UNAPPROVED MINUTES
SC Insulating Fluids Meeting
October 27, 2010
Toronto, Ontario

Insulating Fluids Subcommittee
SC Chair Susan McNelly
Vice-Chair Jerry Murphy
Secretary C. Patrick McShane

7.3.1. Introduction/Attendance, S10 Minutes Approval, & Patent Disclosure Request

The Insulating Fluids Subcommittee meeting in Toronto, Ontario, Canada was called to order by the Chair at 3:00 PM on Wednesday, October 27, 2010. All of the officers of the SC were present. There were 22 out of 36 members and 42 guests present. The quorum requirement was met.

Three guests requested membership.

- Valery Davydov
- Brian Sparling
- Jim Dukarm

As required the IEEE patent disclosure requirements were discussed, no new disclosures were forthcoming.

The Minutes of the Spring 2010, Houston, Texas meeting were approved as written.

7.3.2. WG & TF Reports Presented at the SC Meeting

7.3.3. C57.104 – IEEE Guide for the Interpretation of Gases Generated in Oil – Immersed Transformers
WG Chair Rick Ladroga, Vice-Chair Claude Beauchemin

The WG Report Given at the Sub-Committee Meeting:

WG report was presented by Vice-Chair Claude Beauchemin. The WG met on Tuesday, October 26 and Wednesday, October 27. A quorum was achieved at both sessions.

The Data and Case Studies TFs gave status updates on their activities. Norman Field reported that the Data TF has collected over 600,000 data samples for more than 150,000 transformers and are now working on sorting the data by class of transformer to determine the effect, if any, of oil volume. The TF is requesting data on Network transformers be submitted.

Paul Boman reported that the Case Studies in the Guide are meant to illustrate the analysis methods that can be used. He indicated that we would need to be careful in the use of color photographs that may not reproduce well in black and white. There may also be copy write issues that will need to be researched for this section of the Guide.

Fifteen proposals for were presented to the WG on various aspects of the Guide, such as Table 1 and the number of conditions (3 or 4) and whether they should be numbered or labeled as normal, caution, and warning. Eight of the 15 proposals were voted on. Details on the various proposals and discussions can be found in the detailed minutes.

The Minutes (unapproved) of WG Meeting as Submitted:

Meeting Times: 3:15PM, Tuesday, October 26, 2010 & 9:30AM, Wednesday, October 27, 2010
Toronto, Ontario, Canada
Minutes of WG Meeting

The meeting was called to order by Chair Rick Ladroga at 3:15pm on Tuesday, October 26. A second session was held at 9:30am Wednesday, October 27. Vice-Chair Claude Beauchemin and Secretary Susan McNelly were also present.

There were 40 of 59 members present for the first session on Tuesday, October 26 and 30 of 59 members present for the second session on Wednesday, October 27. There were xx guests, and xx guests requesting membership. The membership list was reduced based on attendance at 2 of the last 4 meetings. If someone has been removed, they can request reinstatement, but participation will be mandatory. A membership quorum was achieved.

Guests requesting membership were:

William Boettger	Jerry Corkran
Marc Cyr	Jose Izquierdo
Doug McCullough	James McIver
Tim Raymond	Oleg Roizman
Brian Sparling	Peter Zhao
Waldemar Ziomek	

Agenda

1. Welcome & Roll Call
2. Introductions
3. Approval of Minutes from Fall 2009 Lombard, Illinois meeting and the Spring 2010 Houston, Texas Meeting
4. Patent Disclosure
5. Report of work done since last meeting, R. Ladroga
6. Task Force Reports:
    - DGA in Arc Furnace Transformers - Tom Lundquist
    - Framework Structure - Jim Dukarm
    - Data - Norman Field
    - Case Studies (Q – Existing – SDM, ABB, DOBLE, WEIDMANN, etc) - Brian Sparling
    - Diagnostic Studies – open
7. Proposed motions
8. New Business

Approval of minutes from the Fall 2009 Lombard, Illinois the Spring 2010 Houston, Texas meetings was requested. Both minutes were approved as written.

The IEEE Patent disclosure requirements were discussed and a request was made for disclosure of any patents that may be related to the work of the WG. There were no responses to the request for disclosure.

Report of work done since last meeting:

Rick Ladroga gave a recap of the chairs of the various TFs that have been initiated.

1. Arc Furnace – Chair Tom Lundquist
2. Framework – Chair Jim Dukarm, Vice-Chair Dave Hanson
3. Data – Chair Norman Field, Vice-Chair Pierre Feghali
4. Case Studies – Chair – Paul Boman, Vice-Chair Arturo Nunez
5. Diagnostic Methods – Chair Michel Duval, Vice-Chair Dave Wallach
6. Bibliography – Chair Jerry Murphy, Vice-Chair Tom Prevost

A group met to work on the Guide in Stowe VT on August 12, 2010. Teleconference meetings were also held on September 10 and October 1 of 2010.

Task Force reports:

1. Arc Furnace – Chair Tom Lundquist

   Nothing more to report at this time.

2. Framework – Chair Jim Dukarm, Vice-Chair Dave Hanson

   Nothing to report at this time.

3. Data – Chair Norman Field, Vice-Chair Pierre Feghali

   Data has been provided. Over 600,000 data samples for over 150,000 transformers have been received for analysis. Work to clean up the data is being done before analyzing it can be done. They hope to have concentration and ratio limits available for review prior to the San Diego meeting. The transformers making up the database are anywhere from 0.5MVA to over 500MVA in size.

   T. Prevost: Size matters. How much of the data has the transformer size included in the data? Norman indicated that most of the data includes the transformer size.

   J. Thompson: The present guide has no distinction based on volume of oil. Norman indicated that they intend to sort the data by different classes to help determine the effect of oil volume. Approximately 32,000 samples representing 10,000 network transformers are included in the data that has been received.

   L. Cheim: Laboratory variations need to be taken into account on the data.

   P. Zhao: What is the test environment? Beauchemin indicated that primarily the data is from utility DGA analysis sampled by utilities and performed by laboratories.

4. Case Studies – Chair – Paul Boman, Vice-Chair Arturo Nunez

   Paul presented a case study for a turn-to-turn fault. The case study shows how the various analysis methods are applied with a walk through guide for users. He requested input from others that could also be used for additional case studies.

   Paul indicated that while we can include photos for the case studies in the Guide, we will need to be careful in putting photos in the document that will not reproduce well in black and white.

   T. Prevost: There may be copy write issues that will need to be researched and provided.

   P. Zhao: Will there be any attempt to show case studies for units that have failed without any gassing evident or what percentage of units may fail without any gassing? P. Boman indicated that the case studies are meant to illustrate the analysis methods that can be used not to indicate the likelihood of whether a unit will fail or not fail based on the levels of gassing.

5. Diagnostic Methods – Chair Michel Duval, Vice-Chair Dave Wallach

   No report.

6. Bibliography – Chair Jerry Murphy

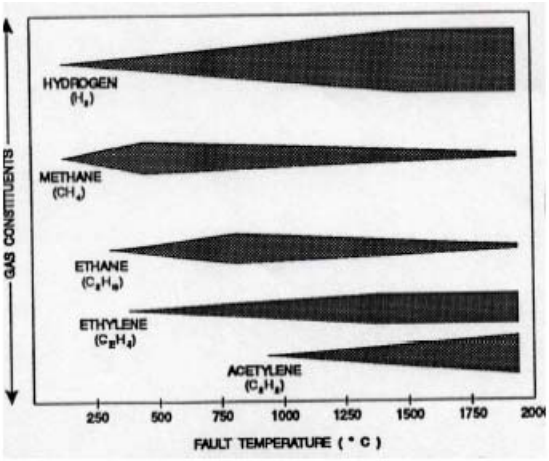
   No report.

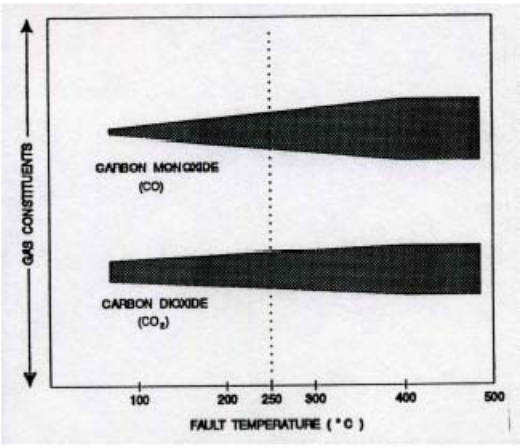
Propositions for WG vote:

The following proposals were sent out to the WG members recently for consideration and presented at the meeting for vote.

1. This proposal refers to section 4.2 "Oil decomposition"

   It is proposed to remove the Halstead graph (actual Figure 1 "Halstead's thermal equilibrium partial pressures as a function of temperature") and replace it with the Rogers graphs on relative gas generation rate (as illustrated below).





   Result: A motion was made and seconded to approve this proposition. There was minimal discussion by the WG membership. Proposition 1 passed.

2. This proposal refers to section 6.1 "General"

   It is proposed to add a section discussing the reliability and accuracy of DGA results in general and especially at low gas concentrations and rates.

   A motion to approve the above proposal was made and seconded.

   Discussion & Vote:

   A question was asked as to the variation with temperature as the gas moves in and out of the head space would be included in this section. All of the sources of variation would be included in the section. Information from ASTM D27 should be included. Marc Cyr agreed to help with the ASTM D27 information.

   A modification to the motion was made that this working group will enlist ASTM D27-03 to assist in accomplishing this.

   Proposition 2 passed as amended.

3. This proposal refers to Table 1 “Dissolved Gas Concentrations” in Section 6.5 “Evaluation of transformer condition using individual and TDCG concentrations”

   Note: Revised value for this table will be based on rigorous statistical analysis of all the DGA results supplied to the WG data analysis TF. Every participant is strongly encouraged to supply its own data set for this effort.

   It is proposed to modify “Table 1” “Dissolved gas concentration” to contain three (3) conditions, with 2 limits, (as opposed to the present 4 conditions with 3 limits) and to give a name to each condition (Normal, Caution, Warning) rather than use numbers (condition 1, 2 and 3).

   Discussion & Vote:

   How did the 13 people that responded electronically vote. The 13 electronic votes were all in favor. Question was asked if there is a table available for review. The response was that not at this point. This table is intended for first time test of a unit only to give guidance without a false sense of security based on a single test.

   D. Platts indicated that he would be concerned using strictly a statistical analysis along with cautions or warnings. There would be potential legal concerns with the use of “warning”. He suggested that we use numbering rather than words such as caution or warning.

   The first meeting session was adjourned at this point at 4:30PM, Tuesday, October 26.

   The second meeting session was opened at 9:30AM, Wednesday, October 27.

   L. Cheim: If a number system is used, then what will be the definition of a level 3? The word warning should not then be used in the definition.

   D. Sundin: Use a comparison to a population. R. Ladroga: simple directions need to be provided.

   J. Graham: Need to clearly define what is meant by the normal, caution, and warning.

   R. Thomson: Normal, Caution and Warning carry more prior meaning than a Condition 1, Condition 2 or Condition 3 would.

   T. Lundquist: Indicated that the wording with Normal, Caution, and Warning was used in a previous Draft of the last WG document and that it seems to be appropriate for a first test on a unit.

   The proposal was modified and split into two separate motions. A first motion was made as follows:

   Modify “Table 1” “Dissolved gas concentration” to contain three (3) conditions, with 2 limits, (as opposed to the present 4 conditions with 3 limits). The new motion to move from four to three condition levels was passed.

   A second motion was made as follows:

   Modify “Table 1” “Dissolved gas concentration” to use numbers (condition 1, 2 and 3) rather than Normal, Caution, and Warning. The motion passed as proposed.

4. This proposal refers to Table 1 “Dissolved Gas Concentrations” in Section 6.5 “Evaluation of transformer condition using individual and TDCG concentrations”

   It was proposed that the limits between the “1” and the “2” conditions will be the DGA data set 90% percentile values, or another accepted statistical limit if proven effective, for each gases and TDCG, as derived from the analysis of the supplied DGA data.

   Discussion & Vote:

   J. Thompson: Suggested changing the words “would be” to “will be considered”.

L. Cheim: There should be a set statistical limit.

J. Dukarm: In the event that the statistical result is clearly not practical, then there needs to be an ability to make an engineering based determination.

D. Platts: reiterated his concern with using statistical information.

T. Prevost: We need to use statistics since there are not enough case studies or data from case studies to be able to come up with data any other way than by using statistical analysis.

D. Sundin: Indicated that the lowest limit should be the detection limit. There is no theoretical 0 value in statistics.

An amended motion was made to the following:

It was proposed that the limits between the "1" and the "2" conditions will take into consideration the DGA data set 90% percentile values, or another accepted statistical limit if proven effective, for each gases and TDCG, as derived from the analysis of the supplied DGA data.

The motion as amended was passed with 24 in favor.

5. This proposal refers to Table 1 "Dissolved Gas Concentrations" in Section 6.5 "Evaluation of transformer condition using individual and TDCG concentrations"

   It is proposed that the limits between "2" and "3" will take into account an accepted statistical limit, or a higher percentile value (e.g., 95% or 98%) if standard statistical limits prove to be inconclusive, that can be shown to be sufficiently similar on different populations and to be actually representative of a "3" condition, as derived from the analysis of the supplied DGA data.

   Discussion & Vote:

   A motion was made to accept the above proposition. The motion was passed with 29 in favor.

6. This proposal refers to Section 6.5 "Evaluation of transformer condition using individual and TDCG concentrations" and to Section 6.2 "Determining combustible gas generating rate"

   It is proposed to add a new Table (Dissolved gas rates) with individual gas generation limits (change over time), similar in its construction to Table 1.

   Discussion & Vote:

   T. Prevost: Made a motion to accept the proposal. The motion was seconded.

   J. Crouse: Indicated that on individual samples there is variation based on methods of sampling etc and this should be included. C. Beauchemin indicated that he agreed and that this would need to be described.

   The purpose of the Guide is to produce a document that can be easily interpreted. What does an experienced person do when he gets a sample that is unusual? He takes another sample. Details of trend analysis need to be included.

   The motion was voted on with 1 negative the remainder voted affirmative. The motion passed.

7. This proposal refers to Section 6.5 “Evaluation of transformer condition using individual and TDCG concentrations” and to Section 6.2 “Determining combustible gas generating rate”

   It is proposed, that when a valid fault diagnostic is obtained, to suggest adjustments to values in Tables 1, and in the proposed new Table (dissolved gas rate), based on the nature of the fault, its activity or its location (in paper or oil).

   Discussion & Vote:

   T. Lundquist made a motion for vote on the above proposal. The motion was seconded.

   T. Prevost indicated he is opposed to the proposal.

   M. Duval explained that the gas limits in Table 1 are average values that don’t take into account the location and duration of a fault. Rick indicated that perhaps an informative annex would be appropriate.

   J. Graham: Suggested that there needs to be some logical thought into the location of the fault. He agreed that this would be more appropriate to an informative annex.

   A vote was called. There were no votes for the motion. The motion failed.

8. This proposal refers to Section 6.5.1, “Determining the transformer condition and operating procedure utilizing TCG in the gas space” and Table 2 “Action based on TCG”

   It is proposed to remove Section 6.5.1 describing interpretation of gas phase analysis results with its associated Table 2 (actions based on TCG). An alternative would be to move it to the Annex (Informative) section.

   Discussion & Vote:

   A motion was made and seconded as amended below:

   It is proposed to remove Section 6.5.1 describing interpretation of gas phase analysis results with its associated Table 2 (actions based on TCG).

   Discussions indicated that maybe complete removal should not be done, but that it could be moved to an annex.

   A vote was taken as amended with 5 for and 18 against. The motion failed.

   A motion was made as follows:

   It is proposed to remove Section 6.5.1 describing interpretation of gas phase analysis results with its associated Table 2 (actions based on TCG) and create a section on TCG (head space) interpretation in an Annex.

   The vote was unanimous in favor of the amended motion.

The meeting time expired before the remaining proposed motions could be discussed. Additional web based meetings will be looked at as an option to keep the momentum moving forward on the Guide. The remaining proposals are provided below for information purposes only and were not voted on.

9. This proposal refers to Section 6.5.2 “Determining the operation procedure and sampling interval from the TDCG levels and generating rates in the oil” and Table 3 “Action based on TDCG”

   It was proposed to recommend the installation of on-line monitoring to replace high frequency sampling (e.g., < weekly) or for transformers considered dangerous (zoned).

10. This proposal refers to Section 6.5.2 “Determining the operation procedure and sampling interval from the TDCG levels and generating rates in the oil” and Table 3 “Action based on TDCG”

    It was proposed to add a safety warning for work performed on potentially faulty transformers, as indicated by DGA interpretation.

11. This proposal refers to Section 6.5.2 “Determining the operation procedure and sampling interval from the TDCG levels and generating rates in the oil” and Table 3 “Action based on TDCG”

    It was proposed to modify Table 3 (“actions based on TDCG”) to include individual gas rates (as defined in the new Table) and concentrations (from Table 1).

12. This proposal refers to Section 6.6 “Evaluation of possible fault type by the key gas method” and Section 6.7 “Evaluation of possible fault type by analysis of the separate combustible gases generated”

    It was proposed to use the following diagnostic methods: Key gas, Rogers, Duval Triangle 1 and IEC 60599 (Section 5.2 and 5.3). All other methods, existing in the guide or proposed, should be in the annex section (Informative) (e.g., Doernenburg, Duval Triangles 4 and 5 for low temperature faults…).

13. This proposal refers to Section 6.6 “Evaluation of possible fault type by the key gas method” and 6.7 “Evaluation of possible fault type by analysis of the separate combustible gases generated”

    It was proposed to add a section on the limitations of the various DGA analysis and diagnosis methods.

14. This proposal refers to Section 7 “Instrument for detecting and determining the amount of combustible gas present”

    It was proposed to delete the description of gas monitors in Section 7, and to replace the monitor description with information relevant to the interpretation of monitor readings, when this interpretation is different from interpretation of laboratory results. (example: computing rate of change, taking into account detection limits, comparing results from two different sources…).

15. This proposal refers to Annex A “Bibliography”

    Two possibilities were proposed for the bibliography. **Note:** the actual bibliography contains 176 entries, from 1928 to 1989, several of which could no longer be retrieved.

    A) Extended bibliography containing all references, historical, up-to-date research and practical application (such as other standard) (probably 150 to 200 entries)

    B) Only up-to-date bibliography entries, standard and application oriented references (probably less than 50 entries)

The second meeting was adjourned at 10:55 am.

Rick Ladroga
WG Chair

Claude Beauchemin
WG Vice-Chair

Susan McNelly
WG Vice-Chair and Secretary

7.3.3.1. IEEE C57.121 Guide for the Acceptance and Maintenance of Less Flammable Hydrocarbon Fluids in Transformers
WG Chair: David Sundin

The Report Given at the Sub-Committee Meeting:

David Sundin presented. No meeting was held. The standard was reaffirmed and is valid through 2014.

7.3.3.2. IEEE Trial-Use Guide for the Use of Dissolved Gas Analysis Applied to Factory Temperature Rise Tests for the Evaluation of Oil-Immersed Transformers and Reactors
WG Chair Jim Thompson

The WG Report Given at the Sub-Committee Meeting:

Chair Jim Thompson presented.

The WG met Tuesday afternoon, October 26. The PAR was approved in June of 2010 and will expire December 31, 2014.

The WG will be starting with the last version of the Guide (draft 18) that the previous WG left off with. Discussions included the limit of the document guidance to one per unit load during factory temperature rise tests, the values in Table 1 for Gas generation rate guidelines, the DGA sample time requirements, the IEC guide 61181, the requirement of no detectable acetylene gas in Table 1, and the bibliography.

The WG is looking for data.

7.3.3.3. IEEE C57.139 IEEE Dissolved Gas Analysis in Load Tap Changers
WG Chair Fredi Jacob, Vice-Chair David Wallach, Secretary Sue McNelly

The WG Report Given at the Sub-Committee Meeting:

Presented by Dave Wallach.

The WG met Tuesday morning, October 26.

The document was initially balloted in November of 2009 and just recently completed a 3rd recirculation ballot. After this 3rd recirculation ballot, there were 2 negatives with comments and 5 negative ballots without comment. The BRG has reviewed and responded to the comments. The negative ballots were in regard to the inclusion of the safety warning regarding combustible gases in the LTC, not providing generic gas limits to the user, and the limit percentiles that were provided.

The ballot has been submitted to REVCOM for approval as there is presently a lack of sufficient information/data at this time to be able to provide generic limits. A PAR extension request has also been made to NESCOM in the event that further work is required after REVCOM has reviewed the document.

Susan McNelly indicated a special thank you to Matt Ceglia for his help with the ballot preparation and submittal process and to the WG ballot resolution group Fredi Jacob, Dave Wallach, Jim Dukarm, Claude Beauchemin, Shuezen Xu, Rowland James, Norman Field, and Mick Bayer

The Minutes (unapproved) of WG Meeting as Submitted:

Tuesday, October 26, 2010
Toronto, Ontario, Canada
Minutes of WG Meeting

Fredi Jakob called the WG meeting to order at 11:00am. WG Vice-Chair Dave Wallach and Secretary Susan McNelly were also present. There were 18 of 35 members (Quorum requirement was met).

New members are not being accepted at this time as the document has already been balloted.

Agenda:

1. Welcome and Member Roll Call
2. Patent Disclosure Request
3. Approval of Minutes from Fall 2009 Lombard, Illinois and the Spring 2010 Houston, Texas meetings
4. Ballot Status
5. PAR Status
6. RevCom Submittal
7. Next Steps
8. Presentation - Nomogram for looking at LTC-DGA data (Fredi Jakob and Jim Dukarm)
9. Presentation – Choice of percentile points (Jim Dukarm)
10. Adjourn

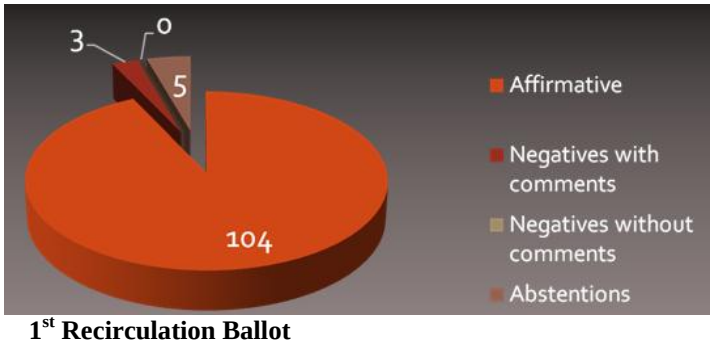
The IEEE Patent disclosure requirements were discussed and a request was made for disclosure of any patents that may be related to the work of the WG. There were no responses to the request for disclosure.

Approval of minutes from the Fall 2009 Lombard, Illinois meeting and the Spring 2010 Houston, Texas meetings was requested. The minutes were approved as previously submitted.

Ballot Status:

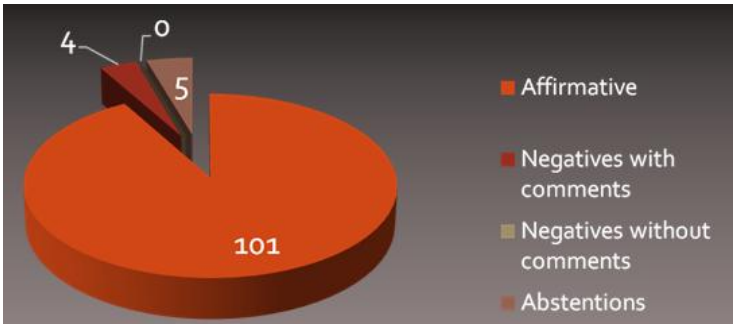
Initial Ballot

- PC57.139 was balloted in 2009
  - Ballot Open Date: November 3, 2009
  - Ballot Close Date: December 3, 2009
- >75% affirmation of 127 eligible ballotors requirement met
- Recirculation was necessary



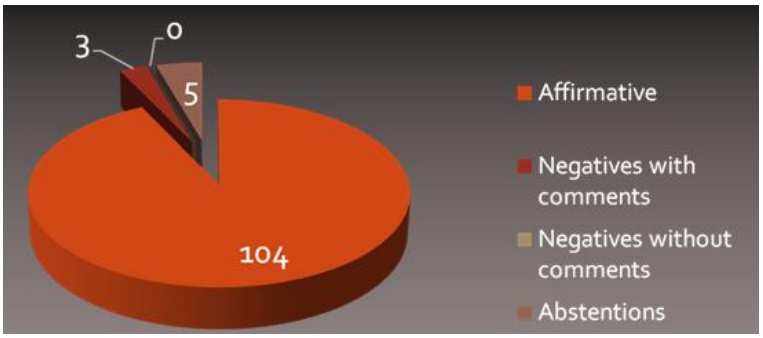
1st Recirculation Ballot

- PC57.139 was recirculated
  - Ballot Open Date: June 18, 2010
  - Ballot Close Date: July 18, 2010
- >75% affirmation of 127 eligible ballotors requirement met
- Recirculation was necessary



2nd Recirculation Ballot

- PC57.139 was recirculated
  - Ballot Open Date: September 23, 2010
  - Ballot Close Date: October 3, 2010
- >75% affirmation of 127 eligible ballotors requirement met
- Recirculation was necessary



3rd Recirculation Ballot

- PC57.139 was recirculated
  - Ballot Open Date: October 11, 2010
  - Ballot Close Date: October 21, 2010
- >75% affirmation of 127 eligible ballotors requirement met
- Detailed comments available in MyBallot
- "Flavor" of the comments
  - Disagreement that there should be a safety warning
  - Disagreement that this version of the guide does not provide generic limits to the user (planned for next revision)
  - Disagreement on limit percentiles

PAR Status

- Present approved PAR will expire December 31, 2010
- PAR Extension Request has been submitted for 1 year to cover the REVCOM process
- The PAR extension request is on the next NESCOM meeting agenda.

REVCOM Submittal

- At the suggestion of our liaison, Matt Ceglia, the RevCom submission form has been submitted and accepted for inclusion on the December 2010 agenda.
- Recirculation #3 just closed
- We are standing by for questions or feedback from RevCom.

Next Steps

- Continue with RevCom
- Ideas for next revision
  - Generic Limits
  - Nomogram for looking at LTC-DGA data
  - Presence of Benzene and Toulene and an indicator of contact wear
  - Liberal use of the word "fault" with DGA analysis (multiple documents)
  - Others…
- New PAR

Presentation - Nomogram for looking at LTC-DGA data (Fredi Jakob and Jim Dukarm)

Fredi presented a nomogram for review that was developed by Jim Dukarm as a method of looking at the gas ratios. A paper that Jim has prepared will be made available on the WG webpage.

Presentation – Choice of percentile points (Jim Dukarm)

Jim Dukarm gave a presentation on the differences between LTC populations. He indicated that further work is needed to provide a basis for publishing numeric limits in the guide. First, the question, can generically usable limits be derived from a large database built from many sources, must be answered. Secondly, formal statistical tests will need to be done to determine if similar models of LTCs can be grouped together and treated as one generic type for purposes of deriving and applying limits.

Gas concentration caution limits, it is known that there is data from faulty LTCs in the database and that some faulty LTCs generate more combustible gas than healthy ones in the same population do. Most of the extremely high gas concentrations belong to faulty or highly stressed LTCS.

Looking at the gas concentration ratios, to calculate gas ratios, only samples where both gases are at least 10 ppm are used. Trace amounts of gas are not interpreted.

A comparison of methane, ethylene, acetylene distributions and ratios for four different utilities was provided with unexplained differences between them. The possibility of coming up with generic limits is not ruled out, but further evaluation would be needed due to the wide differences between these four utilities.

Jim's presentation will be made available on the WG webpage.

The meeting was adjourned at 12:07pm.

Fredi Jakob, Chair

Dave Wallach, Vice-Chair

Susan McNelly, Secretary

7.3.3.4. WG PC57.637 Guide for the Reclamation of Insulating Oil and Criteria for Its Use
WG Chair Jim Thomson, Vice-Chair TV Oommen

The WG Report Given at the Sub-Committee Meeting:

The WG met Tuesday morning, October 26 and a quorum was present.

The work on the Guide is progressing. Jim Thompson gave a presentation on the relationship/cross references of this Guide to other existing guides, particularly in regards to percent saturation of water in oil.

There was discussion about the C57.106 history in regards to the inappropriate application of equilibrium curves. There was also a discussion in regards to cold start warnings.

There was also a discussion on whether re-refined oil can be considered as new oil and where this fits within the Guide. The Guide's scope presently indicates that the guide does not cover the use of oil in new apparatus under warranty.

The Minutes (unapproved) of the WG Meeting as Submitted:

The working group meeting was conducted at 8 am on October 26, 2010 at Toronto Canada with 23 people in attendance with 10 of the 19 current working group members present. This document was reaffirmed in 2007 and the PAR for revision was approved December 10, 2008. Working Group members Jim Thompson (chair) and TV Oommen (vice-chair) conducted the meeting. There was a request for patent declarations regarding the PC57.637 document and none given.

There was a motion to approve the March 9, 2010 Working Group minutes by Don Cherry and a second by TV Oommen. The approval of the minutes was unanimous. The discussion of the meeting included a review of some of the IEEE C57 guides that have cross references to C57.637. There was discussion about the C57.106 history in regards to inappropriate application of equilibrium curves. There was also and cold start warnings in C57.106 that may be provided in the PC57.637 revision. Another topic discussed was the unresolved status of the "re-refined" transformer oil within the ASTMD27 membership. The chair then noted that the PC57.637 scope states "This guide does not cover the used of oil in new apparatus under warranty." The Power Point © presentation will be posted on the Insulating Fluids Subcommittee web site.

The current working group membership prior to this meeting was:

Baranowski	Derek
Beauchemin	Claude
Boman	Paul
Castellenos	Juan
Cherry	Don
Claiborne	Claire
Garza	Joe
Hernden	Rodney
McNally	Mark
Moleski	Hali
Oommen	TV
Pellon	Verena
Peterson	Alan
Rasor	Bob
Stiegemeier	Craig
Sundin	David
Tenyenhuis	Ed
Thompson	Jim
Thompson	Ryan

Respectfully submitted,

Chair Jim Allen Thompson
Vice-Chair TV Oommen

7.3.3.5. PC57.155 – Guide for Interpretation of Gases Generated in Natural Ester and Synthetic Ester Immersed Transformers
Chair Paul Boman, Secretary John Luksich

The TF Report given at the Sub-Committee Meeting:

The WG met Tuesday morning, October 26. Patrick McShane substituted for John Luksich f or taking the minutes. A quorum was not achieved.

This was the first official meeting of the new WG. The WG PAR was approved right after the Spring NESCOM meeting. A presentation on the phenomenon of Natural Ester Fluids (mainly based on the soy bean based natural ester fluid) was presented by Dave Hanson. The presentation also discussed stability or stray gassing. It showed the need to protect the sample after it has been taken from sunlight. Further investigation will be needed on CO2 and H generation. There are two other labs presently working to verify the information prior to putting it into the Guide.

The WG chair thanked Dave Hanson for his excellent presentation. Mentioned UV exposure can create CG so samples should not be exposed. Further investigation is required for ethane, hydrogen, and CO gases. Two other labs are working on reviewing the issue. The Chair will be trimming the roster to help achieve quorum.

Minutes (unapproved) of the WG meeting as submitted:

Meeting was called to order at 9:30.

No Patent Disclosures were reported to Work Group

Attendance: 16 members out of 49 members were in attendance, total attendance was 40 and 5 people requested membership. A quorum was not present.

Correction to March 8, 2010 Meeting Minutes header not the minutes; date change 2009 to 2010. Determined not a change to the minutes.

Announced Task Force Changed to Working Group Status

Dave Hanson Presentation: Stray Gases in Natural Esters under varying conditions. J Luksich has suggested looking for physical composition. Effect of lighting on samples

Question: Focus to understand Ethane, but would like to see more on hydrogen development. DH will

Was oxygen level tracked? DH yes details in paper. Oxygen was higher than expected. Moisture was not observed in this experiment.

ASTM D3612A and D3612C observed similar DGA results. Sunlight affects sample DGA results. The technical paper and power point was supplied to the Working Group for posting on Internet.

Duval and Sim reported on Soybean fluid filled transformer rated at 200 MVA. Investigation should be completed by the end of 2010.

Chairman stated that the Working Group roster will be review for member attendance. Inactive members will be removed from the Work Group.

The meeting was adjourned at 10:30 AM.

7.3.3.6. TF Guide for Field Application of Natural Esters
Chair Jim Graham, Vice-Chair Jerry Murphy

The TF Report Given at the Sub-Committee Meeting:

Jim Graham presented.

The TF has completed its assignment. A PAR was submitted but did not meet with approval from the Administrative SC. A new PAR will be submitted to create a new WG to revise C57.147 instead of creating a new Guide. Patrick McShane and Clair Claiborne volunteered to pick this up as Chair and Vice-Chair respectively and Jim Graham will take on duties as the Secretary.

Minutes (unapproved) of the WG meeting as submitted:

Fall 2010 Report

The task force for field applications of natural ester fluids has completed its assignment and did not meet. An application for a PAR to develop a new guide was prepared and submitted, but the PAR request was denied by the administrative subcommittee. Instead, there was support to incorporate the field applications material into C57.147, the natural esters fluids guide.

This task force will disband, and be replaced by a working group charged with revising C57.147 to include the field applications material.

Respectfully submitted,

James W. Graham
Task Force Chair – Guide for Field Application of Natural Ester Fluids

7.3.3.7. TF on Particle Count Limits in Mineral Oil - Chair: Mark Scarborough

Mark Scarborough– Chair, T.V. Oommen- Vice-Chair , Paul Boman - Secretary

The Report given at the Sub-Committee Meeting:

Mark Scarborough presented.

This Task Force was established after the spring 2008 meeting to investigate the issue and determine if there is a need to develop a standard or guidelines for particulate limits for new fluid, as received in new equipment, and continued use.

There were presentations on the TF history and methods of testing and differences in measurements done today as compared to in the past.

The TF will continue to work on developing a scope statement so that as it progresses they can ensure that they are staying within the scope of their task.

A web based survey was sent out to the Transformer Committee in an attempt to collect information on what others are doing in industry and the test methods and limits they use. The survey will remain open until December 31st of this year.

TF meeting minutes (unapproved) as received:

Meeting Date: 10/25/2010 Time: 1:45 – 3:00 PM

Attendance: 17 members out of 29 members were in attendance, total attendance was 54 and 7 people requested membership.

The meeting was called to order at 1:45 PM. Attendance rosters where circulated.

The following agenda was followed:

1. Introductions & Roster
2. Patent Disclosure
3. Origins
4. Activities to Date
5. Member List / Quorum
6. Purpose / Scope
7. Mini-Tutorial
8. Survey / Survey Results
9. Back to Purpose / Scope
10. Next Steps / Discussion
11. Adjournment

The IEEE Patent Disclosure policy was reviewed. No patents were disclosed.

Attendee introductions were made by group.

Quorum was established as the TF membership role call was performed.

A motion was made and seconded to approve the Spring 2010 TF Meeting Minutes as written. The motion was passed unanimously.

A review of Task Force history was provided.

T.V. Oommen presented the background and history of particle counts and the available particle count references. The presentation will be made available on the IEEE website. T.V. made a proposal for limits based on his research.

Dave Hanson provided samples of ACFTD and MTD used to calibrate particle counting equipment. He also provided slides with 2.5mg of the each material. This represents 2,250 particles / ml between 2-5 µm.

Comments on presentation:

- Jin Sim Comment: Additional references given; F.M. Clark and R.T. Harold. Jin Sim will provide technical papers to Chairman. Also, Jin Sim asked that the TF consider a minimum particle count limit.
- Elgar Trummer Comment: D-1816 dielectric strength uses very small gaps, when gaps increase to a practical size found in transformers, >5 µm particles have a large affect on dielectric breakdowns. Practical gaps are 20, 50 and 100 µm wide.
- Yang Baltun in favor of clean transformers but not cleanliness limitation.

Chairman did a quick review of survey results from the Particle Count Survey #1 sent out October 18, 2010 via the IEEE Transformer Committee e-mail distribution system.. The results will not be posted on the IEEE Transformer Committee web site at this time. The TF needs to review and "normalize" the responses provided. As of October 25, 2010, 63 respondents have completed the survey.

Chairman presented a Purpose / Scope statement for the TF. No motion to approve it was provided. It was agreed to send the Purpose / Scope around for comment to the TF members for a vote.

Chairman reviewed next steps for Task Force.

At 3:00PM a meeting adjournment was motioned and seconded by group.

The presentation used for the meeting will be posted on the IEEE Transformers Committee web site.

7.3.3.8. TF on Moisture in Oil - Chair: Bob Rasor

The TF Report given at the Sub-Committee Meeting:

Sue McNelly presented for the TF.

The TF presented data to demonstrate the many trends that can be seen with moisture and how all data parameters may need to be considered. Data was presented from online monitors and Karl Fischer testing. The data presented and the comments following involved interest in how there were noticeable variations in the water content and saturation based on temperature.

The TF Meeting Minutes (unapproved) as Received:

TF on Moisture in Oil
Monday, October 25th, 2010 3:15 pm
Toronto, Ontario Canada

The meeting was called to order by Chair Bob Rasor at 3:20 pm. There were 118 attendees. 17 of the 31 members were present. And 14 requested membership.

Members attending were:
- Bob Rasor
- Hali Moleski
- Dave Hanson
- Oleg Roizman
- Claude Beauchemin
- Juan Castellanos
- Jim Thompson
- Paul Boman
- Dinesh Chhajer
- Valery Davydov
- Don Cherry
- Jin Sim
- Mark Scarborough
- Don Platts
- Tom Prevost
- Mark Tostrud
- Shuzhen Xu

Attendees requesting membership were:
- Tom Melle
- Brian Sparling
- Tim Raymond
- Stephanie Denzer
- Gary Hoffman
- Bob Ganser Jr.
- Rowland James
- Luiz Cheim
- Larry Weathington
- James McIver
- Barry Ward
- David Woodcock
- Poorvi Patel
- Terry Martin

Agenda

1. Roster was sent
2. No patents were disclosed
3. Introductions were given
4. Reviewed scope
5. Dates of recent 5 conference calls were given
6. Presentation was given that included
    i. Brief description of nomenclature and equations
    ii. Summary of moisture in standards/guides
    iii. Data examples from both online monitors and Karl Fischer results were presented by Oleg Roizman and Claude Beauchemin

    In summary, the TF presented data to demonstrate the many trends that can be seen with moisture and how all data parameters may need to be considered. Data was presented from online monitors and Karl Fischer testing. It was noted that top oil relative saturation can be much different than bottom oil relative saturation. Data examples also demonstrated that moisture content (ppm) responds to temperature and that that season affects moisture data. Relative saturation was shown to stay relatively stable as compared to moisture content on these graphs. Data also supported that relative saturation could be high (greater than 20 percent) when compared to the water content (ppm) at low temperatures. When oil temperature increased, water content also increased dramatically, often shifting between acceptable and unacceptable levels within days.

7. Discussion and questions followed
8. Meeting was adjourned at 4:30pm

Comments provided at the end of the meeting regarding the presentation include the following:

- Paper affects the correlation between temperature and relative saturation
- Failures have been seen due to moisture. Field dry-outs reduced the ppm of the oil drastically, however, after many years the moisture came back. The critical question is what is wet and what is dry.
- The shifts in calculated ppm vs. relative saturation appear to be different in the presented graphs. This is possible due to the time period of data, a larger time period graph will look different.
- The importance of online monitors and relative saturation was stated
- Also, online monitors actually measure relative saturation and therefore do not introduce the error in calculation.
- Industry mainly uses Karl Fischer and many conversions are used to calculate relative saturation from ppm. If we keep using KF, the important question will be to define the key levels.
- Transformer specifics such as load and design must also be considered.
- Karl Fischer method measures total water content. However, only need to know how much water is free to move as some water binds with compounds.

7.3.4. Old Business:

None

7.3.5. New Business:

C57.146-2005 - Guide for Interpretation of Gasses Generated in Silicone-Immersed Transformers – This standard was set to expire at the end of the year. A request for reaffirmation was made. Jerry Murphy has agreed to head up this reaffirmation process.

Patrick McShane is reviewing TC Standards and Guides for the various nomenclatures used for transformer dielectric coolants with the intent to create uniformity, obvious omissions of various alternative fluids in existing C57 standard, and areas where revisions may be necessary in existing standards based on the suitability, or unsuitability, of alternative fluids based on typical property differences with the standard mineral oil.

SC IF Adjournment 4:15PM

Respectfully Submitted:

Susan McNelly, Fluids SC Chair
Jerry Murphy, Fluids SC Vice-Chair
Patrick McShane, Fluids SC Secretary