the *Parties* may exercise their rights afforded to them by law.

19. BREACH OF AGREEMENT

In the event of anyone of the *Parties* ("the Defaulting Party") committing a breach of any of the terms of this Agreement and failing to remedy such breach within a period of **seven (7) days** after receipt of a written

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notice from the other *Party* ("the Aggrieved Party") calling upon the Defaulting Party so to remedy, then the Aggrieved Party shall be entitled, at its sole discretion and without prejudice to any of its other rights in law, either to –

19.1. claim specific performance of the terms and of this *Agreement*; or

19.2. terminate this *Agreement* forthwith and without further notice, to claim and recover damages from the Defaulting Party.

20. TERMINATION FOR INSOLVENCY

Should either Party become bankrupt or otherwise insolvent, or commit an act of insolvency or in the event of any of the following circumstances:

20.1. Either *Party* being placed under judicial management whether provisionally or finally;

20.2. A judgment of any competent court being given against either *Party* which judgement is not satisfied within a period of fourteen (14) days from date of knowledge thereof by either *Party*, or no application to be made to a competent court to rescind such judgement within a period prescribed by the rules of the court:

either Party shall have the right without prejudice to any other rights or claims which it may have, to cancel and terminate this Agreement without notice.

21. NOTICES

The Parties choose the addresses set out in SLA as their domicilium citandi et executandi for all purposes under this Agreement, whether in respect of the service or delivery of court process, notices or other documents or all other communications. The Parties also choose the persons named in the SLA as their project managers and contact persons for the purpose of this Agreement. Any notice to be given or to be made for any purpose under this Agreement shall be in writing and shall:

21.1. If delivered to the addressee's physical address, be deemed to have been received when so delivered; or

21.2. If sent by registered post to the addressee's postal address, be deemed to have been received seven (7) days after it has been posted; or

21.3. If sent by facsimile, be deemed to have been received on the day on which it was sent; or

21.4. If sent by email, be deemed to have been received on transmission on the day on which a document was emailed.

21.5. Any of the *Parties* shall be entitled to change its respective *domicilium* and any other address, as the case may be, on **fourteen (14) days' notice** to the other, provided such address is within the Republic of South Africa.

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22. NON-SOLICITATION OF PERSONNEL

22.1. The *Parties* agree not to make any offer of employment or to employ any member of either *Party's* personnel working on the basis of this *Agreement*, either during the period of this *Agreement* or for a period of six (6) months after completion of the *Services* in terms of this *Agreement*. The *Parties* also agree not to use either *Party's* personnel as consultants, either independently or via a third party for the same period.

22.2. A breach of this condition will render the breaching *Party* liable to pay damages in an amount equal to six (6) month's salary of the relevant member of personnel, provided that such damages shall be calculated in respect of the six (6) month period prior to such member of personnel leaving the employ of non-breaching *Party*. The *Parties* agree that the aforementioned damages are fair, based on the damage the non-breaching *Party* is likely to suffer, and considering the difficulty in calculating the actual damages.

23. RELAXATION

No latitude, extension of time or other indulgence which may be given or allowed by any Party to the other Party in respect of the performance of any obligation hereunder, and no delay or forbearance in the enforcement of any right of any Party arising from this Agreement, and no single or partial exercise of any right by any Party under this Agreement, shall in any circumstances be construed to be an implied consent or election by such Party or operate as a waiver or a novation of or otherwise affect any of the Parties' rights in terms of or arising from this Agreement or stop or preclude any such Party from enforcing at any time and without notice, strict and punctual compliance with each and every provision or term hereof.

24. VALIDITY AND SEVERABILITY

24.1. If any provision of this *Agreement* is found or held to be invalid, unlawful, or unenforceable, such terms will be severable from the remaining terms.

24.2. The validity of all the other remaining provisions will not be affected and will continue to be valid and enforceable. If any invalid term is capable of amendment to render it valid, the *Parties* agree to negotiate an amendment to remove the invalidity.

25. VARIATION

No variation of or addition to this Agreement will be of any force or effect unless reduced to writing and signed by the Parties or their duly authorised representatives.

26. WARRANTIES

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- 26.1. The Service Provider warrants that the goods supplied under the contract are new, unused, of the most recent or current models, and that they incorporate all recent improvements in design and materials unless provided otherwise in the contract. The Service Provider further warrants that all goods supplied under this contract shall have no defect, arising from design, materials, or workmanship (except when the design and/or material is required by NECSA's specifications) or from any act or omission of the Service Provider, that may develop under normal use of the supplied goods in the conditions prevailing in the country of final destination.
- 26.2. This warranty shall remain valid for twelve (12) months after the goods, or any portion thereof as the case may be, have been delivered to and accepted at the final destination indicated in the contract, or for eighteen (18) months after the date of shipment from the port or place of loading in the source country, whichever period concludes earlier, unless specified otherwise in SLA.
- 26.3. NECSA shall promptly notify the Service Provider in writing of any claims arising under this warranty.
- 26.4. Upon receipt of such notice, the Service Provider shall, within the period specified in SLA and with all reasonable speed, repair or replace the defective goods or parts thereof, without costs to NECSA.
- 26.5. If the Service Provider, having been notified, fails to remedy the defect(s) within the period specified in SLA, NECSA may proceed to take such remedial action as may be necessary, at the Service Provider's risk and expense and without prejudice to any other rights which NECSA may have against the Service Provider under the contract.

27. APPLICABLE LAW

This Agreement shall in all respects be governed by and construed in accordance with the Laws of the Republic of South Africa and all disputes, actions and other matters in connection therewith shall be determined in accordance with such law.

28. GOVERNING LANGUAGE

The contract, all correspondence and other document pertaining to the Agreement that is exchanged by the Parties shall be written in English.

29. TAXES AND DUTIES

- 29.1. A foreign Service Provider shall be entirely responsible for all taxes, stamp duties, license fees, and other such levies imposed outside NECSA's country.
- 29.2. A local Service Provider shall be entirely responsible for all taxes, duties, license fees, etc., incurred until delivery of the contracted goods to NECSA.

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- 29.3. No contract shall be concluded with any bidder whose tax matters are not in order. Prior to the award of a bid the Department must be in possession of a tax clearance certificate, submitted by the bidder. This certificate must be an original issued by the South African Revenue Services.