RELIABILITY & H.V. EQUIPMENT DEPARTMENT

RAMS REQUIREMENTS FOR 170 KV WALL BUSHINGS

1. RAMs REQUIREMENT

RELIABILITY, AVAILABILITY, MAINTAINABILITY and Safety (RAMs) for Wall bushing with Um= 170KV

1.1. Reliability:

The Bidder shall present the reliability tasks and methods which are used to improve the design for reliability and evaluate the MTTF/MTBF for **(*) Major Failures** [1]only, of the 245 kV ≥ U_m ≥ 170 kV Wall bushing components.

The Bidder shall provide expected values for the relevant parameters of the 245 kV ≥ U_m ≥ 170 kV Wall bushing components and shall add their distribution whenever possible.

1.2. Failure Analysis:

From his Failure Reporting Analysis and Corrective Action System (FRACAS), Bidder shall present a failure report and the analysis of the failures which occurred during the service life of similar 170 kV Wall bushing components **manufactured by him**. The report should include the withdrawn conclusion and the corrective actions subsequently undertaken.

[1] **(*) IEC 62271-1**
3.1.12
major failure (of switchgear and control gear)
failure of switchgear and control gear which causes the cessation of one or more of its fundamental functions
Note 1 to entry: A major failure may result in an immediate change in the system operating conditions, for example, the backup protective equipment will be required to remove the fault or will result in mandatory removal from service within 30 min for unscheduled maintenance.

1.3. 170 kV STATION Wall bushing RAM DATA:

1.3.1. For porcelain insulator: Bidder shall submit the following 245 kV ≥ U_m ≥ 170 kV Wall bushing RAM data

Component	MTTF (Yrs)	EOL (Yrs)	MTTR (Hrs)
1. Wall Bushing			

1.3.2. For composite insulator, the Bidder shall submit the following 245-170 kV Wall bushing RAM data:

Component	MTTF (Yrs)	EOL (Yrs)	MTTR (Hrs)
1. Wall Bushing			

Where:

MTTF: Mean Time To Failure, For *Major Failure
EOL: Expected Operating Life.
MTTR: Mean Time To Replace, For *Major Failure.

1.4. Field data:

1.4.1. For porcelain insulator, the bidder will fill the following table:

Field RAM Data		Current year-8	Current year-7	Current year-6	Current year-5	Current year-4	Current year-3	Current year-2	Current year -1
Total number of installed Wall Bushings 245 kV ≥ U_m ≥ 170 kV									
Number of Major Failures									
Mean Time to Repair/Replace									

1.4.2. composite insulator, the bidder will fill the following table:

Field RAM Data		Current year-8	Current year-7	Current year-6	Current year-5	Current year-4	Current year-3	Current year-2	Current year -1
Total number of installed Wall Bushings 245 kV ≥ U_m ≥ 170 kV									
Number of Major Failures									
Mean Time to Repair/Replace									

2. Unreliability Demonstration Procedure (UDP)/Reliability Test

NOGA IISO could conduct an Unreliability Demonstration Procedure (UDP)/Reliability Test, according to NOGA IISO's Judgement. The manufacturer may request NOGA-ISO to see example for a UDP. The final UDP could be changed according to each individual case and circumstances, as to be decided by NOGA IISO.