



health

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Health
PROVINCE OF KWAZULU-NATAL

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Infrastructure Development

AMENDMENT

Date: 25 OCTOBER 2023	File No:
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SUBJECT: KZN CHILDRENS HOSPITAL - INSTALLATION OF NEW GENERATOR SET ZNB 5244-2023-H: SITE BRIEFING AMENDMENTS
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<u>Page Number</u>	<u>Item Number</u>	<u>Description Amendment</u>	<u>Comment</u>
67	T2.36 #2	All CVs to have TRACEABLE REFERENCES Wiremans Licence OR Master Installation Electrician will be accepted and must include proof of Qualifications and Certification of Wiremans Licence OR Installation Electrician	
112	2.3.1- 2.3.6	300kVA OUTDOOR CANOPY TYPE GENERATOR All construction material will be Grade 304 Stainless Steel	
112	2.3.9	SIM card can be loaded with 5GB per month OR 300GB once off	
112	2.3.10	Existing 60kVA to be decommissioned and relocated to Wentworth Hospital Strategic Spares Stores	
112	2.3.11	To be removed. Do not price for this item.	
112	2.3.12	Explanation: Breaker Panels 2 off: 1xbreaker panel within the LV plant room AND 1xbreaker panel on the control panel (mounted onto genset)	Quantity = 2 each
112	2.3.14	Allow for +-40m of cable ROUTE not total cable length	
113	2.3.21	Chromadeck carport/shadeport 120m2	Quantity = 120 Unit = Meter Squared
114	2.3.33	Should read: signage on generator and around generator and tank area.	
114	2.3.41	To be removed. Do not price for this item.	

Kind Regards,

J. Pillay

Electrical Engineer

eThekwini Management Hub

25 October 2023

Annexure 10:

**KZNCH - KWAZULU NATAL CHILDREN'S HOSPITAL
INSTALLATION OF NEW 300KVA STANDBY GENERATOR AND DIESEL TANK**

PROJECT SPECIFICATIONS

PROVINCE OF KWAZULU-NATAL
DEPARTMENT OF HEALTH

BID No. ZNB 5244/2023-H

KZNCH - KWAZULU NATAL CHILDREN'S HOSPITAL
INSTALLATION OF NEW 300KVA STANDBY GENERATOR AND DIESEL TANK

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PROVINCE OF KWAZULU-NATAL
DEPARTMENT OF HEALTH

BID No. ZNB 5244/2023-H
KZNCH - KWAZULU NATAL CHILDREN'S HOSPITAL
INSTALLATION OF NEW 300KVA STANDBY GENERATOR AND BULK DIESEL TANK
PART ONE

PROJECT SPECIFICATIONS

1 NOTES TO BIDDERS

- 1.1 The institutions will remain open and operational at all times therefore the Contractor shall make the necessary arrangements with the Institutional Management and maintenance staff for any power outages that are required. This may necessitate weekend work
- 1.1.2 All items to be priced fully inclusive of all charges e.g. labour, transport, scaffolding, materials, profit, etc., but excluding Value Added Tax.
- 1.1.3 The Administration reserves the right to negotiate prices in the Schedule of Prices.
- 1.1.4 All redundant material and rubble shall to be removed from the institution's property immediately. Material removed from site must have approval for site removal together with appropriate disposal certificate.
- 1.1.5 All equipment and materials used in this contract shall be that which is specified or approved prior to submission and closure of the bid.
- 1.1.6 The Contractor is advised to examine all the drawings (if any) and to visit the site prior to tendering to acquaint him/herself with the nature of the work to be done and access to the siting of the existing buildings etc., as no claim will be allowed on the grounds of ignorance of the conditions under which the work will be executed.
- 1.1.7 All items in the Schedule of Prices are **PROVISIONAL** and subject to re-measure after installation.
- 1.1.8 The Schedule of Prices shall be read in conjunction with the Scope of Work. Any discrepancies or omissions shall be brought to the attention of the Project Leader immediately.
- 1.1.9 **Preference will be given to Bidders who have registered offices / workshops within the borders of the Province of KwaZulu-Natal. This is in an effort to reduce response times to call outs for breakdowns in the more remote areas of the Province.**
- 1.1.10 **Only Contractors who are registered with a CIDB Grading of 4 EB OR 4 EP or higher shall be considered.**
- 1.2 **SCOPE OF CONTRACT**
- 1.2.1 The Scope of the Contract is contained in Part Three (Particular Specification) contained hereunder.

1.3 PERIOD OF CONTRACT

Nine (9) Months as the completion period for the Contract from the date of site handover.

1.4 SITE AND MODE OF PROCEDURE

The work contained in this contract will be carried out on the site of KZNCH - KWAZULU NATAL CHILDREN'S HOSPITAL eThekweni in the Province of KwaZulu-Natal.

Damage to the existing buildings - Bidders to note that any damages done or occurring to any of the buildings will be repaired at the expense of the contractor/ Bidder.

The work undertaken shall be to the satisfaction of the KwaZulu-Natal Department of Health.

1.5 SATISFACTORY INSTALLATION

All work shall be carried out according to the Department of Health's Standard Preambles to all Trades, the OHS Act, National Building Code of Practices and Regulations, the KZN DOH Policy Document for the Design of Electrical Installations and the SANS 10142-1 Wiring Code.

Copies of these documents are available from the office of the Manager, Infrastructure Development KwaZulu-Natal Department of Health, Townhill Office Park, 35 Hyslop Road, Pietermaritzburg and may be obtained on request.

BID No. ZNB 5244/2023-H
KZNCH - KWAZULU NATAL CHILDREN'S HOSPITAL
INSTALLATION OF NEW 300KVA STANDBY GENERATOR AND BULK DIESEL TANK

PART TWO

TECHNICAL SPECIFICATION

1. GENERAL: OUTDOOR CANOPY TYPE STANDBY GENERATOR

FAILURE TO COMPLETE THE SCHEDULE OF INFORMATION IN ITS ENTIRETY SHALL LEAD TO THE DISQUALIFICATION OF THE BID.

The standby generator set herein specified is to be installed at KZNCH - KWAZULU NATAL CHILDREN'S HOSPITAL located in eThekweni Health District. The ambient temperatures are 40°C maximum and 10°C minimum and +- 500m above mean sea level.

In order to best meet South Africa's employment targets, locally assembled generator sets will receive preference.

Due to the critical nature of this installation, ONLY genuine and accredited DIESEL GENERATOR SET MANUFACTURERS / ASSEMBLERS with Local 24 hour support and IN HOUSE maintenance facilities will be considered.

When pricing this document, allowance must be made for the installation to be carried out after hours and / or over a weekend at a time suitable to the KZN Department of Health's institution.

Prior to any shutdown it should be agreed with the Health Institution whether any temporary standby plant is required. Apart from this, downtime must be kept to a minimum and once an installation starts, it must be completed and commissioned without any interruptions.

The Tenderer must provide documented proof that they have the staff and capacity to carry out this type of installation. Including additional rotational staff on standby in the event of increased staff infection due to Covid19.

The whole of the installation shall be carried out in accordance with:

- The Department of Health Policy Document on the Design of Electrical Installations Revision 7 of 2013.
- All low voltage switchgear and control gear assemblies are to comply to SABS 1473 Part 1 - 1989 /IEC 439 - 1 1985.
- An Electrical Certificate of Compliance, in accordance with the SANS 10142-1 Wiring Code will be required for all Electrical Works.
- The Occupational Health and Safety Act and Regulations 85 of 1993.
- The Municipal By-laws and any special requirements of the Supply Authorities of the area or district concerned.
- Local Fire Regulations.
- National Building Regulations – SANS 10400 Part T
- The contractor should fully familiarise himself with these documents prior to quoting.

The Outdoor Sound Attenuated Canopy Type stand-alone standby generator set herein specified is to be installed at KZNCH - KZN CHILDREN'S HOSPITAL. The ambient temperatures are 40°C maximum and 10°C minimum and is approximately 20m above sea level. **Canopy to be tropical and not weatherproof.*

2. SCOPE OF CONTRACT

The contract comprises the design, manufacture, assembly, delivery to site, off-loading at site, installation, testing, commissioning and handing over in first class working order of a complete standby diesel generating set and all ancillary equipment necessary to comply with the requirements of this specification.

The plant generally shall comprise a diesel engine coupled to an alternator mounted on a common base, a set of starting batteries, automatic charging unit, interconnecting cables, a control panel housing the generator M.C.C.B. and all necessary switchgear, including the changeover equipment and on-load bypass switch, together with a fuel system, capable of running the set for **72 hours at full load**.

- Manufacture, supply and deliver a single 300 kVA prime, 400V, 50Hz, diesel standby generator set, with sound proof enclosure. Canopy (enclosure), Base tank & frame constructed with **Grade 304 Stainless Steel**. (Coastal area).
- Supply and deliver all the needed protection equipment, electrical panels, cables and terminations needed for the complete installation.
- Supply, deliver, install and commission LV Panel – including change-over & bypass switches, breakers, bus-bars and associated wiring
- Decommission, rig out, remove from site and provide **disposal certificate** for each:
 - Existing 60kVA diesel generator.
- Cast suitable plinths for both generator and bulk diesel tank.
- Install ABS Certified Aluzinc Galvanized fencing for Coastal applications around generator and bulk fuel tank. Fence installation must be all inclusive of a fully installed fencing system including but not limited to posts, foundations, topping, anti-burrow and gate.
- Manufacture, supply, deliver and install the engine exhaust for generators.
- Base tank to be installed beneath the generator and in conjunction with bulk tank, **have sufficient capacity to allow for 72 hour standby power.(i.e. Generator must be able to run for 72 hrs at 100% load.)**
- Self Bunded Bulk tank to feed generator day tank - All pipework and electronic cables to be necessary for the capacity upgrade to be installed.
- Supply and install the standard controller with WebNet reporting module, which allows remote monitoring of the plant and diesel system.
- Install new warning enclosure linked to all generator alarms, complete with siren and strobe.
- Fuel System to comprise of a water/fuel separator complete with new housing and filter.
- Supply and install the standard controller with WebNet reporting module, which allows remote monitoring of the plant and diesel system.
- Installation of Breaker panel: Supply, deliver and install suitably rated circuit breakers (2 off) and suitably rated panel (1 off) for cable protection to be installed within main incomer plant room and installed in accordance with SANS standards (SANS 10142 I&II)
- Balancing of 3-phase loads at substation/meter room and main DB
- Refurbish the Substation/Meter Room. This includes paintwork and finish of walls, floor and ceiling:
 - a) Including: doors, windows, vents, cable tunnels, lighting, LV panels and make good wall-mounted drawings.

- b) Flooring: Cleaning, making good of the surface and painting. Sand down, patch inconsistencies with rock set and apply two coats of epoxy floor paint (grey).
 - c) Cable tunnels to be cleaned and covers to be replaced/added if necessary.
 - d) Walls: Cleaning, making good of the surface and painting; this is to allow for any building/civil works that must take place. The doors and frame should be replaced if necessary to accommodate the larger sized generator into the plant room. All brickwork and plaster to be reinstated and must returned to its original state as per the existing building material. Sand down, patch inconsistencies with rock set and apply two coats of epoxy floor paint (grey)
 - e) Ceiling: Cleaning, making good of the surface, sand down, patch inconsistencies with rock set and apply two coats of white enamel paint.
 - f) Paint colour to be discussed during site handover. Paint specification should be Class 4 – “Typical area”.
 - g) Lighting lux levels must adhere to OHS Act (No.85 of 1993) and SANS 10400, SANS 10114-1 lighting requirements. Contractor to install additional lighting if necessary.
 - h) Wall-mounted drawings – refer to Part 17 & 18 within Part 2 of this document.
 - i) Renew water proofing and gutters.
 - j) Remove redundant cable ladders/trays
- Repaint/Respray panel doors within meter room; red to indicate Essential Supply
 - Install and commission the fire protection for the generator set.
 - *NB: Contractor to engage with local fire chief (inspection authority) before installation prior to issuing for fire compliance certificate for the generator plant room.*
 - **Supply, deliver and install fire detectors (Contractor may utilise existing Fire Detection and Alarm Panel)**
 - **Supply, deliver and install fire extinguisher equipment (mounted)**
 - **Supply, deliver and install diesel spill kit**
 - An Earth Mat should be installed (if not already in place) of sufficiently low impedance to match the generator rating.
 - Electrical Engineers Design:
 - Submission of Engineers Design Report for KZN DOH approval
 - Submission of Single Line Diagram for KZN DOH approval
 - Obtain Fire Compliance of the Installation which includes generator and bulk fuel storage unit.
 - Obtain Electrical Certification of Compliance for the electrical installation
 - Training to be provided to selected staff at the KZNCH - KWAZULU NATAL CHILDREN’S HOSPITAL
 - Maintain the installations for 1 year after Practical Completion.
 - As built drawings: standby plant arrangement, schematics of plant room, complete electrical system.
 - Installation of Breaker panel: Supply, deliver and install suitably rated circuit breakers (2 off) and suitably rated panel (1 off) for cable protection to be installed within main incomer plant room and installed in accordance with SANS standards (SANS 10142 I&II)
 - Supply, delivery and Installation of Chromadeck carport/shadeport to be installed over the concrete plinth area with 500mm overhang. Installation to include all necessary components: gutters, support structure, lighting etc.
 - Install ABS Certified Aluzinc Galvanized fencing for Coastal applications around generator and bulk fuel tank. Fence installation must be all inclusive of a fully installed fencing system including but not limited

to posts, foundations, topping, anti-burrow and gate with 2 sets of locks and 4 keys. Quantity is the perimeter of the fence. Minimum height 3.3m from concrete plinth.

3. PLANT LOCATION

The standby diesel generating set shall to be installed as indicated under Part Two Particular Specification which forms part of this document.

Tenderers are advised to acquaint themselves with the site conditions including access, as no claim on the grounds of want of knowledge will be entertained.

The set shall consist of an outdoor sound attenuated canopy type unit. The weather proof canopy shall be manufactured from Grade 304 Stainless Steel for coastal locations. It shall fit onto the sets base frame, making the entire unit self-contained. Lockable hinged doors (container type system with a robust locking facility required) shall allow access for maintenance purposes and louvres complete with vermin proofing shall be installed at both ends. The louvres shall be sized to suit the sets cooling and combustion air flow requirements. The canopy shall be painted with an etching primer, then finished with two coats of enamel paint or epoxy coated. All fasteners, screws, bolts and nuts used in the manufacturing process MUST be rust proof.

The concrete plinths for both the generator set and bulk tank (where applicable and if required) forms part of this contract and drawings shall be provided to the engineer for approval, prior to construction taking place.

The standby diesel generating set shall to be located as indicated under Part Two Particular Specification which forms part of this document.

Tenderers are advised to acquaint themselves with the site conditions including access, as no claim on the grounds of want of knowledge will be entertained.

4. PLANT DUTIES

The diesel generating set and its ancillary equipment shall normally operate as an automatic mains failure unit. It shall be capable of delivering its full rated output at any time and any ambient conditions likely to occur at the site. The generating set will not be required to be synchronized with the main supply.

5. SYSTEM

The system to which the plant is to be connected is 3 phase, 4 wire, 400 volt between phases and 230 volt between phase and neutral, with a frequency of 50 Hz.

6. RATING

Note: The units shall be capable of delivering:

- a. 300 kVA at 0.8 power factor at PRIME POWER.

The unit shall deliver 100% of the initial load at a maximum of 15 sec after start up.

The rating of the diesel generating set shall be based on operation of the set when equipped with all necessary accessories such as radiator fan, air cleaners, lubricating oil pump, fuel transfer pump, fuel injection pump, water circulating pump, and battery charging alternator.

The generator set shall be capable of delivering the specified output continuously under the site conditions without overheating. The engine shall be capable of delivering an output of 110% of the specified output for one hour in any period of 12 hours consecutive running in accordance with BS5514.

7. DIESEL ENGINE

7.1. Type

The engine shall be of the multi cylinder, four stroke cycle, cold starting, direct injection, compression ignition type, suitable for operation on diesel fuel.

Only genuine engines with full local Original Equipment Manufacturer (O.E.M.) backup will be accepted. Grey products and "copies" will under no circumstances be accepted and will lead to the Tender being rejected.

7.2. Cooling System

The engine shall be of the water cooled type and the cooling system shall be of sufficient capacity to cool the engine when the set is delivering its full rated load in the ambient conditions specified in Clause 1.

The engine shall be equipped with a heavy duty type radiator, complete with engine driven fan and centrifugal water circulating pump and a thermostat to maintain the engine at the makers recommended temperature level. **The radiator core MUST be a tropical core.**

A thermostatically controlled immersion heater shall be provided and fitted in the engine cooling circuit to ensure easy starting of the engine at any ambient temperature.

The heater shall be so fitted that it can easily be withdrawn without having to drain the system. The heater shall be suitable for a 220 volt 50 Hz supply.

A low radiator level shutdown sensor switch shall be fitted in the radiator header tank. A separate temperature sensor must be fitted on the block for the normal high engine temperature shutdown and gauge.

The sight gauge shall be easily accessible for reading purposes and it shall be safe and easy to top up the coolant without having to climb inside or over the unit. This includes indoor and outdoor units.

7.3. Speed

The engine speed shall not exceed 1500 R.P.M. at normal full load conditions.

7.4. Fuel

The engine shall be capable of satisfactory performance on a commercial grade of distilled petroleum fuel oil such as Number 2 fuel oil. (Commercial grade diesel fuel: 50ppm).

7.5. Rating

The engine shall be suitable for continuous running at the specified speed, delivering its rated output at the specified site conditions.

In addition the engine shall be capable of delivering 110 % load for one hour, after the set has been running at full load for a period of six hours and shall, after the overload period of one hour be capable of maintaining the rated output continuously without any undue mechanical strain, overheating, incomplete fuel combustion or other ill effects.

The engine shall have sufficient capacity to start up and shall within 15 seconds from mains failure, supply the full rated load at the specified voltages and frequency.

7.6. Governor

The engine shall be of the latest electronic type, or controlled by a governor to maintain governed speed for 50 Hz operation. Class A1 governing in accordance with B.S. 5514 as amended is required.

7.7. Fuel System

The complete system including bulk tank and base tank shall be sized to allow the set to run for 72 hours at full load.

An engraved label shall be installed in a conspicuous area on the generator control panel that indicates the following:

- Base tank capacity.
- Bulk tank capacity
- Full load litres per hour consumption.

7.7.1 Base tank

The fuel tank shall be an integral part of the base frame of the generator set. The tank shall have sufficient capacity to run the engine on full load for a minimum period of 12 hours.

Base tank shall be of 304 Stainless Steel construction material, powder coated. Prior to painting, all steelwork must be thoroughly degreased and re-rusted and then primed with a zinc chromate primer.

The base tank shall be a closed channel self-bund walled type that shall be of sufficient capacity to contain any spillage, equivalent to 80% in volume of the base tank. A float level alarm connected to the generator controller shall be incorporated into the bund area located such that the alarm will be activated when 50% of the volume of the bund area has been reached in the event of any diesel fuel leakage.

The base tank shall not exceed 2000 litre's capacity, be fitted with a suitable filter, breather pipe, visual gauge, removable inspection cover, drain, filler cap, low level and extra low shutdown alarm sensors. These shall supply an audible and visible signal on the control panel.

The base tank shall be fitted with the following:

- A suitable fuel filter.
- Breather pipe
- Visual dial fuel level indicator
- Removable inspection cover
- Tamper proof drain plug

- Filler pipe & lockable cap
- Low level and extra low shutdown alarm sensors. These shall supply an audible alarm and visible indication on the control panel.
- Spillage containment sensor. It shall supply an audible alarm and visible indication on the control panel.
- **Fuel level indicator to send signal to DSE controller to indicate Base tank fuel level AND Bulk tank fuel level.**

In addition, pump, solenoid valve start, stop sensors are required to control the automatic filling of the base tank from a remote free standing tank if applicable.

The set shall be supplied with a hand operated “wing pump” and a suitable length of oil resistant hose. The hose shall be of the “push lock” type and shall be sufficient in length to extend to the door for filling from 200 litre drums.

Drain plugs shall be constructed in such a manner that shall prevent the removal of such drain plug by conventional means i.e. shifting spanner, pliers etc.

7.7.2 Bulk Tank

The bulk fuel tank shall consist of an ISO 9001 quality containerised double walled tank mounted on a steel reinforced concrete plinth of suitable MPa strength to carry the weight of a fully fuelled bulk tank and canopy type generator. The size and configuration of the bulk tank shall be matched to the size of generator to enable the generator to run continuously for a minimum period of 72 hours on full load.

The composite bulk tank together with all interconnecting supply and return pipes, low level alarm, visual fuel level indicators (a. Mechanical and b. Digital gauge on an LCD display), lockable shut off valves, breather and an automatic filling system shall be provided and installed to the base tank. This installation shall be carried out by a specialized petrochemical installation contractor in accordance with SABS 0131 Part 2/1979 and SABS 089 Part 3/1991.

In the event of the standard bulk tank size being in between the required volume, the next largest size must be supplied

The automatic filling of the base tank, from the bulk tank, shall be controlled by level switches mounted in the base tank. These switches shall start and stop the electric self-priming pump, or solenoid valve system.

Manually operated filling of the base tank from the bulk tank shall be by way of a spring loaded push button switch that shall switch off the pump if the push button switch is released by the operator.
Drain plugs shall be constructed in such a manner that shall prevent the removal of such drain plug by conventional means i.e. shifting spanner, pliers etc.

The construction of the reinforced concrete plinth and other minor civil work shall form part of this contract.

The bulk tank shall be fitted with the following:

- A suitable fuel filter.
- Breather pipe
- Visual dial fuel level indicator
- Removable inspection cover
- Tamper proof drain plug
- Filler pipe & lockable cap
- Low level and extra low shutdown alarm sensors. These shall supply an **audible alarm** and visible indication on the control panel.
- Spillage containment sensor. It shall supply an **audible alarm** and visible indication on the control panel.
- **Fuel level indicator to send signal to DSE controller to indicate Base tank fuel level AND Bulk tank fuel level.**

The bulk tank shall be inspected including:

- pressure testing,
- wall thickness and integrity inspection,
- Diesel cleaning/remediation.

7.8. Lubricating

The engine shall be provided with a forced feed lubricating system with a gear type lubricated oil pump for supplying oil under pressure to the main bearings, crank pin bearings, pistons, piston pins, timing gears, camshaft bearings, valve rocker mechanism and all other moving parts.

Full flow replaceable element type oil filters, conveniently located for servicing, shall be provided. Filters shall be provided with a spring loaded by-pass valve to ensure circulation if the filters become clogged.

7.9. Cylinder Liners

The engine shall be provided with removable wet or dry type cylinder liners of close grained alloy iron.

7.10. Air Cleaners

The engine shall be provided with one or more dry type air cleaners which shall provide positive air filtration.

7.11. Exhaust System

The engine shall be fitted with an efficient Grade 304 stainless steel exhaust system coastal areas. Flexible bellows shall be fitted between the exhaust outlet and the silencer. The flexible piping must on no account be used to form a bend or compensate for misalignment. The silencer shall be located within, or on top of the canopy. The silencer shall be of the highly efficient type suitable for use in clinical areas and shall be capable of providing **35 to 50 decibels of suppression. Silencer type to be Hospital Plus Grade - Exhaust noise reduction of 35 to 50 dBA**

The silencer and discharge piping shall be suitably supported.

The exhaust pipe inside the canopy shall be suitably lagged then clad in galvanized or polished stainless steel sheet.

The end of the exhaust shall be cut to a 45 degree angle, in order to prevent rain ingress and mesh shall be welded into the end to prevent birds or rodents from entering the pipe. A vertical exhaust end may be used provided an efficient Grade 304 stainless steel design is used to ensure no dust or water ingress is permitted.

7.12. Flywheel

The flywheel shall be designed to limit the cyclic irregularities to within the limits laid down in B.S. 5514 as amended.

7.13. Engine Starting

The engine shall be equipped with a 12/24 volt starting system of sufficient capacity to crank the engine at a speed, which will allow starting of the engine.

The starting equipment shall include a 12/24 volt D.C. starter motor engaging directly on the flywheel ring gear. A heavy duty battery charging alternator and maintenance free batteries of the Delco/Deltec type shall be supplied. The batteries shall be mounted in a lockable battery box. Battery technology to be used must be rated at a minimum of 100AH with a minimum warranty period of 5 years and a minimum of 2000 cycles.

The batteries shall be connected to the engine with suitably rated P.V.C. insulated flexible leads.

The batteries shall have sufficient capacity to provide three automatic attempts to start immediately followed by three manual attempts without any appreciable drop in voltage. The automatic attempts to start shall each be of not less than 10 seconds duration with 10 second intervals between and the manual attempts shall be based on the same cranking period.

A device shall be provided to limit the cranking time of each automatic attempt to start, to the 10 seconds specified above and to provide three automatic attempts after which the automatic starting mechanism will cut out until manually reset and at the same time sound an audible alarm and illuminate the L.E.D. on the generator controller. The engine driven battery charging alternator shall have sufficient capacity to recharge the batteries back to normal starting requirements in not more than six hours.

A battery charging unit of the trickle charge type shall be provided to maintain the batteries at full capacity when the set is at rest. The charging equipment shall be connected so that the battery is normally charged from the mains, but is also charged under mains failure conditions from the diesel generating plant and if required via an inhibitor relay to prevent dual charging. The unit shall be complete with voltmeter, push button test, D.C. and A.C. protective gear. The charging unit shall be incorporated in the diesel generator control cabinet.

7.14. Engine Instruments

As per the Deep Sea DSE 7320 Controller fitted with DSE Webnet DSE890 Gateway complete with separate GPS and GSM antennae.

7.15. Safety Controls

The engine shall be equipped with the safety controls as specified in 11.4.

7.16. Engine/Alternator Coupling and Base

The engine and alternator shall be direct coupled and arranged for operation at 400/230 volt, 50Hz and 1500 RPM.

A steel fabricated base-frame (incorporating the day fuel tank) with anti-vibration mounts between the engine / alternator combination and base shall be provided and must be able to be placed directly on the concrete plinth / slab.

The base frame shall incorporate the canopy mounting arrangement.

8. **RADIATOR EXTRACT DUCTING**

A galvanized duct shall be provided and installed between the radiator face and outlet louver to positively expel and duct the hot air out of the canopy. A flexible section shall be fitted between the radiator face and duct in order to prevent the recirculation of hot discharged air.

9. **A.C. GENERATOR**

As per the engine requirements, only genuine and locally supported recognised Original Equipment Manufacturers (O.E.M.) alternators will be acceptable. Grey products and copies from the East are unacceptable and will result in the Tender being rejected.

9.1. Rating

The generator shall be a 400/230 volt, 3 phase, and 4 wire 50 Hz machine. The generator rating shall be applicable for continuous service application.

Note: The units shall be capable of delivering 300kVA prime power, both at 0.8 power factor. The unit shall deliver 100% of the initial load no longer than 15 seconds after start up.

9.2. Construction and Manufacture

The generator shall be a revolving field type, coupled directly to the engine flywheel through a flexible disc for positive alignment. The generator housing shall bolt directly to the engine flywheel housing and shall be equipped with a heavy duty ball bearing support for the rotor. The motor shall be dynamically balanced up to 25 % over speed.

The generator shall be of heavy duty compact design. Insulation shall be Class H as recognised by B.S.5514.

The generator field excitation shall be performed by a rotating exciter mounted on the generator motor shaft through a brushless rotating diode system. The voltage regulator shall be of the static-magnetic type with silicon diode control. It shall be mounted on the top or side of the generator and enclosed in a drip proof enclosure. A built in voltage adjusting rheostat shall provide 10 % voltage adjustment.

9.3. Performance

The generator shall be capable of continuously delivering the full rated load specified in Clause 9.1 and of providing a 10 % overload for the period and in the manner specified for the engine in Clause 7.5.

9.4. Wave Form

The shape for the voltage and current wave shall be within the limits laid down by B.S. 5000.

9.5. Voltage Regulation and Response

The alternator shall be self-regulated and shall incorporate an automatic voltage regulator.

The voltage regulation shall not exceed $\pm 2\frac{1}{2}\%$, from no load to full load, including cold to hot variations at any power factor between 0,8 lagging and unity and inclusive of speed variations within the limits stated in Clause 7.6.

Upon application of full load at a power factor of 0,8 lagging the alternator voltage shall recover to within $2\frac{1}{2}\%$ of the steady state value within approximately 300 milliseconds.

Upon application of any load specified in transient, maximum voltage dip shall not exceed 20% of the nominal voltage when measured at the alternator terminals.

9.6 Windings

The generator stator windings shall be star connected with the star point brought out and connected to the neutral terminal in the terminal box on the generator to provide a 400/230 volt supply.

9.7. Terminal Box

The terminal box shall be fitted to suit the cable route and it shall be large enough to allow for glanding and connecting the cables specified in Clause 13.1.

9.8. Radio and T.V. Interference

The generating set shall be suitably suppressed within the limits of B.S. 800 against radio and television interference.

10. **DIESEL GENERATOR LV PANEL**

10.1. Type and Construction

The LV & Control panel shall be designed for the control of the diesel generating set with instrumentation and protective devices to meet both manual and automatic mode requirements.

The control panel shall be of robust construction, totally enclosed and dustproof, **304 Stainless steel (Identical to canopy construction material and treatment.)**

It shall be of folded **2.0 mm thick cold rolled sheet stainless steel construction**, suitable for front entry through hinged doors. Internal chassis plates, circuit breaker pans and gland plates shall be provided. Special attention shall be given to vermin proofing and dust sealing.

Prior to painting, all steelwork must be thoroughly degreased and re-rusted and then primed with a zinc chromate primer. All internal steel chassis plates, gland plates and switchgear brackets shall be painted with white powder epoxy paint and all exterior steel surfaces shall be finished with red powder epoxy paint

The control panel shall be built into three separate sections, with the controls, change-over and on load bypass switch each having its own section.

10.2 Bus-Bars, Wiring, Switchgear, etc.

All bus-bars and wiring shall be adequately rated and suitably supported, and control wiring shall be neatly laced and numbered with durable plastic ferrules, for easy tracing. Suitable terminals are to be provided for incoming and outgoing cables. Suitably sized holes shall be punched in the gland plates for the required number of cable terminations for both incoming and outgoing cables. The cables shall be secured to the gland plate by means of cable glands as Pratley, C.C.G. or other approved. The gland plate shall be suitably braced to prevent distortion after the cables are glanded thereto.

Circuit breakers are to be of moulded case construction and the 4 pole motorized change-over switch and "On Load" bypass switch shall be a reputable make, with full local representation.

All instrumentation shall be of 1.5% accuracy and their performance shall comply with B.S.89. The instruments shall be flush mounted and the dial dimensions shall be 96mm x 96mm.

Tenderers must give assurance with their tender that replacements for the equipment, switchgear and instruments used in the construction of the panel are readily available from stock held in the Republic of South Africa.

11. CONTROL PANEL

11.1 The change-over panel is to be situated within the canopy. The control panel shall be of robust construction, totally enclosed and dustproof (as per 10.1 above). It shall be of folded 2.0 mm thick cold rolled sheet 3CR12 stainless steel construction, suitable for front entry through hinged doors. Internal chassis plates, circuit breaker pans and gland plates shall be provided. Special attention shall be given to vermin proofing and dust sealing.

11.2 The supply and installation of all cables and supports between the generator set and AMF control panel forms part of this contract.

11.3 Changeover Board and Bypass Switch

11.3.1 1 x T.P. Generator MCB. The MCB shall be rated to suit the generator offered and shall have both adjustable thermal and instantaneous overload elements.

11.3.2 If over 150kVA

1 x Set of Four Pole automatic changeover isolators with motor operated mechanisms (Minimum rating of 630amps) and with appropriate auxiliary and control contacts with electrical and mechanical interlocking arrangements to the approval of the Department. The units are to be Socomec, ABB or other approved prior to the close of the Tender.

11.3.3 If under 150kVA

1 x Set of Four Pole suitably rated contactors with electrical and mechanical interlocking arrangements to the approval of the Department.

11.3.4 If over 150kVA

1 x On load hand operated by pass switch (Minimum rating of 630amps) of the isolator type with three operating positions labelled "NORMAL", "OFF" and "BYPASS" to enable the changeover equipment and control circuitry to be by passed for maintenance purposes. The units are to be Socomec, ABB or other approved prior to the close of the Tender.

11.3.5 If under 150kVA

No by-pass switch required.

11.3.6 3 x Open ring CT's suitably scaled.

11.3.7 1 x Open ring VT

11.3.8 Load, neutral and earth bus-bars.

11.3.9 Control Section

- a) Automatic constant voltage battery charger.
- b) Electronic governor control (if required and not an electronic engine).
- c) Control C/B for instruments.
- d) Control relays for change over contacts.
- e) 12 / 24 Volt fuel relays.
- f) Terminal strips.

11.3.10 Door Mounted Components

NOTE: While the controller incorporates some of this equipment, the specified items as detailed below are STILL REQUIRED and shall be mounted on the door.

- a) As per the Deep Sea DSE 7320 Controller fitted with DSE Webnet DSE890 complete with separate GPS and GSM antennae 1 x Deep Sea DSE 7320 Generator Controller
- b) 3 x Flush mounted M.D.I. 96 x 96mm dial ammeters suitably scaled
- c) 1 x Flush mounted 96 x 96 mm dial voltmeter, 0 - 500VAC.
- d) 1 x Flush mounted voltmeter selector switch with off, phase to phase and to neutral positions. phase
- e) 1 x Flush mounted running hour meter.
- f) 1 x Emergency stop push button - "Latching type".
- g) 1 x Engine alternator charge indication.
- h) 1 x Key operated canopy light switch to operate LED lighting inside the canopy area – set of 2 LED lights required.

Control Equipment Requirement

Control systems may not consist of the electromagnetic relay type. Only the Deep Sea DSE 7320 fitted with Deep Sea Webnet DSE890 Gateway complete with separate GPS and GSM antennae or equivalent (Subject to approval by DoH prior to the closure of the Tender) solid state programmable systems will be accepted.

The solid state controller and associated systems wiring shall be to the control system manufacturer's guidelines and shall be adequately protected against transient over voltages arising from lightning effects, switching surges, power system surges or mains and alternator borne noise/interference. Full details of the suppression systems are to be provided at tender. Wiring to and from the solid state programmable controller is to be screened as necessary to prevent electrostatic and magnetic interference from adjacent wiring/systems.

SPECIFICATION FOR CONTROLLER

FRONT PANEL INDICATORS AND DISPLAYED MESSAGES

The controller status including Warning and Shutdown/ Critical alarms shall be indicated by a combination of LCD and messages on the LCD display.

CONDITION	LCD	DISPLAY MESSAGE	WARNING	SHUTDOWN
HIGH ENGINE TEMPERATURE		X		X
LOW OIL PRESSURE		X		X
OVER SPEED		X		X
UNDER SPEED		X		X
BULK TANK FUEL LEVEL (LITRES & PERCENTAGE)	X			
BASE TANK FUEL LEVEL (LITRES & PERCENTAGE)	X			
BULK TANK LOW FUEL AT 30% OF CAPACITY	X	X	X	
BULK NO FUEL AT 10% OF CAPACITY	X	X		X
LOW BULK TANK		X	X	
LOW WATER		X		X
START FAILS AFTER 3 CRANKS AT 10 SECOND INTERVALS.	X	X		X
EMERGENCY STOP	X	X		X
SHUTDOWN / CRITICAL	X	X		X
MAINS PHASE ROTATION FAULT		X		X
HIGH MAINS VOLTS		X		X
LOW MAINS VOLTS		X		X
MAINS ON	X	X		
MAINS ON LOAD	X	X		
ALTERNATOR ON	X	X		
ALTERNATOR ON LOAD	X	X		
ALTERNATOR PHASE ROTATION		X		X
HIGH ALTERNATOR VOLTS		X		X
LOW ALTERNATOR VOLTS		X		X
BATTERY VOLTS FAULT		X	X	
ALTERNATOR CHARGE FAULT		X	X	
AUTO	X			
TEST	X			
MANUAL	X			
MANUAL START	X			
MANUAL STOP	X			
MANUAL OR TEST (NOT IN AUTO)	X			
ALARMS	X			
EVENT LOG	X			
TIME DELAYS IN SECONDS				
MAIN FAILURE DELAY	10			
START-UP TIME	5			
MAINS RETURN DELAY	60			
COOL DOWN DELAY BEFORE SHUT DOWN.	120			

FRONT PANEL SWITCHES

As per the Deep Sea 7320 controller

PLANT OPERATION

The mode selector touch pad functions shall be as follows

OFF/RESET	Control system off and alarm condition reset.
AUTO	Automatic starting and stopping of the set dependent on the mains supply.
MANUAL	Starting and stopping activated manually. In this mode the load will not be transferred in the event of a mains failure.
TEST	The set will start automatically in this position. The load will be taken by the alternator in the event of a mains failure and will run off load.

LOGGING OF EVENTS

As per the Deep Sea DSE 7320 Controller fitted with DSE Webnet DSE890 Gateway complete with separate GPS and GSM antennae.

USER PROGRAMMABLE

As per the Deep Sea DSE 7320 Controller fitted with DSE Webnet DSE890 Gateway complete with separate GPS and GSM antennae.

12. ELECTRICAL

Cables between the generator set and control panel shall be supplied and installed in accordance with the requirements of the S.A.N.S. Wiring Code (S.A.N.S. 10142 – 1:2017 as amended).

12.2. Terminations

The cables are to be made off with suitable cable glands as C.C.G, Pratley or other approved. The cable glands at the control panel shall be secured to the gland plate in the base section of the panel and at the generator end to the terminal box.

The cable conductors shall be terminated with suitably rated pressure crimped cable lugs.

12.3. Earthing

The neutral point of the generator shall be solidly connected, by means of an appropriate size of insulated earth conductor, to the earth bar in the alternator and in the panel. All plant, ancillary equipment and steel work in the stand-by plant room shall be suitably bonded together with an appropriate size of bare copper tape which shall also be connected to the earthbar.

An Earth Mat should be installed (if not already in place) of sufficiently low impedance to match the generator rating.

12.4. Phase Rotation

The Contractor shall ensure that the mains and generator phase rotations are identical. The existing phase rotation shall be determined prior to the changeover shutdown to ensure that the new set is connected with the same phase rotation.

13. PAINTING

The engine and generator shall be painted **uniformly** with best quality enamel paint in a colour **approved by the Department**.

The LV & Control panel shall be painted with best quality powder coated signal red paint.

14. TESTING

14.1. Testing At Contractor's Premises

An acceptance test shall be carried out at the Contractor's works to establish that the diesel generating plant and its ancillary equipment meets with the requirements of the specification. The Contractor shall give the consultant at least **two weeks' notice** prior to testing the plant. In the event of the plant failing the test and having to be re-tested, at some future date, all expenses (including travelling) incurred by the consultant in attending the second test will be to the Contractor's account. All fuel used for the test will be for the tenderers account. All test equipment including load banks must be present and readily available on the day of the FATs and will be for the bidders account

- a) Simulate a mains failure to automatically start the plant from cold to test its ability to attain full rated speed and voltage and assume the full load in the specified time of ten seconds.
- b) Test run the plant at full load for a period of one hour.
- c) Immediately after the above specified run, without stopping the plant, run it for a further hour at 110 % load.
- d) Test the plant with regards to voltage dip, voltage and frequency recovery, with a sudden application of various loads.
- e) Test the plant for its ability to assume full rated load immediately on failure of the normal supply.
- f) Test and demonstrate (by simulation only where actual Conditions could damage the plant and its ancillary equipment) the correct operation of the engine safety controls and alarms together with other alarms as specified.
- g) Any other tests the client may consider necessary to establish that the diesel generator and its ancillary equipment as a whole is functioning correctly and in accordance with the specification.
- h) The aforementioned tests must be completed together with the pre-commissioning checksheets as per the attached Annexure – “DEPARTMENT OF HEALTH - GENERATOR PRE-DELIVERY SHEET REV 3.2 OCT 2020”. – (ANNEXURE 7)
- i) **The testing at Contractors facilities will include all accommodation, transportation and subsistence in the event of the manufacturer's premises falling outside of the eThekweni District and shall be at the cost of the Contractor for the appointed DOH project manager.**

NB The Contractor shall provide necessary instruments and equipment for carrying out the tests. The test equipment shall be capable of producing 100 % load for one hour and 110 % load for a further hour continuously without interruption. The test load shall be adjustable and balanced over three phases.

The instrumentation shall be capable of recording and producing printed data pertaining to transient voltage dips, recovery time, applied load, etc, as specified in Clause 9.5.

14.2. Tests On Site

On completion of the installation of the plant, the following test shall be carried out.

- a) Automatic starting and stopping with load change over. The load in this instance will be provided by the client.
- b) Test by simulation only of the operation of the engine protection and alarm devices.
- c) Any other tests which the Project Leader may require on site.

15. NOTICES & LABELS

15.1. Warning Notice

The Contractor shall provide and install in a conspicuous position in the plant room a clearly legible and indelible notice 450 x 450mm made from non-deteriorating material, preferably plastic with red letters on a white background worded to read as follows:

"DANGER

THIS ENGINE WILL START WITHOUT NOTICE. TURN THE CONTROLLER OFF AND PRESS THE EMERGENCY STOP BUTTON IN BEFORE WORKING ON THE PLANT."

- 15.2 All labels shall be RED engraved letters on WHITE Ivorene glued with super glue or pop riveted to cover plates where applicable. Letter size shall be a minimum of 3mm.

16. OPERATING AND MAINTENANCE MANUALS, ETC.

The Contractor shall supply three complete comprehensive sets of operating and maintenance manuals, complete with schematic control diagrams and complete spare parts list for both engine and generator.

The above manuals are to be handed to the authorized representative on completion of the installation.

In addition a complete schematic diagram of the power and control circuitry is to be mounted in a glass fronted wooden or non-ferrous metal frame and fixed to the canopy door adjacent to the generator control panel.

The Contractor is to provide a schedule containing particulars and part numbers of all major components e.g. relays, timers etc. of the control circuitry to facilitate the ordering of spares.

NOTE: Under no circumstances will **Practical Completion** be taken of the plant and equipment unless these requirements have been completed.

17. DRAWINGS

Within one month of the receipt of order the successful Tenderer shall submit prints of each of the following drawings for approval:-

- a) General arrangement of the stand-by plant switchboard front panel.
- b) Schematic of the complete electrical systems, including starter motor, battery and automatic battery charger.
- c) Dimensioned layout of all plant in the canopy compartment.

18. SPARE PARTS

Tenderers must **provide an assurance** with their Tender that spare parts for the plant offered by them as a whole are readily available within the Republic of South Africa and to state where these **spare parts** are available.

19. GUARANTEE AND MAINTENANCE

19.1. General

The Contractor shall guarantee and maintain the Contract Works for a period of twelve months (12) after **Works Completion** of the plant. During the maintenance period the Contract Works shall be maintained as specified in Clause 21 by the Contractor and any defective material, equipment or workmanship (excepting proven, willful or accidental damage, or fair wear and tear) shall be made good with all possible speed at the Contractor's expense and to the satisfaction of the client.

19.2. Making Good

When called upon by the client the Contractor shall make good on site and shall bear all expense incidental thereto including making good of work by others, arising out of removal or reinstallation of equipment. All work arising from the implementation of the guarantee or maintenance of equipment shall be carried out at times which will not result in any undue inconvenience to users of the equipment or occupants of premises.

If any defects are not remedied within a reasonable time the client may proceed to do the work at the Contractor's risk and expense, but without prejudice to any other rights which the client may have against the Contractor.

19.3. Latent Defects and Failure to Comply with Specification

The client reserves the right to demand the replacement or making good by the Contractor at his own expense of any part of the Contract which is shown to have any latent defects or not to have complied with the Specification, notwithstanding that such work has been taken over or that the guarantee period has expired.

19.4. Qualification by Tenderer

Should any specified materials or equipment in the Tenderer's opinion be of inferior quality, or be unsuitably employed, rated or loaded, the Tenderer shall prior to the submission of his tender advise the consultant accordingly. His failure to do so shall mean that he guarantees the work including all materials or equipment as specified.

20. MAINTENANCE

At six monthly intervals (2) OR at every 250 hours during the guarantee period of twelve months, starting from the date of Works Completion, the Contractor shall adjust and maintain the standby plant and its ancillary equipment in proper working order. As a minimum requirement the Contractor shall:

- a) Check and top-up if necessary, the fluid levels in the radiator, engine sump, fuel oil tank and batteries.
- b) Test run the standby plant and ancillary equipment for a period of 15 minutes.
- c) Wipe down the standby plant and its ancillary equipment and report on any evidence of any fluid leaks or other defects.
- d) Fill in the standby plant logbook.

The minor and major services must be done in accordance with "Annexure 6A & 6B - KZN DOH Generator Preventative Maintenance Service Programme - Annual Bi-Annual Service".

The contractor is to allow for 6 major services during the 52 weeks warranty period including bi-annual fuel remediation and tank cleaning.

The cost of such inspections, maintenance, adjustments, repairs, etc., shall be included in the tender price, but the cost of renewing any part which may become worn through fair wear and tear, or damaged beyond the control of the Contractor (provided this is not due to unsuitable design) shall be excluded.

If during the guarantee and maintenance period the standby plant is not in working order for any reason for which the Contractor can be held responsible, then the Contractor will be notified and immediate steps shall be taken by him to remedy the defects. Should the standby plant defects be so frequent as to become objectionable or should the equipment otherwise prove unsatisfactory during the guarantee period of twelve months, the Contractor shall, if called upon by the client, at his own expense replace the whole or such parts thereof as the client may deem necessary with equipment to be specified by the client. Approval - tacit or otherwise - of the equipment installed shall be considered as provisional only and shall not invalidate the client's right as indicated above.

PROVINCE OF KWAZULU-NATAL
DEPARTMENT OF HEALTH

BID No. ZNB 5244/2023-H
KZNCH - KWAZULU NATAL CHILDREN'S HOSPITAL
INSTALLATION OF NEW 300KVA STANDBY GENERATOR AND BULK DIESEL TANK

PART THREE

PARTICULAR SPECIFICATION

3.1 GENERAL

This particular specification must be read with, and shall form part of, Part Two of this document (Technical Specification).

In so far as the conditions contained herein are at variance with any obtained in the Technical Specifications, the contract shall be interpreted in terms of this Part Three (Particular Specification).

3.2 SCOPE OF WORKS

3.2.1 The contract comprises the design, manufacture, assembly, delivery to site, off-loading at site, installation, testing, commissioning and handing over in first class working order one standby generator sets:

3.2.1.1 300kVA outdoor canopy type standby diesel generating sets and all ancillary equipment necessary to comply with the requirements of this specification.

3.2.2 The generator set shall comprise unless otherwise stated, of a diesel engine coupled to an alternator mounted on a common base, a 72-hour fuel tank, a set of starting batteries, automatic charging unit, interconnecting cables, a control panel housing the generator M.C.C.B. and all necessary switchgear, including the change- over equipment and "on load" bypass switch.

3.2.3 The contractor shall also provide for the following:

- Manufacture, supply and deliver a single 300 kVA prime, 400V, 50Hz, diesel standby generator set, with sound proof enclosure. Canopy (enclosure), Base tank & frame constructed with **Grade 304 Stainless Steel**. (Coastal area).
- Supply and deliver all the needed protection equipment, electrical panels, cables and terminations needed for the complete installation.
- Supply, deliver, install and commission LV Panel – including change-over & bypass switches, breakers, bus-bars and associated wiring
- Decommission, rig out, remove from site and provide disposal certificate for each:
 - Existing 60kVA Detroit diesel generator.
- Cast suitable plinths for both generator and bulk diesel tank.
- Install ABS Certified Aluzinc Galvanized fencing for Coastal applications around generator and bulk fuel tank. Fence installation must be all inclusive of a fully installed fencing system including but not limited to posts, foundations, topping, anti-burrow and gate.
- Manufacture, supply, deliver and install the engine exhaust for generators.

- Base tank to be installed beneath the generator and in conjunction with bulk tank, have sufficient capacity to allow for 72 hour standby power.(i.e. Generator must be able to run for 72 hrs at 100% load.)
- Self Bunded Bulk tank to feed generator day tank - All pipework and electronic cables to be necessary for the capacity upgrade to be installed.
- Supply and install the standard controller with WebNet reporting module, which allows remote monitoring of the plant and diesel system.
- Install new warning enclosure linked to all generator alarms, complete with siren and strobe.
- Replace existing water/fuel separator complete with new housing and filter.
- Supply and install the standard controller with WebNet reporting module, which allows remote monitoring of the plant and diesel system.
- Installation of Breaker panel: Supply, deliver and install suitably rated circuit breakers (2 off) and suitably rated panel (1 off) for cable protection to be installed within main incomer plant room and installed in accordance with SANS standards (SANS 10142 I&II)
- Refurbish the Substation/Meter Room. This includes paintwork and finish of walls, floor and ceiling:
 - k) Including: doors, windows, vents, cable tunnels, lighting, LV panels and make good wall-mounted drawings.
 - l) Flooring: Cleaning, making good of the surface and painting. Sand down, patch inconsistencies with rock set and apply two coats of epoxy floor paint (grey).
 - m) Cable tunnels to be cleaned and covers to be replaced if necessary.
 - n) Walls: Cleaning, making good of the surface and painting; this is to allow for any building/civil works that must take place. The doors and frame should be replaced if necessary to accommodate the larger sized generator into the plant room. All brickwork and plaster to be reinstated and must returned to its original state as per the existing building material. Sand down, patch inconsistencies with rock set and apply two coats of epoxy floor paint (grey)
 - o) Ceiling: Cleaning, making good of the surface, sand down, patch inconsistencies with rock set and apply two coats of white enamel paint.
 - p) Paint colour to be discussed during site handover. Paint specification should be Class 4 – “Typical area”.
 - q) Lighting lux levels must adhere to OHS Act (No.85 of 1993) and SANS 10400, SANS 10114-1 lighting requirements. Contractor to install additional lighting if necessary.
 - r) Wall-mounted drawings – refer to Part 17 & 18 within Part 2 of this document.
 - s) Renew water proofing and gutters.
 - t) Remove redundant cable ladders/trays
- Repaint/Respray panel doors within meter room; red to indicate Essential Supply
- Install and commission the fire protection for the generator set.
 - ***NB: Contractor to engage with local fire chief (inspection authority) before installation prior to issuing for fire compliance certificate for the generator plant room.***
 - **Supply, deliver and install fire detectors (Contractor may utilise existing Fire Detection and Alarm Panel)**
 - **Supply, deliver and install fire extinguisher equipment (mounted)**
 - **Supply, deliver and install diesel spill kit**

- An Earth Mat should be installed (if not already in place) of sufficiently low impedance to match the generator rating.
- Electrical Engineers Design:
 - Submission of Engineers Design Report for KZN DOH approval
 - Submission of Single Line Diagram for KZN DOH approval
- Obtain Fire Compliance of the Installation which includes generator and bulk fuel storage unit.
- Obtain Electrical Certification of Compliance for the electrical installation
- Training to be provided to selected staff at the KZNCH - KWAZULU NATAL CHILDREN'S HOSPITAL
- Maintain the installations for 1 year after Practical Completion.
- As built drawings: standby plant arrangement, schematics of plant room, complete electrical system.
- Installation of Breaker panel: Supply, deliver and install suitably rated circuit breakers (2 off) and suitably rated panel (1 off) for cable protection to be installed within main incomer plant room and installed in accordance with SANS standards (SANS 10142 I&II)
- Supply, delivery and Installation of Chromadeck carport/shadeport to be installed over the concrete plinth area with 500mm overhang. Installation to include all necessary components: gutters, support structure, lighting etc.
- Install ABS Certified Aluzinc Galvanized fencing for Coastal applications around generator and bulk fuel tank. Fence installation must be all inclusive of a fully installed fencing system including but not limited to posts, foundations, topping, anti-burrow and gate with 2 sets of locks and 4 keys. Quantity is the perimeter of the fence.

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INSTALLATION OF NEW 300KVA STANDBY GENERATOR AND BULK DIESEL TANK

PART FOUR

SCHEDULE OF EQUIPMENT

4.1 GENERAL

THE BIDDER MUST COMPLETE THE FOLLOWING SCHEDULE OF INFORMATION AND ARE TO SUBMIT WITH THEIR TENDER COMPREHENSIVE LITERATURE ON THE EQUIPMENT OFFERED.

FAILURE TO COMPLETE THIS SCHEDULE IN ITS ENTIRITY SHALL LEAD TO DISQUALIFICATION OF THE BID.

4.2 DIESEL ENGINE AND ALTERNATOR INFORMATION - DIESEL ENGINE No.1

4.2.1 DIESEL ENGINE 300 kVA 400/230-volt

- a) Make and Model
- b) Type (two or four stroke).....
- c) Performance Parameters
 - i) Rated output at sea level: Prime Power:kVA / kW.
Standby Power.....kVA / kW.
 - ii) Rated output atmetres above sea level (Altitude of hospital/Institution)
Prime PowerkVA / kW.
Standby Power.....kVA / kW.
 - iii) Ambient air temperatures atmetres above sea level (Altitude of hospital/Institution)
Minimum °C.....
Maximum °C.....
- d) Governed speedRPM
- e) Number of cylinder
- f) Diameter of cylindersmm
- g) Stroke of pistonmm
- h) Piston speedm/minute
- i) Type of air cleaner

- j) Type of lubricating oil filter
- k) Make and type of injection system
- l) Type and number of fuel filters
- m) Manufacture and type of turbo-charger
- n) Manufacturer and type of governor
- o) Max cyclic variations
- p) Speed variation for sudden release or application of load:
 - i) Temporary
 - ii) Permanent
- q) 100% Rated full load may be applied seconds after initiation of starting sequence
- r) Specific fuel consumption at full load. Litres/ HR (submit curves)
- s) Air quantity required for engine coolingcu.m/min.
- t) Cross sectional area of radiator air discharge outlet required

STARTING BATTERY

- a) Manufacturer
- b) Type
- c) Capacity.....
- d) Voltage.....

ALTERNATOR

- a) Make
- b) Type
- c) Type of bearings
- d) Method of lubrication
- e) Rated load at 0.8 power factor at 400 / 230 volt 50Hz 3 Phase
 - i) Continuous ratingKva.....Amps.....
- f) Efficiency of alternator at full load
- g) Output voltage within governed speed range at:
 - i) No loadVolts
 - ii) 50% loadVolts
 - iii) 100% loadVolts
 - iv) 110% loadVolts
- h) Method of voltage regulation

CONTROL CUBICLE

- a) Manufacturer

- b) Dimensions of control cubicle: Length.....mm
 Width.....mm
 Height.....mm
- c) Type of control equipment.....
- d) Type, make and rating of 4 pole by pass switch.....
- e) Type, make and rating of 4 pole motorised change-over switch.....
- f) Rupturing capacity at rated voltage of main circuit.....KA.
- g) Method of tripping employed in main circuit breaker.....
- h) Range of load setting of main circuit breaker.....
- i) Electrical and mechanical interlock provided: YES..... NO..... TYPE.....

VOLTMETER

- a) Make and type.....
- b) Dial dimensions.....
- c) B.S.S. accuracy.....

MAXIMUM DEMAND AMMETERS

- a) Make and type.....
- b) Dial dimensions.....
- c) Time lag.....
- d) B.S.S. accuracy.....

FREQUENCY METER

- a) Make and type.....
- b) Dial dimensions.....
- c) B.S.S. accuracy.....

SELF BUNDED FUEL TANKS

Base tank size (Not to exceed 1000 litres in volume):.....

Bulk tank size . N/A.

Bulk tank manufacturer and model number: N/A.

EXHAUST

Exhaust material

Exhaust material, silencer and outlet pipe.....

MASS OF PLANTkg

OVERALL DIMENSIONS OF PLANT

Length

Height

Width

TYPE AND RATING OF EQUIPMENT TO BE USED FOR LOAD TESTS

.....

COMPANY NAME AND ADDRESS OF BULK TANK INSTALLATION

.....

.....

IS THE TENDERER A DIESEL GENERATOR SET MANUFACTURER WITH LOCAL MANUFACTURING AND BACKUP FACILITIESYES / NO.....

IS THE TENDER 100% TO SPECIFICATIONYES / NO.....

If the answer is NO, provide reasons for the deviation from the specification.

.....
.....
.....
.....
.....

DATE..... SIGNATURE OF TENDERER.....

COMPANY STAMP

[Empty rectangular box for company stamp]



KWAZULU-NATAL PROVINCE

HEALTH
REPUBLIC OF SOUTH AFRICA

Occupational Health and Safety Specification

KZNCH Installation of new generator set



1. Introduction

The Department of Health Kwa Zulu Natal enters into contracts with Contractors to **Install Generators at KZN Health Institutions**. This document describes the requirements of compliance to which the Principal Contractor/Contractor is to adhere in relation to the scope of works. This document defines the minimum management requirement that is to be implemented by the Principal Contractor for the management of Health and Safety on the Health care facility.

The aim of this document is to present the health and safety aspects that need to be controlled and managed on this contract. The client reserves the right to make changes as and when the Client deems fit to address issues of Occupational Health & Safety (OHS) Compliance. The Client will not entertain any claim of any nature whatsoever which arises as a result of costs incurred or delays being experienced due to the Contractor not complying with the requirements of this document or any other applicable legislative requirements imposed on the contractor.

The Principal Contractor will be required to submit a Health and Safety File for approval prior to commencement of work. Arrangements for such approval shall be made with the OHS Department. The Principal Contractor shall submit proof that its appointed contractors Safety file has been approved.

2. Definitions & Abbreviations

- 2.1 “Client” means KZN Department of Health
- 2.2 “CR” refers to the Construction Regulations 2014
- 2.3 “OHS” means Occupational Health and Safety
- 2.4 “DoL” refers to the Department of Labour
- 2.5 “DOH” refers to the Department of Health
- 2.6 “NIHL” refers to the Noise Induced Hearing Loss Regulations
- 2.7 “HCS” refers to the Hazardous Chemical Substances Regulations
- 2.8 “GSR” refers to the General Safety Regulations
- 2.9 “GAR” refers to the General Administrative Regulations
- 2.10 “FR” refers to Facilities Regulations
- 2.11 “PPE” means Personal Protective Equipment
- 2.12 “MSDS” means Material Safety Data Sheets
- 2.13 “EIR” refers to the Electrical Installations regulations
- 2.14 “EMR” refers to Electrical Machinery Regulations
- 2.15 “ERW” refers to Environmental Regulations for Workplaces
- 2.16 **Principal Contractor** means an employer appointed by a Client to perform Construction Work
- 2.17 **Construction Work** means any work in connection with-:
- (a) the construction, erection, alteration, renovation, repair, demolition or dismantling of a addition to a building or any similar structure or;
 - (b) the construction, erection, maintenance, demolition or dismantling of any bridge, dam, road, railway, runway, sewer or water reticulation system, or the moving of earth, clearing of land, the making of excavation, pilling, or any similar civil engineering structure or type of work.
- 2.18 **Construction Manager** means a competent person responsible for the management of the physical construction process and the co-ordination, administration and management of resources on a construction site

2.19 Construction Supervisor means a competent person responsible for supervising construction activities on a construction site

2.20 Competent Person means a person who –

- (a) Has in respect of the work or task to be performed the required knowledge, training and experience and where applicable, qualifications, specific to that work or task. Provided that where appropriate qualifications and training are registered in terms of the provisions of the National Qualifications Framework Act, 2000 (Act No. 67 of 2000), those qualifications and training must be regarded as the required qualifications and training, and
- (b) Is familiar with the Act and with the applicable regulations made under the Act

2.21 OHS Plan means a site, activity or project specific documented plan in accordance with the Client's Health & Safety Specification

2.22 Health & safety File means a file or other record containing information in writing required by Construction Regulations 2014.

2.243 Hazard Identification and Risk Assessment and Risk Control (HIRA) means a documented plan, which identifies hazards, assesses the risks and detailing the control measures and safe working procedures, which are to be used to mitigate and control the occurrence of hazards and risks during construction or operation phases.

2.24 The Act means, unless the context indicates otherwise, the Occupational Health and Safety Act, 85 of 1993 and Construction Regulations 2014 promulgated there under, (OHSA).

2.25 Hazard means a source of or exposure to danger

2.26 Risk means the probability or likelihood that a hazard can result in injury or damage.

2.27 Hazardous Chemical Substance (HCS) means any toxic, harmful, corrosive, irritant or asphyxiant substance, or a mixture or substances, for which an occupational exposure limit is prescribed, or an occupational exposure limit is not prescribed, but which creates a hazard to health

2.28 Construction Plant encompasses all types of plant including but not limiting to, cranes, piling frames, boring machines, excavators, dewatering equipment and road vehicles with or without lifting equipment.

2.29 Occupational Health Practitioner refers to either Doctors or Nurses with the following requirements:

Doctors

- (a) Registered and in good standing with the Health Professions Council of South Africa (HPCSA)
- (b) has a tertiary qualification in Occupational Health or Medicine which is registered as an additional qualification with HPCSA or
- (c) be registered as a specialist in Occupational Medicine with HPCSA

Nurses

- (a) registered and in good standing with the South African Nursing Council (SANC) and
- (b) have a tertiary qualification in Occupational Health Nursing that is recognised and registered with SANC

2.30 dead means at or about zero potential and isolated from any live system;

2.31 earthed means connected to the general mass of earth in such a manner as will ensure at all times an immediate safe discharge of electrical energy;

2.32 portable electric tool means any electrically operated implement, with the exception of ordinary household electrical appliances, which is designed for use with-

- (a) a flexible cord at the supply end and which is intended for use by hand and which is to be carried by hand at the place of work; or
- (b) a flexible cable at the supply end and which is intended for use by hand and which is to be moved by hand at the place of work;

2.33 electrical installation means any machinery, in or on any premises, used for the transmission of electricity from a point of control to a point of consumption anywhere on the premises, including any article forming part of such an electrical installation irrespective of whether or not it is part of the electrical circuit, but excluding

- (a) any machinery of the supplier related to the supply of electricity on the premises;
- (b) any machinery which transmits electrical energy in communication, control circuits, television or radio circuits
- (c) an electrical installation on a vehicle, vessel, train or aircraft; and
- (d) control circuits of 50 V or less between different parts of machinery or system components, forming a unit, that are separately installed and derived from an independent source or an isolating transformer;

2.34 installation work means:-

- (a) the installation, extension, modification or repair of an electrical installation;
- (b) the connection of machinery at the supply terminals of such machinery; or
- (e) the inspection, testing and verification of electrical installations for the purpose of issuing a certificate of compliance;

2.35 master installation electrician means a person who has been registered as a master installation electrician in terms of regulation 11 (2) for the verification and certification of the construction, testing and inspection of any electrical installation;

2.36 point of supply means the point at which electricity is supplied to any premises by a supplier;

3. Client Requirements

3.1 Leadership and Commitment

The Contractor acknowledges the KZN Department of Health's strong commitment to Health and Safety and the Contractor affirms that it has a written Health and Safety Policy, and is actively supported and endorsed by the Contractor's management. The Contractor represents that its written policy is widely disseminated and understood among its employees, and that its policy includes a description of the Contractor's organization, procedures and methods of communication to and from personnel. The Contractor must provide copies of its policy and policy statement to Department of Health (DOH).

3.2 Legal Requirements and Regulations for Health and Safety

The Contractor warrants that it is familiar with the contents and implications of the applicable Legislation; codes of practice, guidelines and standards applicable to the services to be provided. The Act and the Regulations, where applicable, require development and implementation of Work Method Statements for a range of high-risk activities, which, where applicable, the Contractor must develop and implement. The Contractor must ensure that its personnel and its subcontractor's personnel have been informed of all such laws, Acts, regulations, codes of practice, guidelines and standards.

3.3 Contractors' General Requirements for Health and Safety

The Contractor is solely responsible for carrying out the work under the Contract having the highest regard for the health and safety of its employees, the KZN Department of Health's employees and persons at or in the vicinity of the Site, the Works, temporary work, materials, the property of third parties and any purpose relating to the Contractor carrying out its obligations under this Contract.

The Contractor must initiate and maintain safety precautions and programs to conform to all applicable Health and Safety laws or other requirements, including requirements of any applicable government instrumentality and DOH institutions site requirements.

The Contractor must, at its own cost, erect and maintain safeguards for the protection of workers and the public. The Contractor must manage all reasonably foreseeable hazards created by performance of the work.

The Contractor must:

- Provide all things and take all measures necessary for maintaining proper personal hygiene, ensuring safety of persons and property and protecting the environment at or near the Site
- Avoid unnecessary interference with the passage of people and property at or near the Site
- Prevent nuisance and excessive noises and unreasonable disturbances in performing the Services

- Be responsible for the adequacy, stability and safety of all of its site operations.
- Costs for the above are borne by the Contractor
- The Contractor must comply and is responsible for ensuring that all of its Sub-contractors comply with the relevant legislation(s) and statutory regulations for health and safety, the KZN Department of Health's Health & Safety requirements included in the Contract and other document pertaining to health & safety contained in the Program Health & Safety Management System and include standards, policies, procedures, guidelines and safe work instructions
- The contractor must appoint a Competent Safety Officer who will ensure that OHS Act and its regulations are implemented.
- The appointment of a Safety Officer must be approved by DOH
- The Safety Officer must possess a National Diploma in Environmental Health/Safety Management or SAMTRAC and have at least 2years experience.

3.4 Contractor's Health and Safety Management Plan

The Contractor must prepare, implement and administer the Contractor's Health and Safety Management Plan. The Plan is in writing and must be forwarded prior to mobilisation to the site for work under the Contract to the KZN Department of Health's Safety Department for review. The Health and Safety Management Plan must comply with this Contract including Site Rules & Requirements, and applicable law relating to workplace health, safety and environmental standards. Any proposed amendments or revisions to the Contractor's Safety Management Plan are submitted to DOH for acceptance.

The Health and Safety Management Plan must provide a systematic method of managing hazards according to the risk priority and must include all mobilisation and site set-up activities. The Plan will be audited for completeness by the KZN Department of Health.

The contractor shall comply with the requirements of CR 7

The Plan must be presented and accepted by DOH BEFORE permission will be granted to the Contractor to mobilise to site

3.5 Legal & Site-Specific Requirements

The Contractor shall develop, implement and administer Health & Safety Plan. The plan shall be in writing and shall be submitted to DOH within 7 days of the contract being awarded.

The plan shall demonstrate management's commitment to safety and include, but not be limited to, the following minimum auditable elements:

- The Contractors' Safety Policy.
- How safety responsibilities are assigned to different roles within the organisation. Identification of role of Safety Coordinator, and on-site managers

- Selection, placement and training procedures, including induction and ongoing training in 'Basic Safe Work' and Occupational Health & Safety training for newly hired or promoted supervisors.
- Occupational Health & Safety communications and meetings, including daily safe task instructions and project safety meetings.
- Assessment of sub-contractors and Service Providers, including requirements for Health & Safety Plans.
- Safety awareness.
- Nomination of personnel to carry out safety inspections.
- Contractor senior management involvement
- Rules and regulations including safety procedures the Contractor has in place for recurring work activities
- Personal protective equipment rules.
- Control of dangerous and hazardous substances
- System of hazard identification and risk control, such as Risk assessments, Daily Safe Task Instructions and communication.
- Verification procedures including
- Daily site safety inspections and audits
- Inspection of plant, tools and equipment prior to introduction to site and at least monthly thereafter
- Accident/incident reporting, recording, investigation and analysis, which ensure that corrective action, are taken and this action is communicated to report initiators
- Evacuation and emergency planning
- Rehabilitation procedures that encourage an early return to work
- Record keeping, including details of what is kept and for how long

3.5.1 Hazard Identification, Risk Assessment and Risk Control

- The development of a work scope and activity risk profile identifying and considering, safety, health and environmental hazards and exposures.
- Controls to manage risks identified within the risk profile will be formalised and implemented
- Personal Protection Equipment
- The hazard identification and risk assessment process for specific operations and activities and for new activities identified after the development of the project/work scope and activity risk profile.
- The process to be used to review the effectiveness of risk controls

- Workplace hazard inspections
- The implementation of a safety observation and coaching process conducted as a minimum by persons in leadership roles
- Method by which daily activities will be assessed for hazards and controls defined before work commences
- Contractor will carry out inspections and maintain requests of the identification of and implementation of inspection and maintenance controls for plant, mobile plant, equipment and tools requiring formal management.

3.5.2 Risk Assessment

- The principal contractor must, before the commencement of any work and during such work, have risk assessments performed by a competent person appointed in written.

The risk assessment should include-

- (a) the identification of risks and hazards to which persons may be exposed to
- (b) an analysis and evaluation of the risks and hazards identified based on a documented method
- (c) a documented plan and applicable safe work procedures to mitigate reduce or control the risks that have been identified
- (d) a monitoring plan and
- (e) a review plan

- Furthermore, the contractor shall conduct job/task specific risk assessment. Communication of the risk assessments shall be kept in the OHS file.
- Risk assessment must be performed by a trained risk assessor who has been appointed in writing.
- The principal contractor shall comply with the requirements of CR 9

3.5.3 Task Specific Risk Assessment

Prior to the commencement of each work activity, a Task Specific Risk Assessment (HIRA) is completed; documented and submitted to KZN Department of Health for approval prior to the task commencing. The purpose of the HIRA is to identify all potential hazards associated with the Work and the Work environment, assess the risk these hazards present and then to provide risk control action that deals with those hazards, as well as providing to the workforce involved in the particular work activity, details of any hazards and the proposed controls.

The Task Specific Risk Assessment must:

- Describe the operation to be performed in the sequence of the basic job steps.

- Identify the hazards or potential hazards at each step.
- Identify the possible consequences for each hazard at each step.
- Assess the Initial Risk Score that each hazard presents (Probability x Severity x Frequency), the total score will be used to identify the Risk Ranking/Priority Factor.
- Once control measures have been considered and implemented, a Revised Risk Score must be allocated to each hazard.
- Identify the Site Rules that apply.
- Describe how the hazard is controlled such that the residual risk is as low as reasonably practicable and is acceptable to the work crew.
- Identify the related Work Instruction if appropriate.
- Be reviewed prior to each shift.
- Be acknowledged by way of signature of all personnel involved in the work activity

3.5.4 Safety Method Statements

- The Contractor must submit Safety Method Statements to the KZN Department of Health's nominated Representative for approval prior to the task commencing.
- The Task Items listed in the Safety Method Statement must tie up with the task items being assessed in the Task Specific Risk Assessment document.
- The Safety Method Statement must detail in a step by step and methodical manner how the task is to be done from beginning to the end and must indicate what tools/equipment will be used at each stage and/or how the work area is to be accessed.

3.5.5 Hazardous Materials

- The Contractor must set out its policy for the use, transportation, handling and storage of fuel and hazardous materials taking into account the legislative requirements. The Contractor must ensure that all hazardous materials and waste products are disposed of in accordance with applicable laws and regulations and any procedures published by DOH or in the absence of any relevant law, regulation or procedures, in accordance with sound safe practice.

3.5.6 Incident Management

- The principal contractor must appoint a competent incident investigator in writing.
- Incident management plan must be developed and implemented by the principal contractor
- All incidents must be investigated and recorded
- Reportable incidents must be reported to the Department of Labour
- Incidents must be reported to DOH within 24 hours of occurrence
- An incident register must be kept on site.

- Incident investigation report inclusive of corrective measures must be submitted to DOH

3.5.7 Emergency Preparedness and Procedures

- The principal contractor must develop an emergency procedure
- The emergency procedure must have; but not limited to:
 - A detailed response procedure;
 - List of key personnel
 - Details of emergency services
 - Steps to be taken in the event of each and every specific type of emergency
- The emergency procedure must be communicated to all employees
- Emergency numbers must be known to all employees

3.5.8 First Aid Equipment

- The principal contractor must appoint first aider in writing
- The appointed first aider must be in possession of First Aid Level 2 certificate.
- The contractor must provide his own first aid box

3.5.9 Unsafe Acts and Conditions

- The Contractor must implement a system to recognise, correct, and report unsafe acts and conditions associated with all Site activities.

3.5.10 Occupational Health & Infection control

- The contract may expose employees to biological agents; contractors must ensure that an adequate risk assessment is prepared and identifies the biological agents and controls thereof.
- Appropriate PPE must be used at all times

3.5.11 Extreme weather conditions

- If weather conditions pose a threat to Health & Safety of employees, be it extreme heat, cold, lightening or any weather condition, the Principal must apply appropriate safety measures. For hot environments; cool portable water shall be provided.

3.5.12 Medical Certificates of Fitness

- Prior to commencement of works; the principal contractor must submit valid medical certificates of fitness for all employees
- DOH will only accept Medical certificates of fitness obtained from an authorised Occupational health Practitioner
- A procedure to cater for employees with limitations must be developed and implemented by the contractor.
- Employees without valid medical certificates will not be allowed on site.

3.5.13 Plant and Equipment

- The contractor must implement and comply with OH&S Act - Electrical Machinery Reg. 9, Driven Machinery Reg. 1 – 20, Electrical Machinery Regulations and Electrical Installation Regulations.
- The Contractor must supply, at his cost, all items of plant and equipment necessary to perform the work and must maintain all items in good order and condition.
- Should any plant or equipment become inoperable for a period considered to be harmful to the progress of the work, the Contractor, must remove the unserviceable plant or equipment and replace it with similar serviceable plant or equipment at no cost to KZN Department of Health.
- No item of plant or equipment delivered to site for this Contract is removed from the site prior to the completion of the Contract without the written approval of DOH.
- DOH reserves the right to inspect items of plant or equipment brought to site by the Contractor for use on this Contract. Should DOH Representative has the opinion that any item is inadequate, faulty, unsafe or in any other way unsuitable for the safe and satisfactory execution of the work for which it is intended, He/She must advise the Contractor in writing and the Contractor must forthwith remove the item from the site and replace it with a safe and adequate substitute.

3.5.14 Personnel Protective Equipment/Clothing (PPE)

- The contractor must provide suitable and adequate PPE to all his/her employees
- PPE must be issued to all workers free of charge and a record of issuing must be kept
- Training must be provided to all employees to ensure they know how to use and maintain their PPE
- Training should include but not limited to: Cleaning of PPE, Hygiene, Correctly Putting PPE on, Inspection of PPE, Health Risks associated with the task,
- The contractor must comply with the requirements of General Safety Regulations

3.5.15 Working on Live Electrical Equipment / Sub-Station

- The Contractor may not allow any work on live electrical equipment!

3.5.16 Barricading requirements

- All openings and edges must be barricaded with solid barricading to withstand an impact of at least 100kg
- Only solid barricading covered with Orange Netting and or DOH approved equivalent barricading is allowed.
- Solid barriers to prevent persons falling into them must protect openings in floors, stairwells, staircases, open-sided buildings and any structure in the course of erection, where dangerous openings exist
- Contractors must pre-plan the delivery of floor grating, stair treads, landings and handrails to ensure safe access and protection for persons working on structures
- Barricading must be tagged, placed on register, maintained and inspected daily – The owner of the barricade's name and mobile number must appear on the tag
- All handrails and fencing must comply with DOH Standards.
- The contractor must comply with the requirements of General Safety Regulation 13 (I)

Note: Danger tape will not be accepted as barricading!

3.5.17 Working in Existing Operations

- Work must be carried out such that no interference is caused.
- Any work which requires section of the Plant to be taken out of operation with resultant interruption to production and/or other activities must be carried out in the absolute minimum of time and be on the basis of the Contractor working around the clock (within legal parameters) for the duration of such work. The times when work of this nature can be carried out must be arranged with DOH

Lock-out Procedures

In operating areas lock out procedures must follow DOH I procedures.

- There must be a separate set of procedures that cover the requirements for lockout, commissioning, start-up and hand over of the completed works.

To ensure the safety of persons working in operating plant areas, the Contractor must ensure:

Lock-out procedure compliance

Instruction to all workmen concerned in its application and implementation

Daily checking of permits

Distribution of information and communication of any other permit system required

Electrical/Mechanical Lock-out Procedure

- The contractor must appoint a competent person and compliance with OH&S Act Regulations regarding a Certificate of competency
- The contractor must ensure that all plant and equipment being put into operation is done so in an orderly manner to safeguard all personnel involved in the commissioning process.
- The Contractors 16(2) assignee must nominate and appoint a competent person as the responsible person for energising and isolating equipment in response to requests from holders of work permits
- Manager must nominate and appoint a competent person for the duty of managing the "Permit to work" system which must entail the stages of issue, revocation and completion
- All electrical control panels are to be locked by the Contractors' appointed person with padlocks having two keys for the series
- The Contractor must provide these padlocks
- The Construction Manager and the Contractors' appointed person would be the sole custodian of these keys
- The Contractor must provide a sufficient number of padlocks; each with a unique key, for his artisans who is requesting permits for working on equipment
- These padlocks and keys are numbered for the permit holder's identification
- The Contractor must ensure that multi locks are available for his staff to cater for multiple lockouts
- The Contractors Construction Manager must provide a sufficient number of tags that are to be attached to the padlocks at the point of isolation by the person working on that piece of equipment
- These tags must indicate that the equipment is locked out and bears the name and permit number of the holder.
- Permit to work books must contain three copies, first copy for retention by the person carrying out the work on equipment, second copy to be in the hands of the Contractors responsible person and a fixed third copy for the records
- Permit holders are to enter the names of their assistants in the register and after briefing them on the nature of the work and the dangers involved, they are to sign the register to this effect in the spaces provided

For the first stage of commissioning, involving rotation testing of electric motors, the Contractors responsible person must:

- Energise the motor on receipt of a permit from the electrical technician
- Isolate and lock out for adjustments to be made
- Re-energise for further testing, and
- Isolate and lock out on completion
- The electrical technician must maintain radio contact with his assistant at the local isolator to ensure that no persons are in the immediate vicinity of the equipment to be test-run.
- After making adjustments he must again test-run the unit and, if correct, sign off the permit and remove his tag and padlock

The second stage involves cold commissioning of the equipment, and the Contractors responsible person must:

- Verify that it is the correct equipment as specified on the permit \ Isolate the piece of equipment and ensure that it is de-energised
- Attach his lock and tag to a multiple locking device
- The permit holder, having witnessed the isolation, must
- Physically test that the equipment is correctly isolated

- Sign the permit to this effect
- Inform his workers of the nature of the work and hazards involved
- Complete and sign the Workers Register and attach to the permit
- Attach his lock and tag to the multiple locking device, and
- Hand the second copy of the permit and worker's register to the Contractors responsible person
- After completion of the work, the permit holder must remove all tools and equipment and leave the area in a neat and tidy condition
- The permit holder must sign all copies of the permit and workers register to the effect that his work is complete, and remove his tag and lock from the isolator
- If work continues over more than one shift, a worker must remove his tag and lock at the end of the shift.
- If another person is to work on the machine he must follow the same lockout procedure
- If a permit holder does not remove his lock after the shift, and does not report to work the following day, the construction manager is the only person authorised to remove his lock and energise the equipment after ensuring that it is safe to do so
- At the first stage of cold commissioning DOH commissioning team takes over control of the plant and must follow a similar lock-out procedure but must utilise their own plant documentation, padlocks and tagging system

Fall Protection

- The Principal contractor must designate a competent person to prepare a fall protection plan
- The principal contractor must implement the fall protection plan and amend when necessary and
- Ensure that there is continued adherence to the fall protection plan

Fall protection plan must include:

- A risk assessment of all work carried out from a fall risk position and the procedures and methods used to address all the risks identified per location
- The process of evaluation of employees medical fitness necessary to work at a fall risk position and records thereof
- A programme for training of employees working from fall risk positions and records thereof
- The procedure addressing the inspection; testing and maintenance of all fall protection equipment
- A rescue plan detailing the necessary procedure; personnel and suitable equipment required to affect a rescue of a person in the event of a fall incident to ensure that the rescue procedure is implemented immediately following the incident.
- The site manager must be in possession of the most recently updated version of the fall protection plan

The Principal contractor must ensure that

- All unprotected openings on the floors; edges; slabs; hatchways and stairways are adequately guarded; fenced or barricaded or that a similar means are used to safeguard any person from falling through such opening;
- No person/s is permitted to work in a fall risk position unless the work is performed safely as above

- Fall prevention and arrest equipment are approved as suitable and of sufficient strength for the purpose for which they are being used; with regards to the load including any person; they are intended to bear;
- Securely attached to a structure or plant and the structure or plant means of attachment thereto are suitable and of sufficient strength and stability for the purpose of safely supporting the equipment and any other person who could fall and
- Fall arrest equipment is used only where it is not reasonably practicable to use fall prevention equipment.
- The contractor must comply with the requirements of CR 10

Scaffolding

- The contractor must appoint a competent person to supervise scaffold (scaffold Supervisor)
- The contractor must appoint a competent person to erect scaffold (Scaffold erector) these must be 2 different persons
- The contractor must ensure that scaffold are tagged accordingly
- The contractor must comply with the requirements of CR 16

Vehicles and mobile plant

- The contractor must ensure that vehicles and mobile plants comply with the requirements of CR 23

Housekeeping and general safeguarding on site

- The contractor must comply with the requirements of Environmental Regulations for Workplaces (ERW) and CR 27
- The contractor must ensure continuous housekeeping on site

Stacking and storage on site

- The contractor must appoint in writing a competent stacking storage supervisor
- The contractor must comply with the requirements of GSR and CR 28

Fire precautions on site

- The contractor must minimise fire risks on site
- The contractor must comply with the requirements of ERW and CR 29

Employee Facilities on site

- The contractor must provide adequate facilities on site i.e. toilets; eating areas; changing areas and showers etc.
- The contractor must comply with the requirements of CR 30

Work on disconnected electrical machinery

- Without derogating from any specific duty imposed on employers or users of machinery by the Act, an employer or user shall, whenever work is to be carried out on any electrical machinery which has been disconnected from all sources of electrical energy; but which is liable to acquire or to retain an electrical charge, as far as is practicable, cause precautions to be taken by earthing or other means to discharge the electrical energy to earth from such

electrical machinery or any adjacent electrical machinery if there is danger there from before it is handled and to prevent any electrical machinery from being charged or made live while persons are working thereon.

Notice

- An employer or user shall cause notices to be displayed within, and at all designated entrances to premises, as the case may be, where generating plant and transforming, switching or linking apparatus are situated.

Notices shall:

- (a) prohibit unauthorized persons from entering such premises;
- (b) prohibit unauthorized persons from handling or interfering with electrical machinery;
- (c) contain directions of procedure in case of fire; and
- (d) contain directions on how to resuscitate persons suffering from the effects of electric shock:

Switchgear and transformer premises

- The contractor shall cause enclosed premises housing switchgear and transformers:
 - (a) to be of an ample size so as to provide clear working space for operating and maintenance staff;
 - (b) to be sufficiently ventilated to maintain the equipment at a safe working temperature;
 - (c) to be, as far as is practicable, constructed so as to be proof against rodents, leakage, seepage and flooding;
 - (d) to be provided with lighting that will enable all equipment, thoroughfares and working areas to be clearly distinguished and all instruments, labels and notices to be easily read;
 - (e) to have doors or gates, which can be readily opened from the inside, opening outwards;
 - (f) to be provided with fire extinguishing appliances or systems which are suitable for use on electrical machinery and which are maintained in good working order: Provided that, in the case of unattended premises, suitable fire extinguishing appliances be made available at such premises only when work is in progress thereon or therein; and
 - (g) to be of such construction that persons cannot reach in and touch bare conductors or exposed live parts of the electrical machinery.
- (2) No person other than a person authorized thereto by the employer or user shall enter, or be required or permitted by the employer or user to enter, premises housing switchgear or transformers, unless all live conductors are insulated against inadvertent contact or are screened off:

Provided that the person so authorized may be accompanied by any other person acting under his control.

- The contractor must comply with the requirements of Electrical Machinery Regulation (EMR)
-

Electrical control gear

- The principal contractor shall provide all electrical machinery with controlling apparatus and protective devices which shall, as far as is reasonably practicable, be capable of automatically isolating the power supply in the event of a fault developing on such machinery.
- The contractor must; whenever reasonably practicable, provide switchgear with an interlocking device so arranged that the door or cover of the switch cannot be opened unless the switch is in the 'off position and cannot be switched on unless the door or cover is locked.
- The contractor shall mark or label all controlling apparatus permanently so as to identify the system or part of the system or the electrical machinery which it controls, and where such control apparatus is accessible from the front and the back these markings shall be on both the front and the back.
- The contractor shall post a notice at switchgear or control gear which has been switched off or locked out to enable persons to work on electrical machinery or other machinery operated by electricity and controlled by. Such switchgear or control gear, warning against reclosing such switchgear or control gear.
- The contractor must comply with the requirements of EMR 7

Switchboards

- The contractor shall provide an unobstructed space for operating and maintenance staff at the back and front of all switchboards, and the space at the back shall be kept closed and locked except for the purpose of inspection, alteration or repair.
- The contractor must comply with the requirements of EMR 8

Electrical machinery in hazardous locations

- The contractor shall identify all hazardous locations and classify them in accordingly.
- No person may use electrical machinery in locations where there is danger of fire or explosion owing to the presence, occurrence or development of explosive or flammable

articles, or where explosive articles are manufactured, handled stored, unless such electrical machinery, with regard to its construction relating to the classification of the hazardous locations in which it is to be used, meets the requirements of the safety standard incorporated for this purpose in these Regulations under section 44 of the Act.

- The contractor must comply with the requirements of EMR 9

Portable electric tools

- No person shall use or permit the use of a portable electric tool with an operating voltage that exceeds 50 V to earth unless-

(a) it is connected to a source of electrical energy incorporating an earth leakage protection device, the construction of which meets the requirements of the relevant health and safety standard incorporated into these Regulations under section 44 of the Act; or

(b) it is connected to a source of electrical energy through the interposition between each tool and the source of an individually double-wound isolating transformer, the secondary winding of which is not earthed at any point and the construction of which meets the requirements of the relevant health and safety standard incorporated into these Regulations under section 44 of the Act; or

(c) it is connected to a source of high frequency electrical energy derived from a generator which is used solely for supplying energy to such portable electric tool and which arrangement is approved by the chief inspector; or

(d) it is clearly marked that it is constructed with double or reinforced insulation.

- The contractor must comply with the requirements of EMR 10

Portable electric lights

- No employer or user shall use or permit the use of a portable light where the operating voltage exceeds 50 V unless –

{a} it is fitted with a substantial handle which is made of non-hygroscopic, non-conducting material;

{b} all live metal parts or parts which may become live owing to a faulty circuit are completely protected against accidental contact.

(c) the lamp is protected by means of a substantial guard firmly fixed to the insulated handle; and

(d) the cable lead-in is such that the insulation can withstand rough use

- The contractor must comply with the requirements of EMR 11

Earthing

- An employer or user shall cause:

(a) roofs, gutters, downpipes and waste pipes on premises to which electrical energy is supplied to be earthed, except :-

(i) Where the operating voltage does not exceed 50 V;

(ii) Roofs made of non-conductive material or metal roofs covered by non-conductive material;

(iii) Gutters, downpipes and waste pipes made of non-conductive material or gutters and downpipes attached to a metal roof which is covered by non-conductive material;

(iv) Roofs, gutters, downpipes and waste pipes on premises which receive electricity by means of underground service connections: Provided that the connection is to the conductive structures;

- The contractor must comply with the requirements of EMR 18

Responsibility for electrical installations

- The user or lessor of an electrical installation, as the case may be, shall be responsible for the safety, safe use and maintenance of the electrical installation he or she uses or leases
- The contractor must comply with the requirements of Electrical Installations Regulations (EIR) 2

Design and construction

- A registered person shall exercise general control over all electrical installation work being carried out, and no person may allow such work without such control
- The contractor must comply with the requirements of EIR 5

Electrical contractor

- No person may do electrical installation work as an electrical contractor unless that person has been registered as an electrical contractor in terms of these Regulations
- The contractor must comply with the requirements of EIR 6

Certificate of compliance

- Every user or lessor of an electrical installation, as the case may be, shall have a valid certificate of compliance for that installation in the form of Annexure 1, which shall be accompanied by a test report in the format approved by the chief inspector, in respect of every such electrical installation.
- The contractor must comply with the requirements of EIR 7

Commencement and permission to connect installation work

- No person shall commence installation work which requires a new supply or an increase in electricity supply capacity unless the supplier has been notified
- The contractor must comply with EIR 8

Working on moving or electrically alive machinery

- The contractor shall not permit any employee either than a competent person or a person who has been trained to the satisfaction of an inspector to do any work on or near moving or electrically alive machinery if such work may endanger him
- The contractor must comply with the requirements of General Machinery Regulations (GMR)

3.5.18 Notification of Construction Work

- The principal contractor must notify the department of Labour in writing 7 days before commencement of construction works. The Contractor must obtain a permit from DOH and necessary test must be conducted i.e testing for gases and vapour presents, etc.
- The permit must list specific condition and hazards involving the specific task

3.5.19 Vehicles and mobile plant

- The contractor must ensure that vehicles and mobile plants comply with the requirements of CR 23
- Vehicles and mobile plants must be inspected daily before use and records thereof must be kept
- Competent personnel must be appointed to use and manage such

3.5.20 Housekeeping and general safeguarding on site

- The contractor must comply with the requirements of Environmental Regulations for Workplaces (ERW) and CR 27
- The contractor must ensure continuous housekeeping on site
- Accumulated waste must be removed regularly
- The site must be kept neat and clean at all times

3.5.21 Stacking and storage on site

4. Training and Competency

- Prior to the commencement of the work, the Contractor must provide current documentation to the satisfaction of DOH verifying that the Contractor's personnel are competent and have the appropriate qualifications, job skills and training as required by this Contract and applicable laws.
- The Contractor must ensure that all his employees and his Sub-Contractors' employees working on the site are adequately trained in the type of work to be performed, are trained in relevant procedures and have the appropriate qualifications, certificates and are under competent supervision. Records are to be maintained on site.
- The Principal Contractor and all contract employees are holders of current certificates or licenses, where the operation being performed requires such or applicable industry standard where legislation does not prescribe or have registered courses to meet the requirements.

4.1 Induction in Health and Safety

- The Contractor must ensure that no employee of the Contractor or its subcontractors, including transport and delivery Contractors entering the site delivering materials and/or equipment, must proceed to enter the Site or any operations area until they have received all training required under applicable laws and regulations, including, but not limited to, work activity inductions and the KZN Department of Health's Site-specific induction.
- The Contractor must also prepare and present to all its employees its own Contractor Induction, explaining the Contractor's Safety Management Plan, the Contractor's Rules, the obligations imposed by the Occupational Health and Safety Act and Regulations.
- The contractor must comply with: OH&S Act - Section 8

5. Smoking

- The Contractor must not permit smoking at the Site except within designated smoking areas.

6. Intoxicating Liquor or Drugs

- The contractor must implement and comply with OH&S Act – General Administrative Regulation 10
- Any person found on the site or attempting to enter site, in possession of or consuming intoxicating liquor or illegal drugs or considered unfit for work from the apparent influence of intoxicating liquor or illegal drugs or prescription drugs, is removed from the site.

7. Housekeeping

- The contractor must implement and comply with Construction Reg. 27
- The Contractor must maintain all work areas in a tidy state, free of debris and rubbish.
- The Contractor must dispose of all debris, rubbish, spoil and hazardous waste off site, outside KZN Department of Health's property in a designated and authorised area or facility.

The Contractor should make itself aware of the KZN Department of Health's waste management plan and collection and disposal arrangements and align its waste management program accordingly.

- In cases where an inadequate standard of housekeeping has developed and compromised safety and cleanliness, DOH has the right to instruct the Contractor to cease work until the area has been tidied up and made safe.
- The Contractor must carry out regular safety/housekeeping inspections at least weekly to ensure maintenance of satisfactory standards. The Contractor must document the results of each inspection and must maintain records for viewing by DOH.

8. Fundamental health and safety requirements

Before any work commences, proof of and the following non-negotiable deliverables are required:

- Incident investigation training by Construction Manager and or Safety Officer
- Letter of good standing with the Workman's Compensation Commissioner
- Legal liability training of all Supervisors and Construction Managers
- Original of the notification of construction work stamped by the Department of Labour
- Public Liability Insurance
- Competency training certificates of people to execute the job
- Method statements for work to be conducted
- A Baseline Risk Assessment
- Risk Assessments for every Job/Task
- Signed legal appointments as required by legislation
- Contractors' Safety Officer CV and competency certificates
- Health and Safety Management Plan
- Health and Safety file
- All equipment to be on a current register, backed up by relevant test certificates
- A Medical fitness certificate for each employee with Annexure 3 completed per employee
- Proof of induction (Contractor induction training)

9. Management of Covid-19

9.1 Covid- 19 Documentation

The principal contractor shall;

- Develop a policy on COvid-19; signed by CEO

- Appoint a Covid-19 compliance officer in writing
- Covid-19 prevention and management plan must be developed
- Conduct a risk assessment to determine exposure to Covid-19
- Daily Safety Task Instructions (DSTI's) shall include Covid-19.

9.2 Hand washing facilities

Construction sites must be equipped with hand washing facilities at the usual welfare facilities.

Ensure soap and fresh water is readily available and kept topped up at all times.

Ensure regular cleaning of hand wash facilities and provide adequate bin for disposal of hand paper towels with regular disposal.

Hand washing techniques posters shall be posted around the hand washing facilities

Hand sanitising agents must also be placed at strategic areas

9.3 Medical Certificates of Fitness

Principal contractor shall keep copies of employee's medical certificates of fitness on site safety file.

Having studied the medical certificates of all employees; the principal contractor must ensure that high risk employees are managed accordingly i.e. employees with underlying medical conditions

9.4 Screening

The principal contractor must ensure that all personnel accessing their sites are screened.

All cases referred for testing shall be reported to relevant Department of Health's project manager.

9.5 Travel to site

The principal contractor shall arrange safe transportation of employees to and from site.

Ensure that vehicles are disinfected on daily basis.

Where single occupancy of vehicle is not practicable; employees shall sit as far apart as the vehicle allows; and all windows must be kept open.

9.6 Eating Areas

The principal contractor must ensure that there are dedicated eating areas for employees.

Ensure that eating areas are kept in a hygienic condition and disinfected after use.

The contractor shall stagger breaking times to reduce congestion and contact.

Employees shall be encouraged to follow the acceptable social distancing measures and seating arrangements must be as such.

Hand washing facilities and or sanitisers must be provided in these areas.

9.7 Changing facilities

The principal contractor shall introduce staggered start and finish times to reduce congestion and contact at all times.

Changing facilities shall be cleaned and disinfected regularly.

Based on the size of each facility; the contractor shall determine how many people can use a changing facility at any one time to maintain the acceptable distance

9.8 Avoiding close working

There will be circumstances where it is not possible or safe for employees to distance themselves from each other by the acceptable distance.

Principal contractor shall ensure that where the acceptable distance is not practicable-:

- employees have no symptoms of Covid-19;
- allow only 1 person per m²
- PPE is worn correctly and is in line with risk assessment and
- Supervision is maintained throughout the activity.

9.9 Deliveries

All personnel delivering equipment and material to site shall be subjected to screening. Equipment and materials delivered on site must be disinfected at a designated decontamination area to avoid transition of the virus.

9.10 Personal Protective & Equipment Clothing

Personal protective equipment & clothing refers to a variety of barriers, used alone or in combination, to protect against hazardous agents in the environment.

The principal contractor shall ensure that his employees and sub-contractor employees are issued with suitable PPE and that PPE is worn at all times and in a correct manner

Ensure that used PPE is disposed of in an acceptable manner.

9.11 Training & awareness

The principal contractor shall ensure continuous training and awareness on Covid-19 and measures that can be used to minimise the spread

Training to include but not limited to:-

- Cough etiquette; social distancing; Hand washing; Screening station; Correct use and disposal of PPE; Reporting of symptoms to the employer and any other topic relevant to the pandemic.

9.12 Cleaning Procedures

The principal contractor shall establish adequate cleaning and disinfection procedures and intervals thereof.

This includes but limited to:-

- cleaning to prevent contamination
- taps and hand washing facilities
- toilet flush and seats
- door handles
- handrails on staircases and corridors
- lift and hoist controls
- machinery and equipment controls
- keyboards; photocopies and other office equipment

10. Close out requirement

The Health & Safety file for the Principal contractor and all contractors requires closure and handover to the client at the completion of the project. Documentation required includes all records from the start of the project. Daily or monthly plant inspection records are not required unless they are related to an incident. All records to be in electronic format and submitted to DOH for approval before final submission.

The list of documents to be submitted includes but not limited to:

- Client specification
- Principal contractor's OHS plan
- Covid-19 management plan
- Organograms
- Legal appointments
- Letters of good standing for the project
- Incident records
- Non-conformance records
- Audits
- Method statements
- Risk assessments
- Safe work procedures
- Medical certificates of fitness

11. OMISSIONS FROM HEALTH SAFETY AND REQUIREMENTS SPECIFICATION

- By drawing up this OHS specification, DOH has endeavoured to address the most critical aspects relating to OHS issues in order to assist the contractor in adequately providing for the health and safety of employees on site. Should DOH not have addressed all SHE/Q aspects pertaining to the work that is tendered for, the contractor needs to include it in the SHE plan and inform DOH of such issues when submitting.

Contractor's Acceptance & Acknowledgement of the Health & Safety Specification:

I, _____ (print name in full), the undersigned responsible person (Contractors 16.1/16.2 Appointee) for: _____ (Company Name) declare that I have read, understood and accept the responsibilities and requirements of this Health & Safety Specification for the project: **KZNCH Installation of new generator set** will ensure that this Health & Safety Specification is communicated to the relevant parties so that the requirements hereto can be complied with.

**Contractor's Responsible Person
(16.1/ 16.2 Appointee)**

Date