

Possibilities of condition assessment of OLTCs in converter transformers

A2

PS1 Question 1.4: Which requirements are necessary for HVDC converter transformers to do a risk and condition assessment to ensure that they will perform satisfactorily?

Alexei Babizki, Germany



Remarks: The content of this presentation refers only to possibilities of condition assessment of OLTCs (vacuum switching technology). Condition assessment of the transformer itself or other parts is not covered.

- OLTCs with vacuum switching technology are maintenance free up to 300.000 switching operations
- In many applications this is equivalent to maintenance free over the transformer lifetime.
- Nevertheless, it can be required to perform regular checks.
Reasons could be:

- **regulatory requirements** (e.g., ISO 55000, to undertake risk assessment – or report the required KPIs from the management)
- **insurance policies** (verify an appropriate asset management policy)
- **internal service processes** , (e.g., regular transformer service incl. OLTC service for very critical applications like HVDC)



Conclusion: Measures to assess the condition of OLTCs (as part of the transformer) must be available.

Possible measures transformer lifetime

Transformer Commissioning

OLTC tests during transformer commissioning (SAT)

- VAM / DRM fingerprint
- Oil analysis fingerprint
- Visual inspection of the complete OLTC equipment after installation

Transformer ENERGIZED

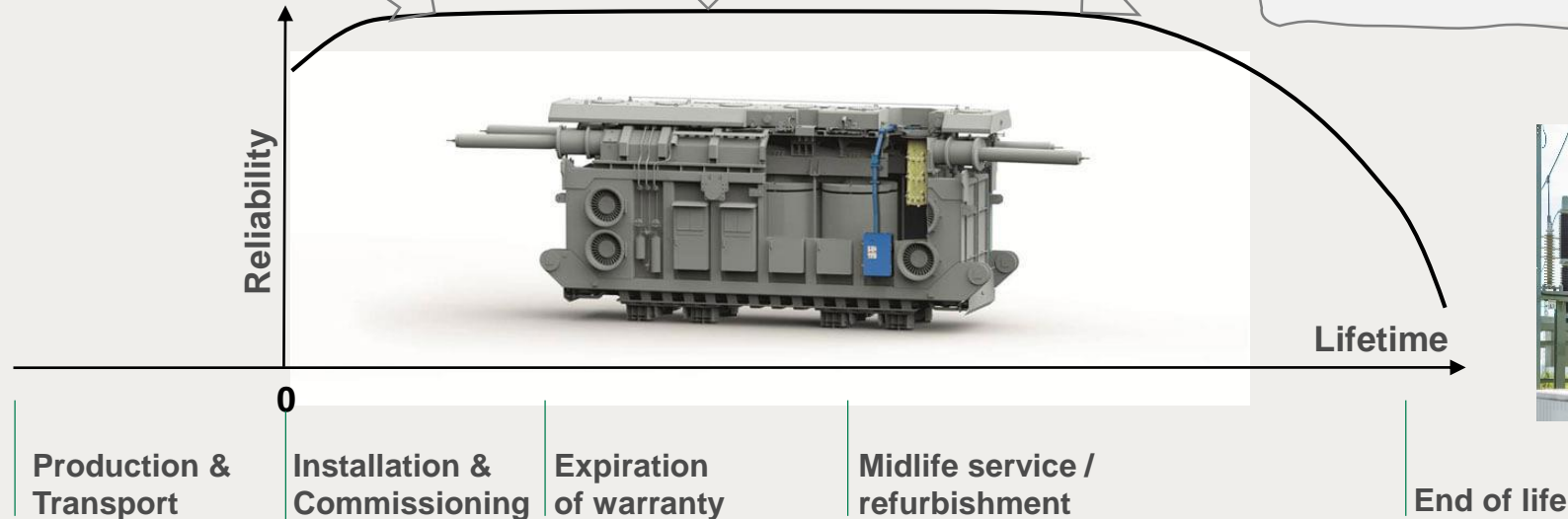
- Visual inspection of accessible parts
- Oil analysis
- Vibroacoustic measurement
- DGA

Combination with annual inspection

Transformer DEENERGIZED

- Visual inspection of the *complete* OLTC equipment
- Oil analysis and DGA
- Vibroacoustic measurement
- *Test of vacuum interrupter*
- *(Dynamic) resistance measurement*

Combination with transformer routine maintenance according to operating instruction



Conclusion:

- **Combination of advanced diagnostic methods provide detailed information to achieve a comprehensive assessment of the OLTC condition**
- **These measures have to be carried out by qualified and regularly trained service personal which is able to interpret the results, recommend and conduct required measures if necessary.**