RELIABILITY & H.V. EQUIPMENT DEPARTMENT

RAMs Requirements For 400 kV

SURGE ARRESTERS

A. REIABILITY, AVAILABILITY, MAINTAINABILITY and Safety (RAMs) for AIS SURGE ARRESTERS

a. **Reliability**

The Bidder shall present the reliability tasks and methods which are (will be) used to improve the design for reliability, and evaluate the MTTF/MTBF, for (*)Major Failures only, of the 330 - 336 kV AIS Surge Arresters and their components.

The Bidder shall provide expected values for the relevant parameters of the 330-336 kV Surge Arresters, and shall add their distribution whenever possible.

b. **Failure Analysis**

From this 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 330 - 336 kV AIS Surge Arresters manufactured by him. The report should include the withdrawn conclusion and the corrective actions subsequently undertaken.

(*)IEC 62271-1 3.1.12

major failure (of switchgear and controlgear) failure of switchgear and controlgear 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.

c. **336 kV AIS Surge Arresters RAM DATA**

Bidder shall submit the following 330 - 336 kV AIS Surge arresters RAM data:

Table 1: Surge Arresters Components RAM parameters of similar construction and ratings:

Component	MTBF (Yrs)	EOL (Yrs)	MTTR (Hrs)
Porcelain/Polymeric housing insulators			
ZnO Disc			
Pressure relief			
Insulating Base			
Painting			
Others			

Where:
MTBF: Mean Time between Failures (for *Major Failures).
EOL: Expected Operating Life.
MTTR: Mean Time to Repair (for *Major Failures).

d. **Field Data**

The bidder will fill the following table:

Table 2: Field Demonstrated Ram Data for Surge Arrester (last 9 years)

Field RAM Data		-1 [years]	-2 [years]	-3 [years]	-4 [years]	-5 [years]	-6 [years]	-7 [years]	-8 [years]	-9 [years]
Total number of installed SA's										
Total No. of Major Failures										
Specific Part which undergo Major Failure	Porcelain/Polymeric housing insulators									
	ZnO Disc									
	Pressure relief									
	Insulating Base									
	Painting									
	Others									
Mean Time to Repair/Replace										

e. 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 to see example for a UDP. The final UDP may change according fora specific individual case and circumstances, as to be decided by NOGA IISO.