



**SCOPING REPORT FOR A HIGH DEPENDENCY UNIT AT
PIGGS PEAK HOSPITAL, ESWATINI**

06/04/2022

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1. INTRODUCTION

A team from Right to Care visited three hospitals in Eswatini to assess their facilities for the establishment of a High Dependency Care Unit. The team consisted of the following members:

- Mr. Willie Nieuwoudt: Disaster Medicine Consultant for Right to Care
- Mrs. Heelna Nieuwoudt: ICU advisor for Right to Care
- Mr. Molefe Sematlane [Pr. Eng]: Professional Civil Engineer for Right to Care
- Mr. Cliffs Wagbafor: Mechanical engineering Technologist for Right to Care

2. PURPOSE FOR SCOPING EXERCISE

The team was to undertake a scoping exercise to assess the Piggs Peak Hospital facility's suitability for establishing a High Dependence Care Unit [HDCU]. The scoping exercise took place on Wednesday the 6th of April 2022.

The scoping brief consisted of the main guidelines as listed below:

- HDCU space should be able to accommodate 2-4 beds with oxygen supply of 15-30 l/min for each bed
- Electricity in the HDCU should be able to power main medical equipment and suctioning without interruption.
- The identified space should be easily accessible and within acceptable distance from essential areas
- Availability of suitable main medical equipment
- Availability of suitably qualified human resources

3. INTRODUCTORY MEETING WITH HOSPITAL MANAGEMENT

An introductory meeting was held between the Right to Care team and the Piggs Peak Hospital management. The hospital management team was formed by the Acting Senior Medical Officer [Dr. Rian Munro], two hospital Matrons [Ms. Pearl Masuku and Ms. Precious Nkambule] and hospital Anesthetist [Ms. Catherine Mamba]. No representation was available from the biomedical and maintenance department[s].

This 220-bed hospital have:

- An OPD
- Casualty department
- Laboratory
- X-Ray department
- Male and female surgical wards
- Male and female medical wards
- TB isolation ward
- Covid ward
- 2 Theatres
- Maternity ward
- Paediatric ward
- Renal Ward

The hospital has an average occupancy rate of 32% except for maternity whose occupancy rate is 100%.

4. SCOPING EXERCISE

Two areas earmarked by the hospital for the possibility of establishing a High Dependency Care Unit were visited and assessed. First option was in the Covid Isolation ward, which was unsuitable due to its location inside the Covid Isolation Ward, long distance from the sluice, Casualty Department, and x-rays. The second option was in the Renal section and was concluded to be more suitable due to its ability to fulfil most criteria set for HDCU compliance. It is however not suitable to zone into green, yellow, and red due to its size.

The selected room in the renal section was deemed suitable due to the fulfilment of the following factors:

- Ability to accommodate three beds
- Ability to permit adequate airflow
- Proximity to essential nursing areas
- Ability for sufficient lighting for observation procedures
- Enough space for keeping patients' records
- Already having oxygen and vacuum ports
- Availability of patient toilet
- Proximity to the x-ray, theaters, and Casualty Department
- Easy access from ambulance off-loading

The two pictures below show the outlook of the selected room for purpose of HDCU.



Figure 1: Opposite ends of the Room identified as HDCU in the Renal Section

5 PROPOSED HDCU OXYGEN SUPPLY

Piggs Peak Hospital main oxygen supply source is by rented cylinders from Afrox, some of which get connected to the manifold which supplies selected parts of the hospital through partial reticulation. The partial reticulation only serves Main and Minor theatres, Maternity, Female, Male, Paediatric and Neonatal wards.

Although the Acting Senior Medical Officer [SMO] indicated imminent erection of an oxygen bulk tank at Piggs Peak hospital, currently the reticulated oxygen to the wards or sections of the hospital comes from the 2 x 5 [i.e., ten cylinders] cylinder manifold bank shown in picture below.



Figure 2: Existing 10-cylinder Manifold Bank

It is recommended that an additional manifold oxygen bank system is erected to perform oxygen supply source purpose specifically for the HDCU. The additional manifold system should consist of a 2 x 5 of 10.2Kg cylinder bank; this will allow the need to replace cylinders daily at a maximum flow rate of 15l/min.

The manifold bank size is calculated as follow:

3-bed HDU one oxygen Terminal Unit (TU) per bed.

The total flow rate of oxygen required in the three Tus is $15\text{l}/\text{min} \times (3\text{Tus}) \times (60\text{min}) \times (24\text{Hrs}) = 64800 \text{ l}/\text{day}$

A 10.2kg oxygen cylinder contains 7650 liters of oxygen

The number of Cylinders required for the manifold bank is: $64800 \div 7650 = 9$ cylinders

The number of cylinders per side of manifold bank = $9 \div 2 = 4.5$ which is rounded up to 5 cylinders per side.

Therefore, a 2 x 5 Oxygen cylinder manifold system is required specifically for the HDU in Piggs Peak Hospital.

The new proposed Cylinder Manifold Bank should also make provision for connection to the reticulation that will come from the Vacuum Insulated Evaporator [VIE] tank. It will therefore function as a back-up should the central oxygen supply need maintenance or fail.

6. PROPOSED HDCU VACUUM/SUCTION SYSTEM FOR HDCU

There is a central vacuum system [See Figure 3 below] which is partially reticulated to serve Main and minor theatres, Maternity, Covid Isolation, Male, Female, Children and Neonatal wards. The identified room for HDCU in the Renal section also has vacuum reticulation. The hospital also has a portable suction machine that could serve as backup.



Figure 3: Existing Vacuum System

7. POWER SUPPLY AND BACKUP GENERATOR

There is a stable power supply in the Piggs Peak hospital and there is a back-up generator [of 150 kVA capacity] with an automatic changeover, that powers the entire hospital operation when main power from the grid is down.

The identified ward in the Renal section currently has four (4) electrical plugs. There will be a need to install an additional five inbuilt plugs per bed to have the identified unit suitable for HDCU electrical compliance. Alternatively, multiplugs with own trip switches could be used by the hospital.

The lights in the facility are on one circuit and cannot dim. The scoping team propose that bed lights are installed at each bed

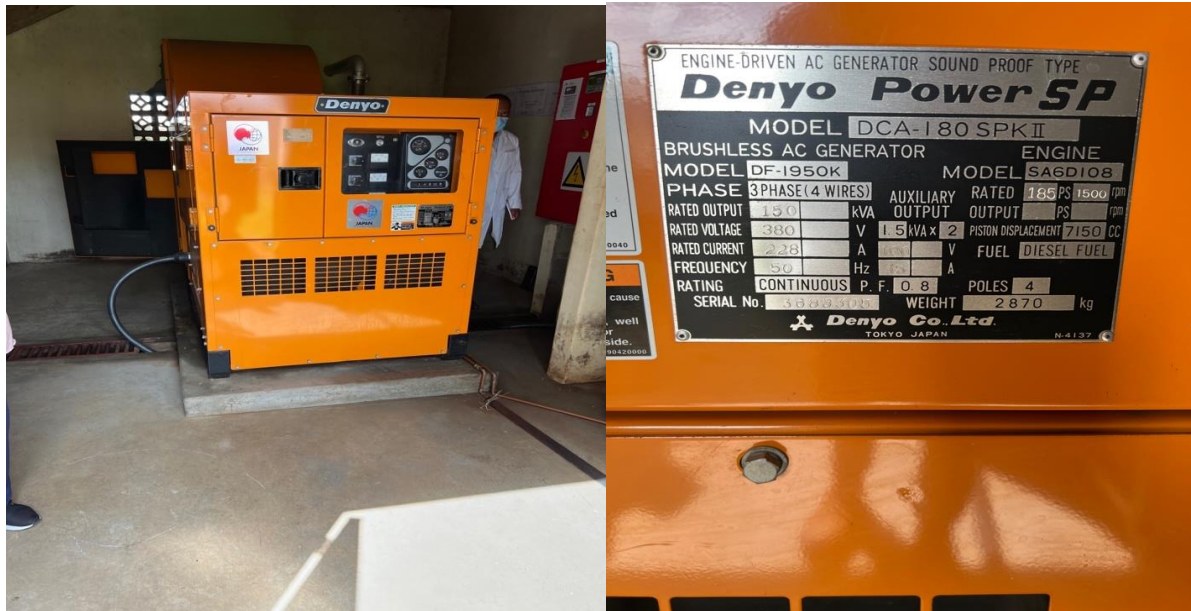


Figure 4: 140KVA Standby Generator with Automatic Change-over

8. STORAGE FACILITY IN THE HDCU

The proposed unit has storage capacity for medicine and consumables and can accommodate scheduled medicine cupboard. It is recommended that the facility be provided with a refrigerator for medicine storage and lockable boxes suitable for scheduled drugs that need to be stored in a refrigerator.

9. EQUIPMENT FOR THE HDCU

The hospital management indicated that they could provide or order the majority of the hospital furniture for the HDCU, but main medical equipment will have to be procured as part of the project.

10. STAFF AVAILABILITY

The hospital does not have any ICU qualified or experienced staff available. It is recommended that staff are identified by the Matron that could receive ICU orientation training and that a qualified ICU nurse is appointed to oversee patient care

11. CONCLUSION

The following conclusions hold:

- The teams [i.e., both RTC and Piggs Peak Management] successfully identified a room in the Renal section of the hospital suitable for establishing the High Dependency Care Unit.
- The existing central vacuum will be able to support the HDCU operation.
- A new 2 x 5 of 10.2Kg oxygen cylinder manifold bank is proposed to supply oxygen needed in the HDCU
- The new proposed oxygen cylinder manifold can be connected to the hospital reticulation with a non-return valve to easily isolate an act as a backup should the central oxygen supply fails.
- The report should be read in conjunction with the appended Scoping instrument containing information on the findings and interventions.