

# Minutes

## Task Force Meeting

### Insulating Liquid for Factory Testing

#### Pittsburgh PA – Mar 27, 2018

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Ed teNyenhuis, Mar 27, 2018, Rev 0

- The Task Force met at 11.00 AM in the Sky Room on March 27, 2018
- The Chair, Ed teNyenhuis, led the meeting.
- There were 96 persons present. This was the first meeting so there was no membership list. The attendees were told that anyone could be a member for voting purposes since this was the first meeting.
- The original request was in the Task Force on PCS Revisions to C57.12.90 at the Fall 2017 Louisville meeting. Steve Schroeder requested: “*We should address the fact that a transformer must be tested with in the same Liquid that it will be filled with in service. This is due to the fact that natural ester and mineral oil have very different properties. This is most critical for temp run and dielectric tests*”. The scope of the task force was to recommend back to the SC if any changes to the standards should be made.
- The main point of the discussion is for transformers designed for natural ester oil but the transformer is filled with mineral oil in the factory.
- A Technical Overview was given by Alan Sbravati from Cargill of the impact of using a different insulating liquid for the first impregnation & factory testing versus a different insulating liquid for design / service. The presentation will be available for the attendees. The main conclusions were:
  1. There is sufficient design margin to account for residual mineral oil slightly affecting the dielectric and thermal properties of the natural ester oil
  2. Above 230kV it is more critical that the same oil be used for factory testing as used in service
- A transformer manufacturer commented that ABB would recommend 110kV limit (instead of 230kV).
- Stray gassing after the unit is in service could be an issue (with mixed mineral and ester oil)
- Several utilities indicated that they specify that the oil the transformer is designed for must be used in the factory.
- Several reasons were given why a transformer manufacturer would not want to fill the transformer with natural ester oil in the factory:
  1. Natural ester oil has a longer impregnation time (up to 3 times longer than mineral oil)
  2. The oxidation stability of natural esters would require that the transformer could not be filled with dry air during shipment (if shipped without oil). It must be filled with Nitrogen for shipping which has more complications.
  3. A separate oil farm system, hoses etc is required for natural ester oil which could be a burden for just occasional natural ester oil usage.

- A motion was given to recommend to “Revise the standards to say that the insulating liquid used for service must also be used for factory testing”. This was motioned by Paul Morakinyo and seconded by Don Platts. This was voted on and the motion did not pass (19 votes for and 24 votes against).
- A second motion was given to recommend to “Revise the standards to say it is recommended that the insulating liquid used for service also be used for factory testing. In the case it is agreed by the user and manufacturer to not test with the same liquid type, it should be supported by calculation or experience”. This was motioned by Patrick McShane and seconded by Jeff Valmus. This was voted on and the motion did pass (19 votes for and 16 votes against).
- The chair will present the TF recommendation to the subcommittee.
- Meeting was adjourned at 12.17 PM