	<b>Scope of Work</b>	<b>NTCSA/Business Unit/ Department/Section</b>  Apollo and CS
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Area of Applicability: **National Transmission Company South Africa SOC Ltd – Apollo & CS**

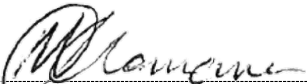


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### CONTROLLED DISCLOSURE

## **1. Introduction**

The Apollo Converter Station is a distinctive high voltage direct current (HVDC) facility that imports 1,800 MW of power from Mozambique's Songo station to South Africa. This transfer occurs via two 533 kV HVDC transmission lines. Apollo Converter Station encompasses valve-cooling equipment that form part of the converter scheme cooling system. The main function of the valve cooling system is to dissipate the heat due to power losses generated in two bridges during the conversion of power from DC to AC. The cooling circuit consists of a main circuit with a treatment circuit in parallel. In the main circuit a cooling liquid is circulated through the bridges converter valves and the outdoor coolers to achieve cooling in the system and the treatment circuit is included to keep the required quality of the cooling liquid. The system is a closed single circuit and includes equipment such as main flow pumps, a deaeration vessel, filters and an expansion vessel.

An expansion vessel forms an important part of the water-cooling circuit. To keep the liquid fresh and with low conductivity, a small part of the main flow thus circulates through this vessel. The expansion vessel is pressurized via a nitrogen cushion to achieve the system static pressure. The nitrogen cushion is pressurized automatically during operation by the pressure regulator which is connected to the nitrogen bottles/ cylinders. In the cooling circuit, the system is designed to have one active and one redundant nitrogen cylinder. The two cylinders are usually installed in the system to ensure that when a low-pressure alarm is activated one can interchange the active nitrogen cylinder with the redundant cylinder with ease and at a reduced time thus causing minimal interruption to the system.

To ensure that the cooling system of the converter valves in the bridges functions effectively it is thus imperative to ensure that the cooling circuit is maintained accordingly and that vital circuit components such as the Nitrogen are replenished when needed to avoid disrupting or causing Bridges to trip. Failing to achieve the above affects two bridges and thus could result in the loss of approximately 440 MW.

## **2. Supporting Clauses**

### **2.1 Scope**

#### **2.1.1 Purpose**

The purpose of this document is to stipulate the details of the Scope of work for the supply and replenishment of Nitrogen Gas at Apollo Converter Station (CS).

#### **2.1.2 Applicability**

This document shall apply to Apollo Converter Station under the Apollo and Centralised Services (CS) business unit.

#### **2.1.3 Effective date**

On the dates that the document is authorised.

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## 2.2 Normative/Informative References

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

### 2.2.1 Normative

[1] None

### 2.2.2 Informative

[2] ISO 9001 Quality Management Systems

## 2.3 Definitions

Definition	Description
Maintenance	A combination of all technical, administrative and managerial actions during the lifecycle of an item intended to retain it in, or restore it to, a condition in which it can perform its required function.
Preventive Maintenance	Planned time or schedule-based maintenance carried out with the explicit objective of preventing functional failures and is directed towards maintaining the physical condition of the asset / plant or equipment. It includes scheduled overhauls and scheduled replacement of worn-out parts or failure prone components.

## 2.4 Abbreviations

Abbreviation	Explanation
AC	Alternating Current
Apollo CS	Apollo converter Station
Apollo & CS	Apollo and Centralised Services
DC	Direct Current
HVDC	High Voltage Direct Current
NTCSA	National Transmission Company South Africa
RPM	Revolution per minute
SoW	Scope of Work

## 2.5 Roles and Responsibilities

Appointed member(s) of the Grid shall detail the scope of work to be executed.

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## 2.6 Process for Monitoring

Not Applicable.

## 2.7 Related/Supporting Documents

Not Applicable.

## 3. Scope of Work

The service is required at Apollo CS for:

1. Supply and delivery of 10 x 11kg Nitrogen Cylinders and;
2. Periodic replenishment of Nitrogen gas (as and when Nitrogen Cylinders require re-filling)
3. Rental of Cylinders for the duration of the Contract (i.e. over a period of 5 years).

These items must be delivered to Apollo Converter Station located in Olifantsfontein.

Coordinates: 25°55'24.40" S 28°16'40.65" E

## 4. Technical Specifications

The required specification for the Nitrogen gas is as indicated in Table 1, below:

**Table 1: Specification for required gas**

Nitrogen Gas	The nitrogen gas used in the system is of ordinary trade quality. Typical specification is AGA Nitrogen Plus: <ul style="list-style-type: none"><li>- nitrogen &gt;99.99% (High Purity)</li><li>- water &lt;5 ppm</li><li>- oxygen &lt;5 ppm</li><li>- hydrocarbos &lt;1 ppm</li></ul>
Cylinder	11 kg

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## 5. Acceptance

This document has been seen and accepted by:

Name	Designation
M Chamane	Maintenance Senior Engineer
M Titus	Maintenance Chief Engineer
Z Sethusa	Maintenance manager

## 6. Revisions

Date	Rev.	Compiler	Remarks
May 2026	1	M Chamane	Scope of Work

## 7. Development Team

N/A

## 8. Acknowledgements

N/A

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