Extended Service Interval for Tap-Changer type UC

Scope

The oil in the diverter switch has to be cleaned or replaced with certain intervals. The reason is concern of oil deterioration, contamination and moisture. This process shall normally be carried out every seventh year or five times during the contact life, in accordance with the applicable maintenance guide, and requires the tap-changer to be taken out of operation.

The intervals can be extended from seven to 15 years or until 2/5 of the expected contact life has been reached, whichever comes first, provided that an oil sample is taken prior to commissioning the tap-changer and then every fourth year, and analyzed in compliance with IEC 60422.

This option does only apply to the UC range of tap-changers.

Equipment

By customer choice, a sample valve and oil filter units are delivered together with the tap-changer to facilitate easy oil sampling and analysis during operation.

Preparation for oil sampling and/or oil filtering is done in the transformer works as part of the tap-changer installation.

- The extra oil valve (see Fig. 1) should be removed and re-connected at the end of the draining tube at operable ground level.
- The tube, through which oil samples are taken, must be connected to the sample pipe, see Fig. 2.
- In case an on-line oil filter unit is deemed necessary, install the unit by following the instructions in the applicable product information.

Fig. 1. Extra oil sampling valve. The valve is removed and then refitted at the end of the sampling tube.
Oil sampling

An oil sample shall be taken every fourth year, and it is recommended within reasonable time before a planned stop, in case an overhaul is deemed necessary based on the test results. The test results should be documented.

Before starting any work, the section referring to oil testing and oil draining in the applicable Maintenance Guide should be read and fully understood. **Observe warning labels.**

Recommended tools: protective gloves, bucket, oil sampling container, test equipment according to IEC 60156, pen and note pad.

Procedure:

- **Sampling procedure for tap-changers without oil filter unit:**
  - When taking the oil sample, first drain some oil into a bucket to make sure the sample will come from the diverter switch compartment, approximately the volume of the tube + 1 liter, see Fig. 2.
  - Use a clean container when taking the oil sample for testing.
  - Analyze the sample according to the instructions below.

- **Sampling procedure for tap-changers with oil filter unit**
  - When taking the oil sample, first drain approximately 0.2 liter of oil into a bucket to clean the valve, see Fig. 3.
  - Use a clean container when taking the oil sample for testing.
  - Analyze the sample according to the instructions below.

Analysis

The following minimum dielectric strength values according to IEC 60156 apply:

- **Neutral point application:** **25 kV**.
- **Delta, single phase and auto transformer with system voltage up to 72.5 kV:** **30 kV**.
- **Delta, single phase and auto transformer with system voltage above 72.5 kV:** **40 kV**. To maintain a dielectric strength of 40 kV, it is our experience that an oil filter for continuous filtering has to be fitted.

Provided that acceptance levels are obtained, the tap-changer can be kept in service for another period of four years, when the test sequence is repeated.

Maximum time in service without overhaul is **15 years** or until **2/5 of the expected contact life** has been reached, whichever comes first.

In case the dielectric test levels are exceeded, the oil should be changed or filtered until the dielectric strength is reached. Oil filtering can be done on-line provided an adequate oil filter system is fitted.
1) A, B and C are optional valves where inlet tubes and other accessories can be connected.

2) A and B are optional valves where inlet tubes and other accessories can be connected.

Fig. 2. Instruction of tube mounting.
Fig. 3. Oil filter unit with sample valve, illustrating connection to UCG.