Insulating Fluids Subcommittee Minutes

10.5. SC Insulating Fluids Meeting
March 14, 2012;
Nashville, Tennessee

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

10.5.1. Introduction/SC Member Roll Call/New SC IF Members

The Chair started the meeting with welcoming and asking the attendees to state their names and affiliations. The member roll call was made. The quorum requirements were exceeded with 30 of 43 members present.

Five new SCIF members were recognized:
Stephan Brauer
Paul Caronia
Larry Christodoulou
Stephanie Denzer
George Forrest

Guest requesting membership for first time (at least recent years):
Gregory Stem
Anthony McGrail
Paul Mushill
Nicholas Perjanik
Melvin Wright
Shawn Galbraith
Ken Kampshoff
Jayme Nunes Jr.

Four additional names have previously requested membership, pending meeting the activity/participation requirements.

10.5.2. Approval of the posted minutes from Fall 2011, Boston

A motion was made, seconded and approved.

10.5.3. Working Group and Task Force SC Reports and Submitted Unapproved Minutes

10.5.3.1. 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, presented by Rick Ladroga:

Rick presented. The WG had a quorum. Rick singled out Claude Beauchemin's presentation. Collected ½ million data points, may use statistician to confirm massage the data. One of the TF chair is Jerry Murphy, 187 references used. New business issue of data security from number of different sources is valuable data, not for commercial use. Like a formal process to safely archive data with access control. This will help future revision to know bases of change.

Looking for offsite meeting to make most sense of the data collected. Probably will hold the meeting the 3rd week in May in Montreal.

No questions.

The Minutes (unapproved) of C57.104 WG Meeting as Submitted:

Tuesday, March 13, 2012
Nashville, Tennessee, USA

Minutes of WG Meeting:

The meeting was called to order by Chair Rick Ladroga at 3:15pm. Vice Chair Claude Beauchemin and Secretary Susan McNelly were also present.

There were 47 of 83 members present. There were 44 guests, and 7 guests requesting membership. A membership quorum was achieved. Guests attending the WG meeting for the first time who request membership will be deferred until the next meeting attended.

Guests requesting membership were (those identified with an asterisk (5 of the 7) will be added as WG members):

Jagdish Burde	Anthony McGrail*****
Frank Damico*****	Nicholas Perjanik*****
Shawn Galbreath*****	Pugal Selvaraj
Rowland James*****	

Agenda

1. Welcome & Introductions
2. Quorum Check
3. Approval of Minutes from fall 2011 Boston meeting.
4. Status
5. Presentation by Claude Beauchemin on Data
6. New Business
7. Adjourn

The minutes from the fall 2011 Boston, Massachusetts meeting were approved as written.

Review of recent activities:

Rick gave a summary of recent activities and indicated that offsite meetings/webinars will be held between TR Committee meetings. He is tentatively looking at the 3rd week in May.

The framework, case work, and bibliography have been done or are in progress. The intent is to provide recommendations at the fall 2012 meeting in Milwaukee for the WG to discuss.

Rick requested case study information from utilities.

Presentation by Claude Beauchemin - Analysis Preview - Review of results to date from analysis of DGA database

Claude extended a thank you to the following people for their efforts:

- Michel Duval
- Norman Field

- Luiz Cheim
- Lan Lin - for the tremendous work done to date on data analysis
- All anonymous data suppliers - To give us the opportunity to answer old questions

C57.104 Table1 What was the choice for limits?

Table 1—Dissolved gas concentrations

Status	Dissolved key gas concentration limits [µL/L (ppm)[a]]							
	Hydrogen (H_2)	Methane (CH_4)	Acetylene (C_2H_2)	Ethylene (C_2H_4)	Ethane (C_2H_6)	Carbon monoxide (CO)	Carbon dioxide (CO_2)	TDCG[b]
Condition 1	100	120	1	50	65	350	2 500	720
Condition 2	101–700	121–400	2–9	51–100	66–100	351–570	2 500–4 000	721–1920
Condition 3	701–1800	401–1000	10–35	101–200	101–150	571–1400	4 001–10 000	1921–4630
Condition 4	>1800	>1000	>35	>200	>150	>1400	>10 000	>4630

NOTE 1—Table 1 assumes that no previous tests on the transformer for dissolved gas analysis have been made or that no recent history exists. If a previous analysis exists, it should be reviewed to determine if the situation is stable or unstable. Refer to 6.5.2 for appropriate action(s) to be taken.

NOTE 2—An ASTM round-robin indicated variability in gas analysis between labs. This should be considered when having gas analysis made by different labs.

- Personal Experience ?
- One user database analysis ?
- Consensus from early users ?
- Lab recommendation ?
- Early mention in 1978 of 90% “probability norms” for some levels (now limit condition 1)
- 1991 mention for table 1 “Consensus values based on the experience of many company”

- Condition 1: < 90% of DGA population?
- Condition 2: 90% to 95% ?
- Condition 3: 95% to 99% ?
- Condition 4: > 99% ?

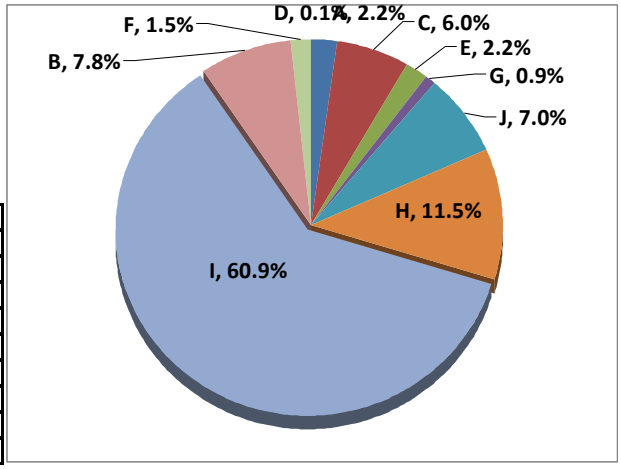
We are using these values for analysis purpose only

Process of data analysis:

- Database filtered to remove inconsistent entries
  - Obvious error
  - Missing important information
  - Non transformer
- Population curve computed for each gas and each studied condition
  - 90% to 99.5% population value used for evaluation

Source of data (479,191Samples)

A	Utility
B	Lab
C	Utility
D	Industrial User
E	Utility
F	Insurance Co.
G	Utility
H	Lab
I	Lab
J	Utility



Data Analysis:

- Values proposed need to be sound from a statistic point of view
- Original data used to set table 1 is unavailable
- Comparison between table 1 and actual data indicate a mix of good and poor correlation using the 90, 95 and 99% hypothesis
- CAUTION: LARGE DISPERSION OF RESULTS

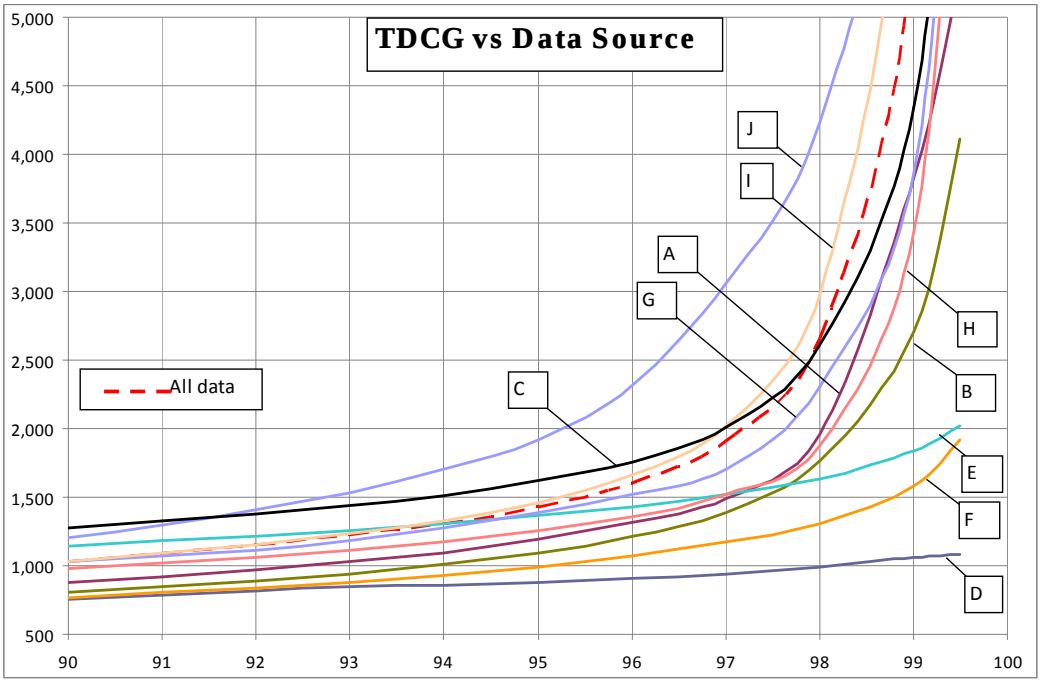
Table 1 VS Percentile, All data

Condition	H2	CH4	C2H2	C2H4	C2H6	CO	CO2	TDCG
1 - 2	100	120	1	50	65	350	2500	720
2 - 3	700	400	10	100	100	570	4000	1920
3 - 4	1800	1000	35	200	150	1400	10000	4630

Percentile	H2	CH4	C2H2	C2H4	C2H6	CO	CO2	TDCG
90	93	85	1	56	92	717	7491	1034
95	215	162	5	124	191	912	10223	1429
99	1706	869	78	1124	600	1386	18435	5439

Delta %	H2	CH4	C2H2	C2H4	C2H6	CO	CO2	TDCG
90	-7%	-29%	0%	12%	42%	105%	200%	44%
95	-69%	-60%	-50%	24%	91%	60%	156%	-26%
99	-5%	-13%	123%	462%	300%	-1%	84%	17%

Example of data dispersion



Problematic of data analysis:

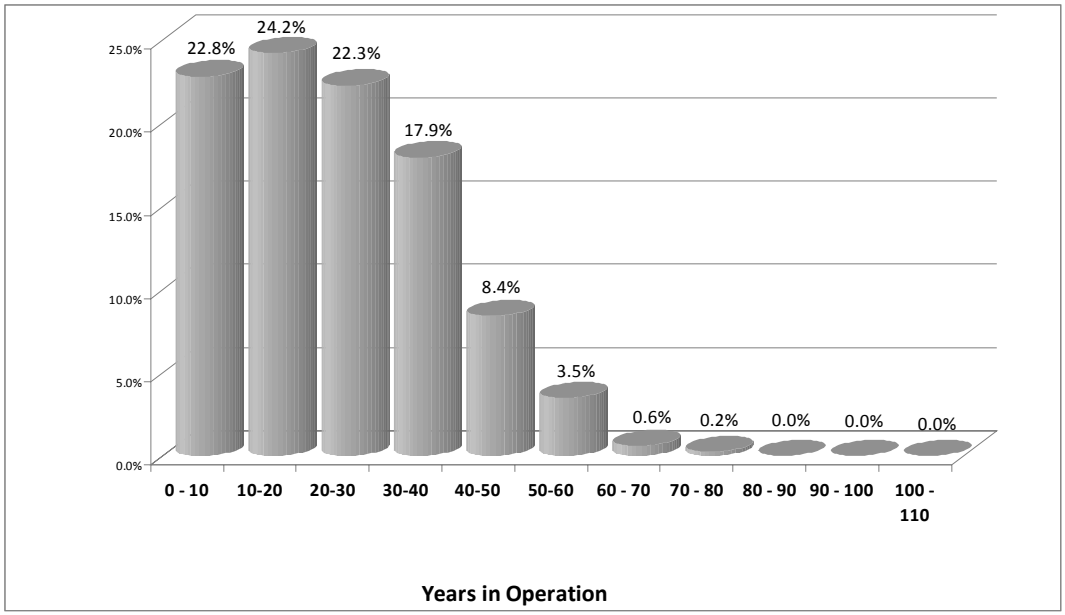
- Dispersion between sources is large
  - Different Network?
  - Different History?
  - Different Utilisation?
  - Different Laboratories?
- This fact must be taken into account during the analysis process

What parameters influence DGA levels ?

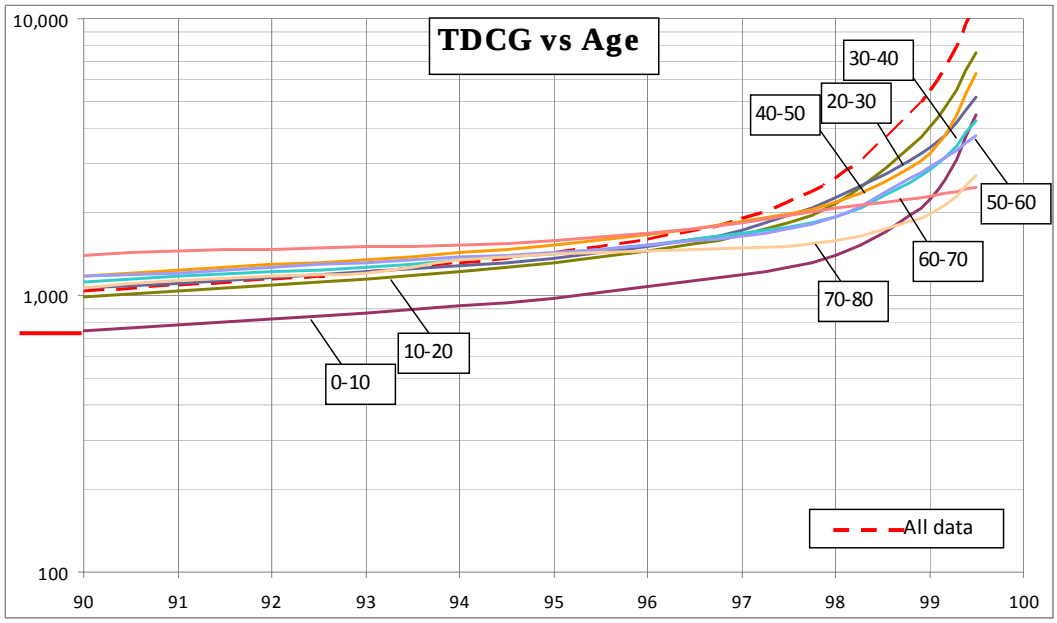
- Age ?
- Size ?
- Voltage Class ?
- Sealed / open ?
- Energized TC VS Non-Energized TC ?
- GSU / Transmission / Distribution ?
- North / South (Weather) ?
- Utility / Industrial ?
- Laboratories used ?
- Other?

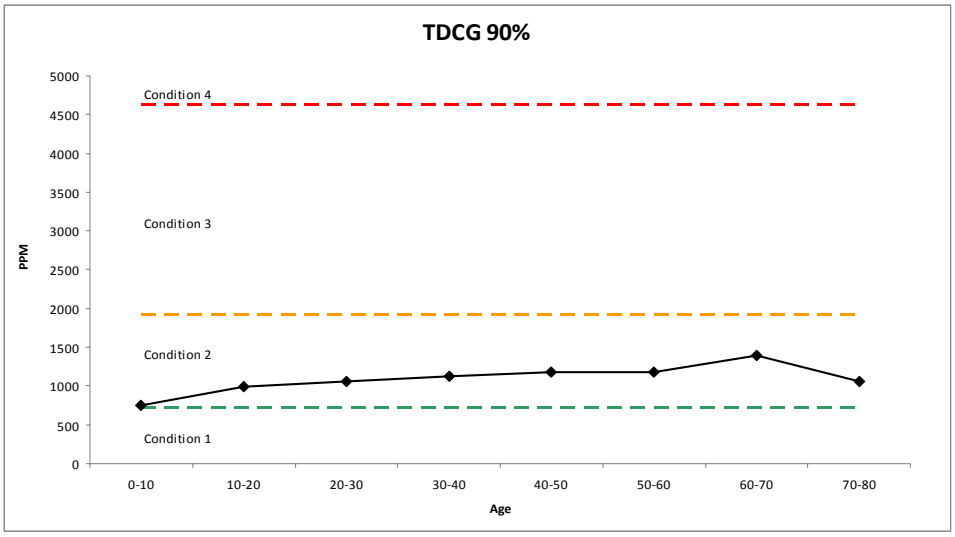
- Each individual parameter have to be studied to see if it has an influence
- Each influence has to be properly isolated
- Quantification of influence has to be statistically sound and documented

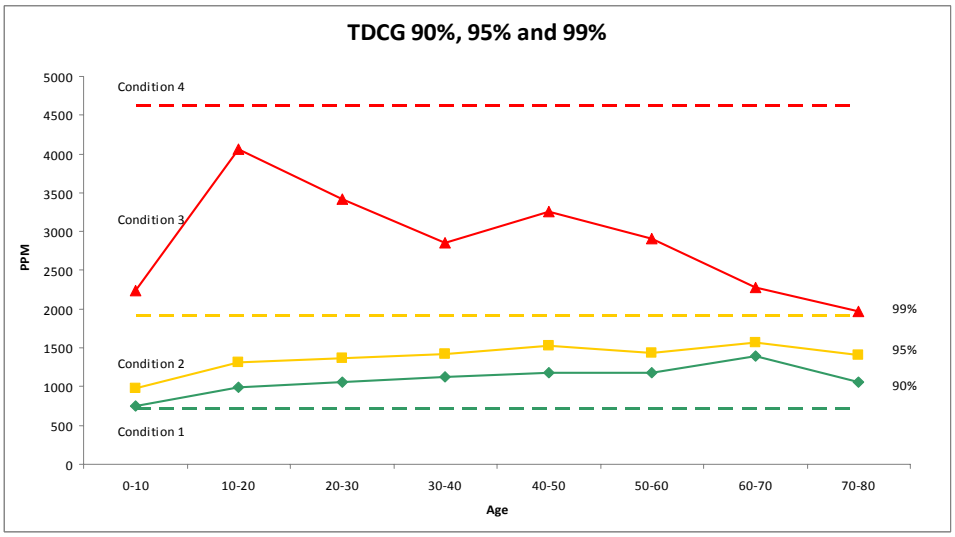
Example of a possible influential parameter: Age

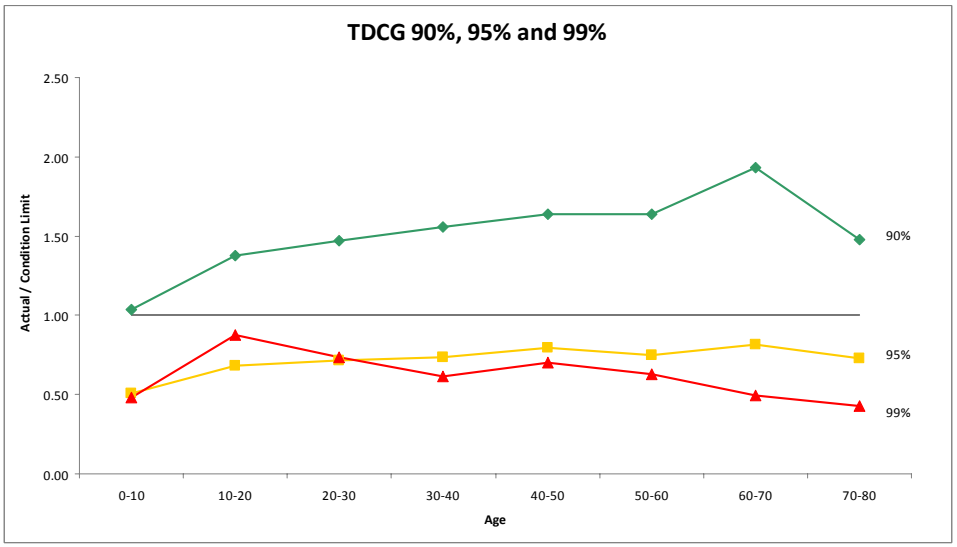


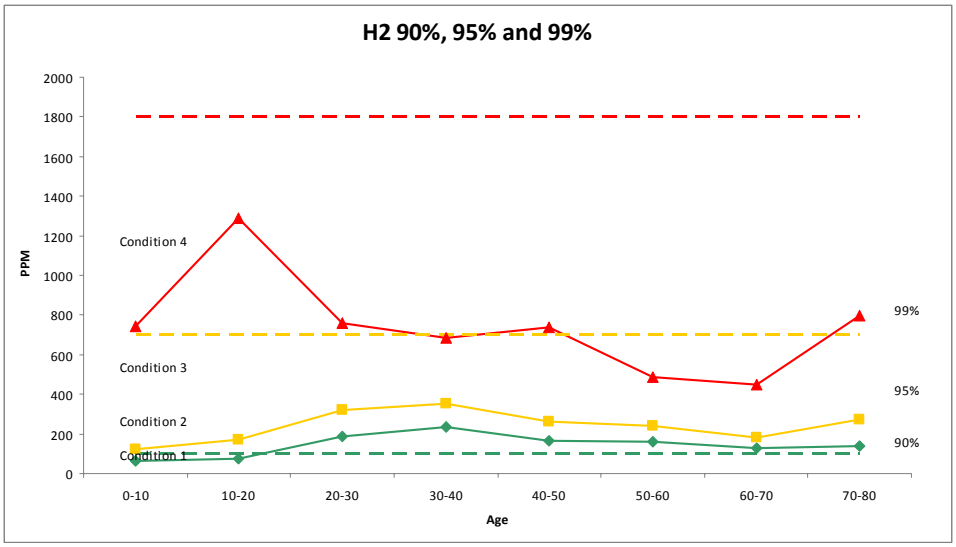
TDCG	all	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
90	1034	747.3	993	1061	1123	1179.3	1177	1391.1	1062.8
91	1087	783	1033.9	1107	1169	1233	1207.9	1438.7	1133.1
92	1148	820	1086	1154	1220	1292.6	1266.3	1458.2	1173.8
93	1222	865	1141.9	1212	1271	1350.6	1307.7	1495.1	1205
94	1311	920.8	1212	1276	1337	1430	1371.2	1528.4	1346
95	1429	980.6	1309.4	1367.6	1415	1525.6	1432	1569.8	1403.2
96	1602	1071	1445	1498	1521.8	1665.6	1512.5	1671.8	1447.4
97	1904	1193.4	1661	1724.5	1669.2	1856	1641.9	1834.8	1482
98	2656	1391.3	2147.9	2266.7	1924	2181.7	1925.2	2071.5	1568.3
99	5439	2239.7	4061.9	3418.3	2848.9	3261.9	2902.5	2282.2	1975.3
99.5	11386	4481.3	7501	5177.7	4295.7	6376.1	3803.1	2471.5	2723.8

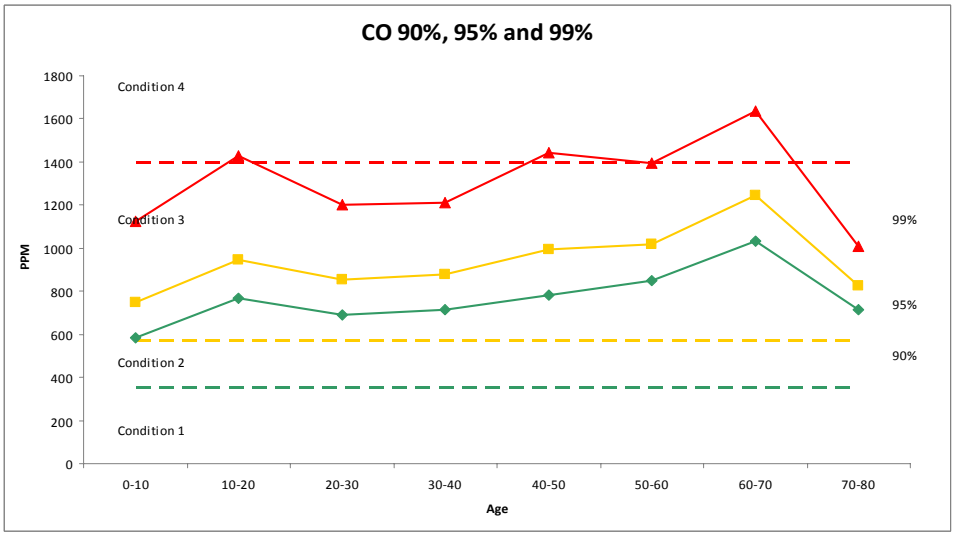


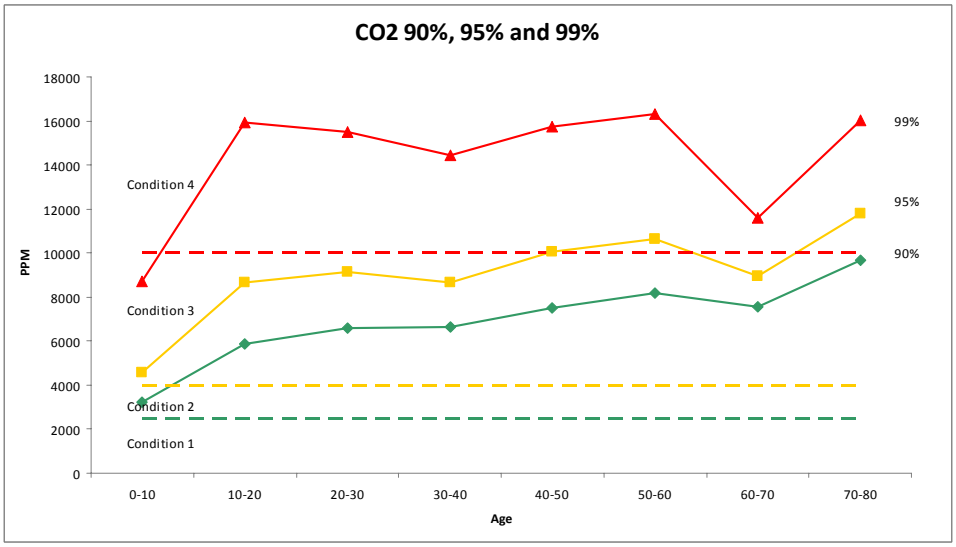

TDCG 90%
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
PPM
Condition 4
Condition 3
Condition 2
Condition 1
0-10
10-20
20-30
30-40
40-50
50-60
60-70
70-80
Age

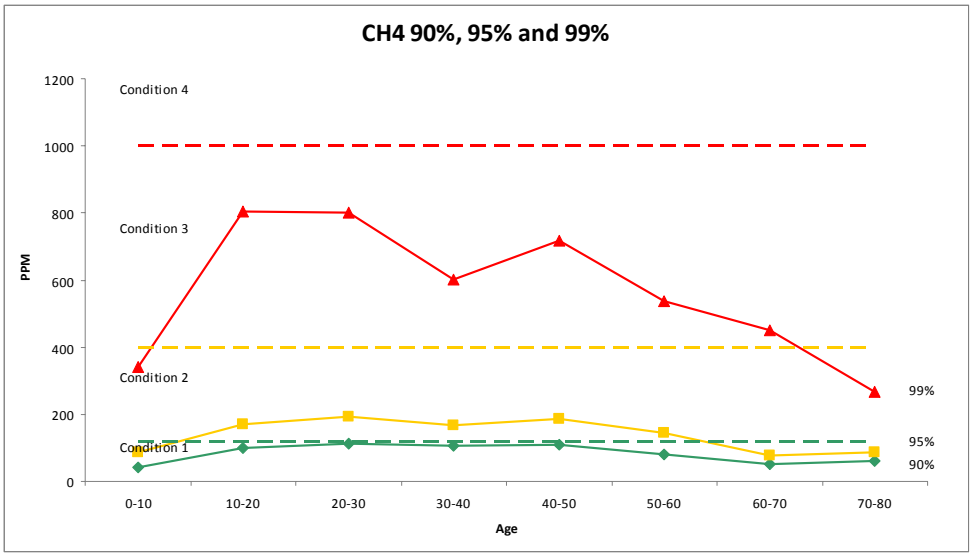

TDCG 90%, 95% and 99%
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
PPM
Condition 4
Condition 3
Condition 2
Condition 1
99%
95%
90%
0-10
10-20
20-30
30-40
40-50
50-60
60-70
70-80
Age

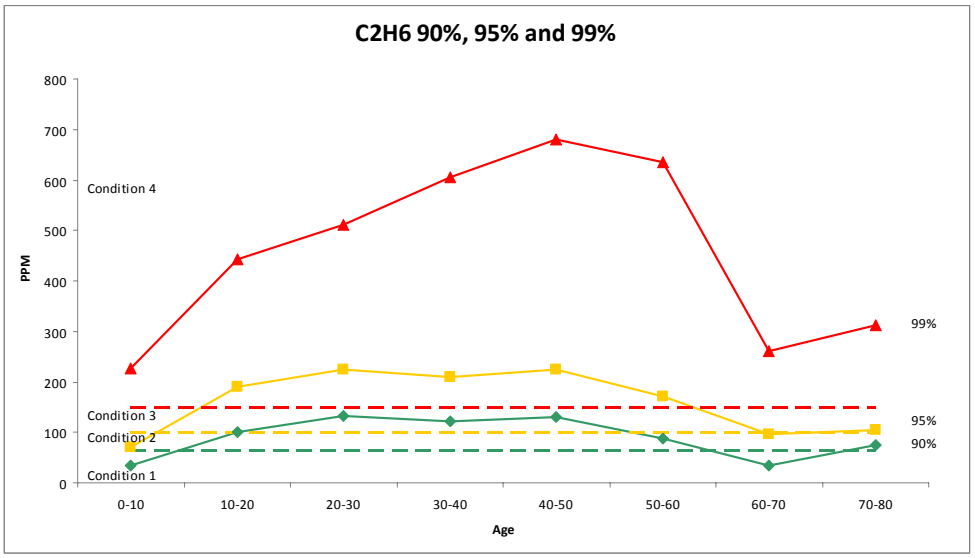

TDCG 90%, 95% and 99%
2.50
2.00
1.50
1.00
0.50
0.00
Actual / Condition Limit
90%
95%
99%
0-10
10-20
20-30
30-40
40-50
50-60
60-70
70-80
Age

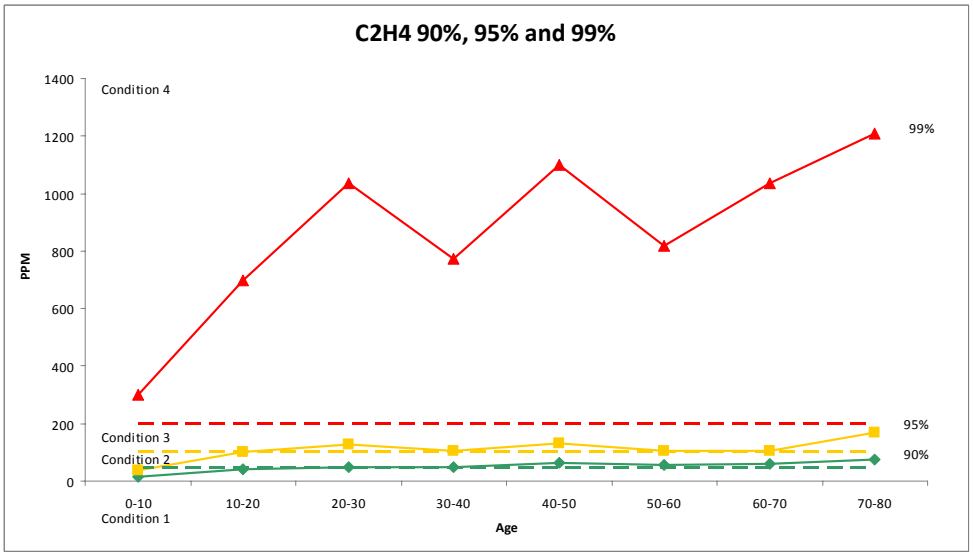

H2 90%, 95% and 99%
PPM
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Condition 4
Condition 3
Condition 2
Condition 1
99%
95%
90%
0-10
10-20
20-30
30-40
40-50
50-60
60-70
70-80
Age

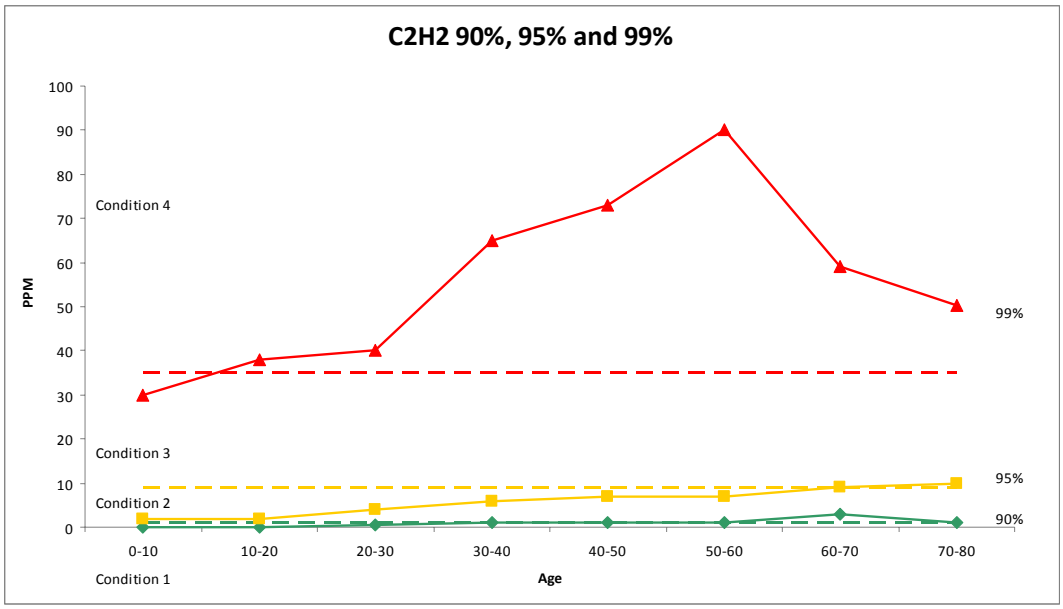

CO 90%, 95% and 99%
PPM
1800
1600
1400
1200
1000
800
600
400
200
0
Condition 4
Condition 3
Condition 2
Condition 1
99%
95%
90%
0-10
10-20
20-30
30-40
40-50
50-60
60-70
70-80
Age


CO2 90%, 95% and 99%
PPM
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
Condition 4
Condition 3
Condition 2
Condition 1
99%
95%
90%
0-10
10-20
20-30
30-40
40-50
50-60
60-70
70-80
Age

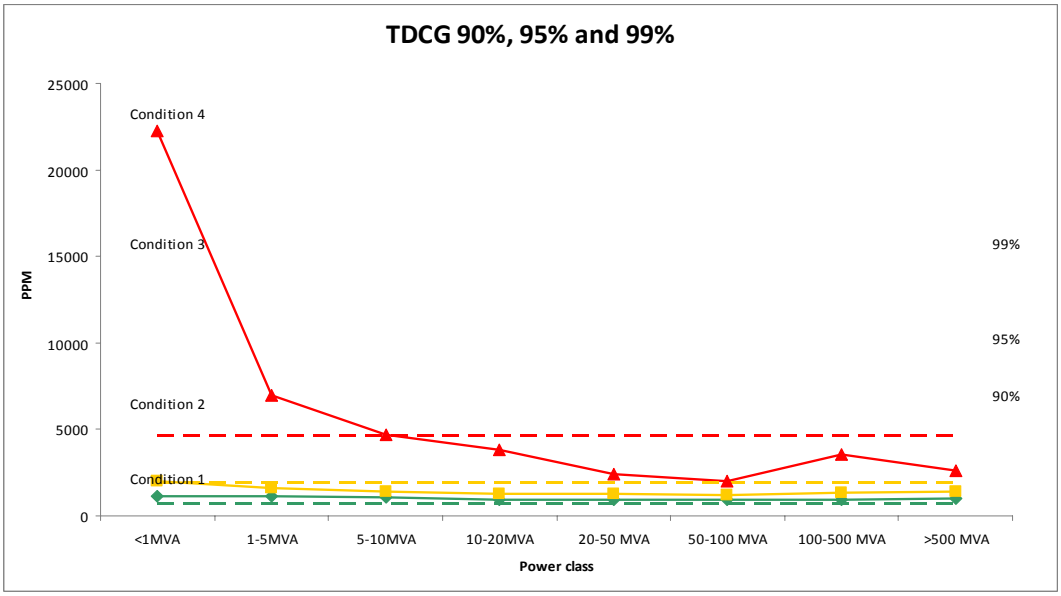

CH4 90%, 95% and 99%
1200
1000
800
600
400
200
0
PPM
Condition 4
Condition 3
Condition 2
Condition 1
99%
95%
90%
0-10
10-20
20-30
30-40
40-50
50-60
60-70
70-80
Age


C2H6 90%, 95% and 99%
800
700
600
500
400
300
200
100
0
PPM
Condition 4
Condition 3
Condition 2
Condition 1
99%
95%
90%
0-10
10-20
20-30
30-40
40-50
50-60
60-70
70-80
Age

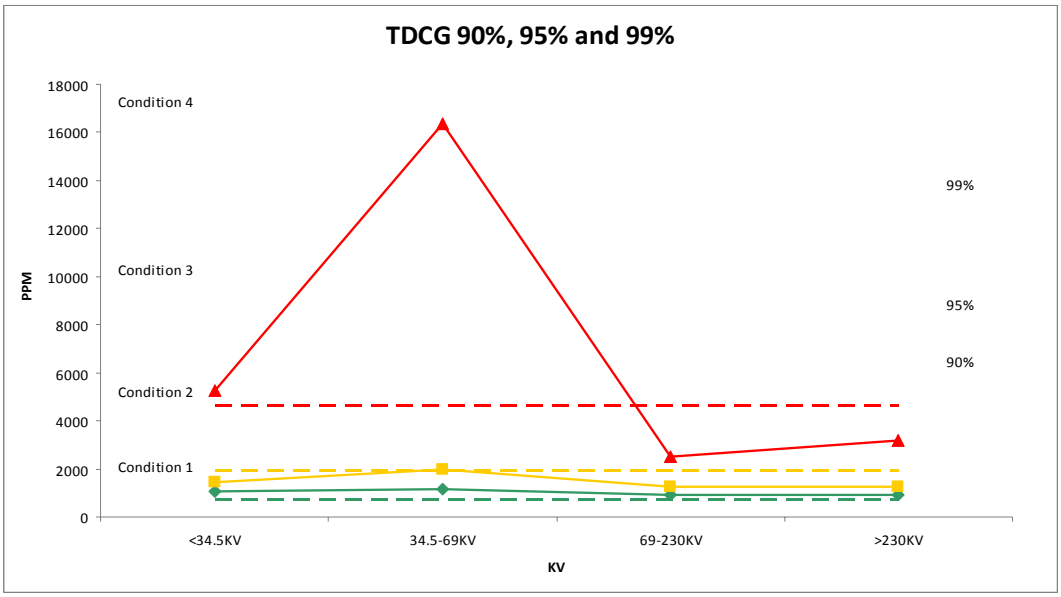

C2H4 90%, 95% and 99%
1400
1200
1000
800
600
400
200
0
PPM
Condition 4
Condition 3
Condition 2
Condition 1
99%
95%
90%
0-10
10-20
20-30
30-40
40-50
50-60
60-70
70-80
Age



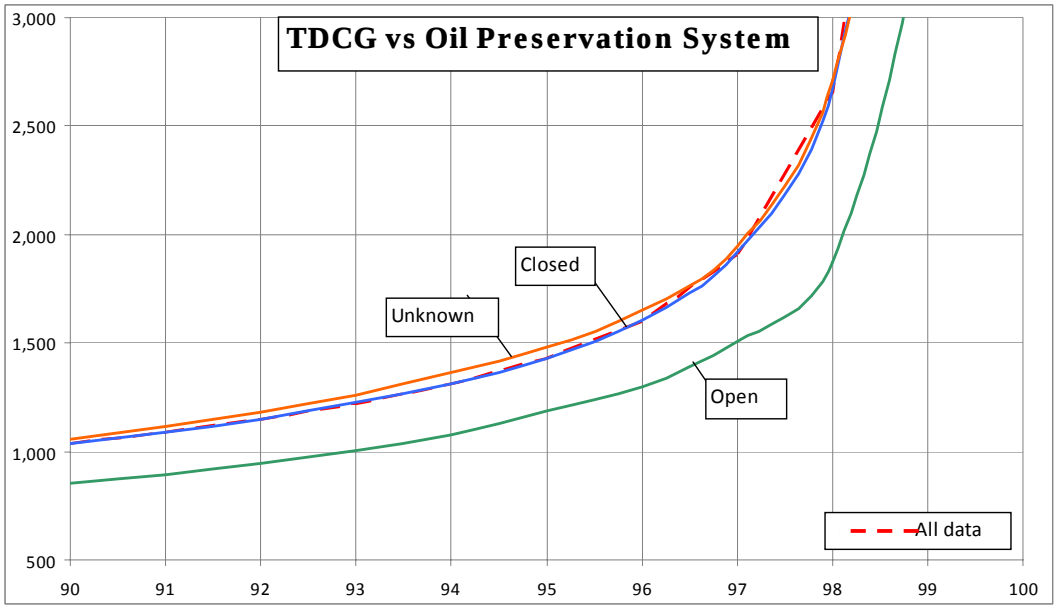
Influence of Rating:



Influence of voltage class:



Open or Closed:



Suspicious VS All

90%	H2	CH4	C2H2	C2H4	C2H6	CO	CO2	TDCG
All	93	85	1	56	92	717	7491	1034
Suspicious	782	912	32	1255	452	738	7749	4305

Rate of rise (ppm/day)

ppm/day	H2	CH4	C2H2	C2H4	C2H6	CO	CO2	TDCG
90	0.13	0.08	0.00	0.04	0.08	0.60	6.6	1.01
95	0.43	0.23	0.00	0.14	0.23	1.25	14.1	2.5
99	6.9	3.3	0.22	3.1	2.0	6.3	69.6	26.3

Discussion:

Question: Fredi Jakob – Regarding Table 1 vs Percentile slide – He indicated he wonders that if Table 1 was from late 80s and 90s, they were pretty young. If still in service, twenty years later, is the difference due to age? Certainly on the CO and CO2 values. *Response:* Beauchemin - Age is likely influencing the difference. If this is the case, it will show up in the slide on age. If an influence is seen, it will be identified.

Question: Jin Sim – Utilities have started measuring DGA on smaller transformers such as layer type transformers. This also could be influencing the data. *Response:* Beauchemin - Yes, this could be influencing the data.

Question: Juan Castellano – Was the type of TR compared? *Response:* Beauchemin – It was not. A very small percent of the data population included this information and what we have we will look at.

Question: Fredi Jakob – In his opinion Table 1 should only be used to give an idea of when a next sample should be taken. He recommends that Table 1 provide direction on what to do in this regard. *Response:* Beauchemin – There are instructions to this effect already there, but unfortunately, it is often not read. Ladroga – Whether the table will be kept or not is being looked at. The challenge is make the guide simple and useful. The intent is to gear the guide more toward how things are really done.

Question: Jin Sim – Does the core group feel the values in Table 1 should be erased.? Depending on the volume should there be correction? *Response:* Beauchemin – He indicated that the statistics will dictate, not the core group. Sim – Disagreed, indicating that there are many of the data that are not valid. *Response:* Beauchemin – That is why there is statistical analysis done to remove some of these outliers. He indicated he also would like to see a resolution to this. Luiz Cheim – We expect that the data is representative. Outliers and cases that could confuse the data needs to be removed, however this is not simple. Better tools and people with time to analyze the data are needed. One thing that may be looked at is making the table more of a matrix to look at the level along with the rate of increase. The goal is to come up with something helpful to the industry.

Fredi Jakob – Paper in IEEE Journals for Power Delivery – There is emphasis on TCGs, which doesn't make much sense. Rick Ladroga requested a copy of the paper.

Question: Anthony McGrail – Indicated he is disturbed that we are having this conversation at all. He indicated that we need to be very careful that the 99 percentile does not indicate a condition. *Response:* Ladroga – It is very much indicative of the data distribution. The goal is to determine if we can correlate.

Question: - Indicated that the Table is used by his insurance company to tell them what maintenance needs to be done.

Question: Doug McCullough – Have we asked the manufacturers to give a table on the gas concentrations on materials used in the transformers. This may help to draw correlations. *Response:* Ladroga – That is a good suggestion and if the manufacturers can provide this information, it will be reviewed.

Question: Leon White – Samples were not always taken properly. Is there any thought on using only samples taken in the last 10 years now that people are more aware of how to properly take the samples? *Response:* Beauchemin – Yes, the data could be reviewed based on the date of samples to see if there is an evolution in this regard. Mel Wright - Looking at the total dissolved gas and the ratio of oxygen and nitrogen can tell you if the sampling is consistent and if it was properly obtained.

Rick indicated that there has been a concern raised about the quality of the data and the security of the data. He is hoping to keep the data with IEEE for future use and limit the access to the data.

The meeting was adjourned at 4:30 pm.

Rick Ladroga
WG Chair

Claude Beauchemin
WG Vice-Chair

Susan McNelly
WG Secretary

10.5.3.2. C57.106 - Guide for the Acceptance and Maintenance of Insulating (Mineral) Oil - Chair: Bob Rasor

The WG Report Given at the Sub-Committee Meeting, presented by Bob Rasor:

A new Par was approved so the 4 year clock has started. Jim Thompson accepted the position of Vice Chair and Claude Beauchemin the position of secretary. A presentation on moisture was made by Jim Thompson. The WG will look at data and original substantiation of current standard.

No Questions

The Minutes (unapproved) of WG Meeting as Submitted:

Monday, March 12th, 2012 4:45 PM

The meeting was called to order by Chair Bob Rasor at 4:50PM. There were 39 attendees (42 including chair, vice chair and secretary). This is the first meeting, and 21 attendees requested membership.

Attendees requesting membership were:

1. Ken Kampshoff
2. Shawn Galbraith
3. Zan Kiparizoski
4. Nick Perjanik
5. Ryan Niemerg
6. Roger Hayes
7. Stephanie Denzer
8. Bob Ganser Jr.
9. Don Platts
10. James Gardner
11. Gordon Wilson
12. Alan Peterson
13. Hali Moleski
14. Pugazhenthi Selvaraj
15. George Leinhauser
16. Dave Hanson
17. Tom Prevost
18. Clair Claborne
19. Juan Castellanos
20. Jimmy Rasco
21. Don Cherry

1. Agenda was reviewed

2. Roster was circulated
3. Introductions given
   Chair: B Rasor
   Vice Chair: J Thomson
   Secretary: C Beauchemin
4. Par status provided
   Approved 9 Nov 2011
   Expiration 31 Dec 2015
5. The overview of scope and purpose were read
   Overview:

1.1 Scope

Scope: This guide applies to mineral oil used in transformers, load tap changers, voltage regulators, reactors, and circuit breakers. The guide discusses the following: a) Analytical tests and their significance for the evaluation of mineral insulating oil. b) The evaluation of new, unused mineral insulating oil before and after filling into equipment. c) Methods of handling and storage of mineral insulating oil. d) The evaluation of service-aged mineral insulating oil. e) Health and environmental care procedures for mineral insulating oil. The characteristics of the oils discussed in this guide do not include oil that is in factory fill lines, nor does this guide cover reclaimed oil installed in new equipment. The qualities of such oil, if used, should be agreed upon by the manufacturer and the user of the equipment.

1.2 Purpose

Purpose: This guide is to assist users of the equipment in evaluating the serviceability of new, unused oil being received in equipment; oil as received for filling new equipment at the installation site; and oil as processed into equipment. It also assists the operator in maintaining the oil in serviceable condition.

Comments followed:

- Sue McNelly: Document will need to be reviewed for terminology to keep consistent.
- Valery Davydov: Title states Insulating Oil, this might be revised to Insulating Mineral Oil?
- Sue McNelly: Yes, P. McShane does this kind of review.

Jim Thompson requested that he present the history of C57.106 (i.e. revisions made during 2002-2006). This presentation addressed the moisture section. He noted that the presentation he gave was based on a previous tutorial given (during the last revision to the guide) at the 2004 San Diego Transformers Committee Meeting and it is archived on the IEEE Transformers Committee website. He also mentioned his recently published paper presented at the IEEE PES General Meeting in July, 2011 regarding a moisture diffusion model for transformer oil and paper. Jim Thompson expressed that section 4.5 was changed in 2006 to correct serious errors in the C57.106-2002 document. It should not be changed now because the thermodynamics of an operating transformer are such that there is never equilibrium. The moisture in the paper is a distributed parameter rather than a lumped parameter. Also this moisture distribution in the paper is dynamic with regards to time. Bob replied that each section of the Guide is open to review and none are to be excluded.

Bob Rasor presented the various sections of C57.106. He asked that volunteers sign up for sections that they felt needed modified. Volunteers were to sign up at the end of the meeting.

There was discussion on what section revision might require PAR change. Tom Prevost clarified that a change in title, scope or purpose will require a revision of the PAR. Sue McNelly agreed and said that is it OK if that is needed. It was suggested to wait until further into the document revision to avoid multiple PAR change.

Sue McNelly asked if there were specific sections that those present felt the need to review.

Tom Prevost questioned the origin of some of the content and values: i.e. should circuit breakers still be part of the guide ; are both 1 and 2 mm gap Dielectric D1816 values needed anymore; should corrosive sulfur be included? The origin of some of the values was questioned. Some comments were raised asking if Dielectric D877 should be put back in Table 1. Jim Thompson commented that ASTM D877 is used for new oil refinery tests and is still an ASTM standard and should be included. Also there are many users that still use their own test sets for D877 mineral oil dielectric breakdown voltage tests.

T.V. Oommen said the moisture values were not based on consensus values, but scientific based. T.V. Oommen suggested a seminar be held to show this. An attendee commented that many are confused with the moisture section in the guide and how it addresses moisture in oil with moisture in the paper insulation. Brian Sparling suggested the section be removed. Jim Thompson stated it is based on four years of meetings with power points and a tutorial and it is written in understandable language for the general transformer user reading the document.

Valery Davydov suggested consideration needs to be given as to the overlap of moisture in several guides and if this section should be kept in C57.106. Jim Thompson said the section was written (in 2006) to remove interpretation for moisture in paper that was in the previous section (2002). Jim Thompson said that if the moisture section is to be revised it must align with other documents such as the reclamation guide C57.637. Jim Thompson questioned if service-aged limits belong in C57.106, and suggested that they are covered in C57.637. Valery Davydov noted that the scope of C57.106 clearly covers service-aged mineral oil. Note: The C57.637 reclamation guide is currently in revision.

Tom Prevost asked the group if data and statistical analysis would be beneficial to back up the existing table values, like what is underway in C57.104 revision and suggested the TF to gather data to review limits. TV Oommen indicated that the C57.104 numbers a based on scientific reasons. Jim Thompson added that the value were consensus value generally accepted and that there were no objections to them. Brian Sparling mentioned that none present knew of the origin of these values (in C57.104). Jim Thompson mentioned that the 1977 data for C57.104 was based on a survey utilizing a 90% value statistic.

Additional comments were raised as to the origin of the values in C57.106 and if changes in industry and oil (i.e. refining of crude oil) would suggest that data be collected to validate these existing values. Jim Thompson mentioned that since oil has not changed, there is no need to revise numbers. A comment was made from a refinery representative that since 1977 changes in oil refining has improved the qualities of the oil. Jim Thompson suggested that data quality is an issue if data collection is used to define limits. Sue McNelly said that it can be done as was shown in the C57.104 gas guide revision.

Bob Rasor agreed a basis for the values would be beneficial. He stated as sections are being reviewed, that it be recorded on a master list of what is being reviewed and who is responsible.

Meeting was adjourned at 6:00PM

10.5.3.3. C57.130 Trial-Use Guide for Dissolved Gas Analysis During Factory Temerature Rise Tests for the Evaluation of Oil-Immersed Transformers and Reactors. WG Chair Jim Thompson

The C57.130 WG Report Given at the Sub-Committee Meeting:

Jim Thompson presented: Met on March 13, no quorum. A new PAR Approval was issued. Current draft designated as Draft 19. The new draft now includes the term "Mineral" in the title. A standard status vs. a *guide* was proposed by Tom Prevost.

Reviewed the IEC equivalent guide. The 90% threshold is only listed as *informative* data, not *reference* data.

No Questions.

The Minutes (unapproved) of C57.130 WG Meeting as Submitted:

March 13, 2012

Unapproved Minutes Working Group Meeting for IEEE PC57.130

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"
Chair Jim Thompson

The working group meeting was conducted on March 13, 2012 at Nashville, Tennessee with 23 people in attendance, including 7 of the 30 working group members.

This document was in draft 18 when the decision was made to let the PAR expire in 2009. A new PAR was approved on June 17, 2010 and is labeled draft 19.

Tom Prevost's previous meeting motion was to change the guide from a trial use guide to a guide and the word mineral to the title so the phrase reads mineral oil was discussed and will be sent to the working group members this summer for approval.

Data was presented and discussed for gas (ppm/hr) generation rates for a 1 per unit factory load tests. This guide is for 1.0 per unit testing only. A request was made by the chair for comments regarding objections to the values in table 1 in the draft document. There were none offered. A note in draft 19 uses zero as a value in the text and the wording will be changed to "non detectable."

Then discussion included precision statements from ASTM 3612, Standard Method for Analysis of Gases Dissolved in Electrical Insulating Oil by Gas Chromatography. This guide does not appear to have precision statements yet--although there is a round robin reported in the 2011 document.

Other discussion included IEC 61181. This guide does not use a table of values of gassing rates for recommended actions. The 90 percent typical values in IEC 61181 are listed only in the appendix as informative data only. Another suggestion was made to add a note to take backup samples. And finally, a suggestion was made by Sue McNelly to include minimum data in factory test reports so that the gas generation rates can be determined from the information provided.

Respectfully submitted,

Chair Jim Allen Thompson

C57.139 WG - Guide for Dissolved Gas Analysis of Load Tap Changers

Chair David Wallach, Secretary Sue McNelly

The C57.139 WG Report Given at the Sub-Committee Meeting:

Sue McNelly presented. No quorum. Ten new members were added to the WG. There is progress, a straw ballet is planned for mid – 2014. The current par expires in 2015. TF Jim Dukarm, Fredi Jacob and Michael Duval presented at meeting.

The Minutes (unapproved) of WG Meeting as Submitted:

Tuesday, March 13, 2012
Nashville, Tennessee, USA

Minutes of WG Meeting

Chair Dave Wallach called the WG meeting to order at 11:00am. WG Secretary Susan McNelly was also present. There were 23 of 50 members (Quorum requirement was not met). There were 64 guests present with 15 guests requesting membership. Guests attending the WG meeting for the first time who request membership will be deferred until the next meeting attended.

Guests requesting membership were (those identified with an asterisk (10 of the 15) will be added as WG members):

Jonathan Cheatham*****	Nicholas Perjanik*****
Frank Damico*****	Markus Stank*
Norman Field*****	Kjell Sundkvist*****
Marc Foata	Humayun Tariq*
Shawn Galbraith	Mark Tostrud*****
Soni Mahendra Kumar	Ajith Varghese
Anthony McGrail*****	Melvin Wright*****
Amit Mukerji	

Agenda:

1. Introductions/Member Roll Call
2. Approval of minutes from Fall 2011 meeting
3. PAR & Schedule Review
4. Task Force Focus Areas
5. New Business
6. Adjourn

Minutes from the fall 2011 Boston, Massachusetts meeting were not approved due to a lack of quorum.

Schedule

1. Working group meetings until next revision needs to begin ballot:
    i. Spring 2012 (this meeting)
    ii. Fall 2012
    iii. Spring 2013
    iv. Fall 2013, and
    v. Spring 2014

2. Working group needs to plan to begin Balloting process – Mid 2014

    a. Straw Ballot
    b. MEC
    c. Form Ballot Pool
    d. Ballot
    e. Ballot Resolution

3. PAR expiration – December 31, 2015

   Submit balloted document to REVCOM by October 15, 2015 deadline

Task Forces

The following task forces were developed for work on revision of the Guide.

- **Data Analysis**, Chair: Jim Dukarm
  Members: Shuzhen Xu, Tony McGrail, Mark Tostrud, Luiz Cheim, Prabhu Soundarrajan, and Stephanie Denzer

  – Develop generic design category norms for Appendix A LTC Types
    - Gather data by type and operating conditions
    - Begin attempts to develop generic design category norms
  – Variation of norms between users due to loading, maintenance, temperatures

  STATUS:
  - No off-line meetings have been conducted since the fall meeting. Jim Dukarm plans to complete a list of data fields that are needed to complete the next activity of data collection for analysis. Jim plans to contact the members of the Data Analysis TF in the coming weeks.
  - David Wallach also contacted Erin Spiewak at the suggestion of Fredi Jakob to inquire if this Working Group can contact purchasers of C57.139 to inquire about collecting data. Erin thinks there would be some legal and policy challenges with this request but will check with IEEE SA staff.

  Dukarm/Jakobs Presentation: Gas Ratio Nomograms for LTC DGA

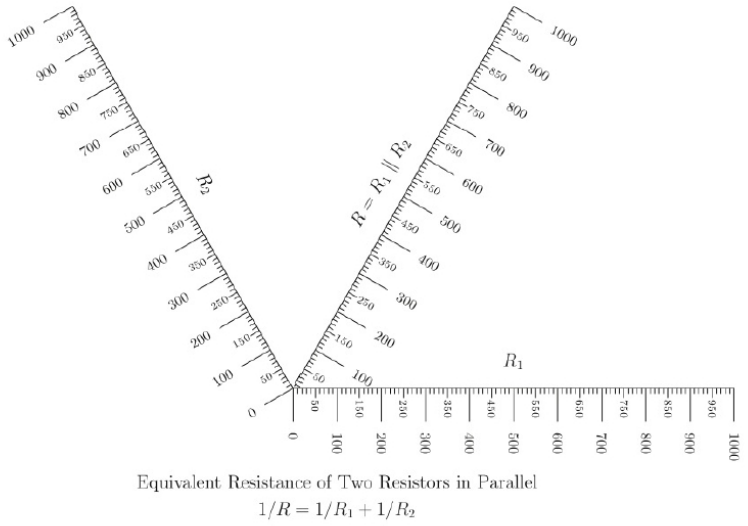
  What is a nomogram? A nomogram is a carefully aligned arrangement of numerical scales. Each scale represents one variable in an equation or set of equations.

  A line drawn through the scales of the nomogram represents a solution of the nomogram's equation, i.e., an assignment of values to the variables (points where the line crosses the axes) that satisfies the equation. (Such a line is called an isopleth.)

  Generally some of the line-crossing points represent known values of certain variables, and the others represent the "missing" values.

  In other words, a nomogram is a diagram which can be used to do complex calculations graphically.

  Equivalent resistance of two resistors in parallel



Source: Ron Doerfler, *The Lost Art of Nomography*

Nomogram Features

- Calculate a ratio and evaluate its significance visually by drawing a line.
- Borderline cases are easily noticed and interpreted.
- A series of samples can be plotted on one nomogram to visualize fault evolution

Because of its complexity, a pre-printed template is required for drawing the nomogram.

Discussions on Dukarm/Jakob Presentation

The TF will be looking to collect more on-line monitoring data.

- **Other Diagnostic Methods**
  Members: Fredi Jacob, Tony McGrail, Arturo Nunez

  – Triangle (Duval)
  – Nomograms (e.g. Jakob, Dukarm efforts)

Michel Duval Presentation: Application of Duval Triangles 2 to DGA in LTCs

Normal operation of LTCs may involve:

- arc-breaking-in-oil between contacts, producing arcing gases D1.
- switching of selectors and valves, also producing sparking discharges D1.
- current dissipation in resistors, increasing their temperature and producing hot spot gases T3, T2 or T1.
- combinations of the above, producing mixtures of the corresponding gases

Faulty operation of LTCs may involve:

- an increase in the resistance and temperature of contacts, with the production of hot spots T3 and T2, and coking on contacts, through carbonization of oil.
- abnormal arcing D2 or D1 on metallic parts of the LTC.

To be able to distinguish between normal and faulty operation of LTCs:

- gases formed as a result of normal operation should be identified as precisely as possible under different power operating conditions.
- deviation from normal operation will indicate faulty operation.

Mostly arcing gases are formed during normal operation of a large majority of LTCs, such as:

- LTCs of the reactive-type in oil or vacuum from:
  -Westinghouse: UN, UR, UV series, UTS, UTN, UTT.
  -Cooper, McGrawEdison: series 394, 396, 494, 550, 995, 996.
  -General Electric: LR and LRT series.
  -Reinhausen: RM series.
  -Allis Chalmers, Siemens: TLH series.
  -Federal Pacific: TC series.
  -Ferranti Packard: RT series.

- also, in LTCs of the resistive-type in oil or vacuum from:
  -ABB: UB, UC, UZ series.
  -Reinhausen: OilTaps C, R, V, Y.
  -Westinghouse: UTH.

Duval Triangle 2 can be used for all these types of LTCs, with:

- arcing gases D1 appearing on the left side of the Triangle,
- hot spot gases T3, T2 and T1 on the right side.
- Hyundai: RS series

Other types of normal operation

- Some resistive LTCs such as OilTaps Y and M and VacuTaps VV operate normally in either zone N or zone T3 or zone T2, depending on operating conditions.
- The use of methane in addition to acetylene and ethylene allows to distinguish between faulty and normal operation in such LTCs.

A few other resistive LTCs such as OilTaps G and some UZBs of ABB (ref.John Pruente) operate normally in zone X3 (mixture of arc-breaking-in-oil and high-temperature operation of resistors), depending on operating conditions.

HQ data - OilTaps G:

OilTaps G are high-currents application models. Normal gases occur in zone X3 (mixture of arcing and hot spots).

Different versions of Triangle 2 should therefore be used for some LTCs, indicating the normal zone(s) of operation depending on power operating conditions:

- Triangle 2a and 2b for OilTaps M-Y and VacuTaps VR-VV.
- Triangle 2c for OilTaps G and some UZBs.

Finally, reactive LTCs of the vacuum-type:

- Arc-breaking activity occurs in the vacuum bottle only. Normal operation in the surrounding oil used for cooling the bottle does not involve sparking of selector or resistor heating.
- Triangle 1 should be used for these LTCs.

Discussions on Duval Presentation

Question by Fredi Jacob: What do the red lines on slide 23 mean? *Response*: Jim Dukarm responded that due to a lucky mathematical accident, that values of certain gas ratios can be represented on the graph as a straight line. The statistical limits for various ratios were calculated. The combination of the triangle itself and the application of these statistical limits can better let you see what is outside of a somewhat normal/usual zone or area of the triangle.

Question by Dave Wallach: is this as another method or way to show more normal areas for the different LTC types? Do you envision this being able to be incorporated into the guide? *Response*: Michel indicated that this is just a graphical representation, perhaps a

visual representation of a unit progressing from one area to another on the triangle. He indicated that this could be done.

Question: Is there a statistical upper and lower bound? *Response*: Michel indicated it will be dependent on users maintenance guidelines to decide at what point they would want to do maintenance and what risk they would be willing to take. A good database of normal operation needs to be built by the user to determine what is considered normal or not.

The number of operations has a direct effect on the amount of gas in the oil. Higher levels may not necessarily indicate faulty operation. Number of operations should also be considered when evaluating levels.

Question: Any difference on the data base with or without filtration system? *Response:* Michel indicated that he did not know. He indicated that the filtering would affect the levels, but should not greatly affect the ratios.

Dave Wallach asked the group if there was interest in preparing examples and text for inclusion in the guide. The general consensus was yes, this would be of interest. Dave Wallach requested that Michel Duval develop some suggested text and graphics for consideration by the Working Group for inclusion in the next revision. Placement in the main body or an annex can be determined at a later date.

Other Topics for possible future TF

- Presence of Benzene and Toulene (Vijayakumaran Moorkath) – no discussion this meeting
- Use of word "fault" with DGA (Kent Brown) – This may be an issue to take up at the IFSC meeting to make sure that we are aligned with terminology used in C57.104 and other documents. – no discussion this meeting

The meeting was adjourned at 12:15pm.

Dave Wallach, Chair

Susan McNelly, Secretary

10.5.3.4. Working Group PC57.147, Guide for the Acceptance and Maintenance of Natural Ester Fluids in Transformers

TF Chair: Patrick McShane, Vice-Chair: Clair Claiborne, Secretary: Jim Graham

The Group Report Given at the Sub-Committee Meeting:

Presented by Patrick McShane. The PAR application for revision of the current Standard Guide was approved by IEEE SA. 26 members signed on, several task forces were created and chairs selected and all have one or more additional volunteers. Expanded list of topics to be addressed during the revision process were recommended by attendees and listed in the minutes. Additional topic suggestions are welcome. The Chair announced that to remain a member of the WG.

Minutes (unapproved) of the PC57.147 WG meeting as submitted:

The **March 12, 2012**
Nashville, TN

- Call to Order was made.
- Introductions/Membership Attendance/Quorum Check

- Attendance
  - 1st Meeting Since PA, so a call for membership was made.
  - 26 members of the 60 present at the meeting enrolled as members
- Chair Report, Patrick McShane:
  - Welcome of new members and guests
  - WG Membership requirements & responsibilities
  - Review of the approved PAR - minor editorial revisions to the scope & purpose by the standards coordinator were adopted
  - Brief review of the proposed consolidation of the fluids guides

- The Fall 2011 Minutes were approved
- Task Force Reports
  - All task force chairs reported no work was initiated
  - Volunteers solicited to support each task force

- Additional Items of Interest to be addressed by this revision
  - Clarify & define acid limits
  - Interfacial tensions
  - DGA values for natural esters - referred to PC57.155 Working Group
  - Power factor values - referred to PC57.152 working group
  - Low temperature properties, especially the effects of separation of fluids from semisolids
  - Material compatibilities for retrofilling applications
  - Compatibilities of mixed natural ester fluid types
  - Compatibilities if natural esters with components/accessories

- Old Business
  - All WG members are required to become a TF active participant
  - Some reassignments of theTF Chairs were discussed and made.
  - Each member was assigned one or more TFs per annex.

- New Business (none)
  - Rosters of task force volunteers will be forwarded to the TF chairs for review
  - TF volunteers will be contacted by the TF chair and advised of upcoming TF meetings

- Adjournment

Respectively submitted,
Jim Graham, Secretary

C57.147 Task Force Rosters

As of March, 2012:

TF 1: Section 4 - Fluid tests & Significance

Chair: **Don Cherry**

Members:	Dave Hanson	Jimmy Rasco
	Mel Wright	Paul Caronia
	Mark Scialdone	

TF 2: Section 6 - Handling & Evaluation of NEF used in field filling

Chair: **Lance Lewand**

Members:	Clair Claiborne	Derek Baranowski
	Juan Castellanos	James Gardner

TF 3: Compatibilities of NE Fluids with Components & Accessories (includes Section 7 - Evaluation of NEF in New Equipment)

Chair: **Jerry Murphy**

Members:	Tony Reiss	Sheldon Kennedy
	Marshall Stewart	Greg Stem
	James Gardner	Dave Harris
	Christopher Sullivan	

TF 4: Section 8 - Maintenance of NEF

Chair: **Stephanie Denzer**

Members:	Libin Mao	Nick Perjanik
	Mel Wright	

TF 5: Annex B

Chair: **David Sundin**

Members:	S. Joon Han	Dave Hanson
	Paul Caronia	Bob Kinner
	Mark Scialdone	Jesse Inkpen

TF 6: Field Application Guide & Equipment Evaluation

Chair: **John Luksich**

Members:	Roberto Asano	Dave Harris
	Jane Verner	Scott Reed
	Thomas Spitzer	

TF 7: All other sections - Miscellaneous

Co-Chair: **Patrick McShane**

Co-Chair: **Jim Graham**

Members: Sue McNelly

10.5.3.5. WG PC57.155 Natural Ester and Synthetic Ester DGA Guide

Chair: Paul Boman, Secretary: John Luksich

Report given at the Sub-Committee:

John Luksich reporting as Paul unable to attend. The meeting was held with John as acting chair. Did not have a quorum but had record 77 attendees. Jim Dukarm presented his data analysis. The data population is relatively younger units, so the percentiles will change in future as data set gets bigger and older.

Minutes (unapproved) of the WG meeting as submitted:

John Luksich – Presiding Officer

Meeting Date: March 13, 2012 Time: 9:30 AM

Attendance: 23 members out of 56 members were in attendance, total attendance was 73 and 4 people requested membership.

- Quorum not present (determined at the end of the meeting using the completed attendance sheets).

- Fall 2011 minutes unofficially approved

Continued business

1) Joon Han report

A task force was formed to obtain and chart the DGA data for ester fluids. Over 1,200 DGA records for both synthetic and natural esters were collected. Claude Beauchemin, Jerry Murphy, Roberto Asano Jr. and Joon Han volunteered.

2) Dr. Jim Dukarm presentation:

Jim Dukarm volunteered to do a statistical analysis of the collected C57.104 data. The records (800,000 sets) included many types of insulating liquids. He extracted the 5,000-odd natural and synthetic ester sets for separate study.

Jim discarded 50 sets as post-failure data. The number of samples was too small to separate into voltage class subgroups. He went into detail how he factored in the variability factor. The volume range per type of combustible gases is quite similar for synthetic and soy esters. The high oleic ester gas volume range is much bigger in variability.

Q: Fredi Jacobs: Why the high low designation of the natural esters?
A: Jim termed the soy fluid as low oleic and the sunflower/safflower fluid as high oleic because of manufacturer statements.

Q: Luiz Cheim: Why was 10,000 ppm total for selected combustible gases as the threshold for assuming
A: The intent was to remove obvious post-failure data, not statistical outliers.

Q: Bob Kinner: He has found that at 240°C, that there can be a stripping of carboxyl group resulting in the formation of CO2 from other than degrading cellulose. Could the CO2 be an arcing indicator?
A: unknown

Q: Valery Davydov: He has determined that the oxygen level can influence gas formation. Also the temperature of the sample is important, as the dissolved oxygen and nitrogen move in and out of cellulose factor. Did the TF factor in oxygen content in the study?
A: No

Statement by Mel Wright: We found that the DGA analysis of silicone fluid samples dependent significantly on whether or not the silicone was degassed in regards to CO2 levels.

Statement by Dr. Dukarm: Would like to have the limit range justified so that up to 90 percentile is non-actionable and taking action below that would typically be non cost effective.

An excellent presentation by Jim (as usual). The WG showed its appreciation with applause.

3) New Business

Question to WG by John Luksich: Should the work of this working group include a Dual logo with IEC?

Jim Dukarm stated that Dr. Duval mentioned that the CIGRE technical bulletin 443 is on the subject of non-mineral oil DGA and that there hasn't been much activity since. Jim suggested that we consider sharing the work of the WG with CIGRE.

4) Miscellaneous

Q: Why is the data base on the web password protected?
A: The data was for the use of the TF to develop their report and presentation. Some of the data is confidential. There are some copy right issues as well.

End of meeting.

10.5.3.1. WG PC57.637 Guide for the Reclamation of Insulating Oil and Criteria for Its Use

WG Chair Jim Thomson, Vice-Chair TV Oommen

Report given at the Sub-Committee Meeting:

Jim Thompson presented. 23 attended the meeting. The Guide revision PAR expires in December so a Par Extension will be submitted. The next draft will eliminate dates of referenced standards in accordance IEEE rules.

Sue McNelly's question: Was it withdrawn, two doc in new oil specs ASTM

Valery Davydov's suggestion: Should consider adding the word "mineral" to the title.

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

March 14, 2012

Unapproved Minutes Working Group Meeting IEEE PC57.637

IEEE PES, Transformer Committee, Insulating Fluids Subcommittee, Working Group for the "IEEE Guide for Reclamation of Insulating Oil and Criteria For Its Use"

Chair Jim Thompson
Vice-Chair TV Oommen

The working group meeting was conducted at 8 am on March 13, 2012 at Nashville, Tennessee with 23 people in attendance and with 9 of the 19 current working group members present. This document was reaffirmed in 2007 and the PAR for revision was approved December 10, 2008. A PAR extension request will be submitted next month. Working Group member Jim Thompson (chair) conducted the meeting.

Sue McNelly will be sent a copy when the final sections are submitted by the volunteers. The ASTM document text in this document will be revised to eliminate the dates of revision. The DBPC document reported by Mark McNally has no current document number in the 2011 ASTM D27 series document. This will be looked at so another ASTM document number will be included in the draft for DBPC testing.

Respectfully submitted,

Chair Jim Allen Thompson
Vice Chair TV Oommen

10.5.3.2. TF on Particle Count Limits in Mineral Oil

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

The Report given at the Sub-Committee Meeting:

Sue McNelly presented for Mark. No meeting was held at S12.

Tom Prevost's question: Wasn't it (the TF) discontinued at the last meeting? Sue McNelly responded that it was not, but that no meeting was scheduled at the S12 meeting week. There is some interests in continuing to gather information on the issue.

Patrick McShane stated that he recently peer reviewed a technical paper proposed for publication by IEEE on the impact of particle contamination on dielectric strength. He believes that the paper will generate increase interest in the subject.

10.5.3.3. TF on Moisture in Oil

Chair: Bob Rasor

The TF Report given at the Sub-Committee Meeting presented by Bob Rasor:

Bob explained that the TF was created to provide guidance on determining a relationship between moisture in the insulating liquid and the solid insulation. This was the 6th meeting. He stated that ppm (of water) has little value unless temperature is given with it. At the TF meeting, the highlights from previous meetings were reviewed since there were many new attendees. Valery Davydov and Claude Dukarm made presentations. Claude's presentation focused on a recent power transformer failure.

Bob would like to set the direction of future work for the task force. They are considering issuing a survey. The TF would like to have more folks participate in discussions.

The TF Meeting Minutes (unapproved) as Received:

Tuesday March 13th, 2012 4:45 pm
Nashville, Tennessee USA

The meeting was called to order by Chair Bob Rasor at 4:55pm. There were 90 attendees. 23 of the 49 members were present. Five requested membership.

Members attending were:
Claude Beauchemin
Luiz Cheim
Donald Cherry
Dinesh Chhajer
Valery Davydov
Stephanie Denzer
Eduardo Garcia
James Gardner
David Hanson
Rowland James, Jr.
Zan Kiparizoski
Libin Mao
Terence Martin
Thomas Melle
Tony Pink
Donald Platts
Thomas Prevost
Subhas Sarkar
Pugazhenthi Selvaraj
H. Jin Sim
Brian Sparling
Jim Thompson
Mark Tostrud

Attendees requesting membership were:
Prabhu Soundarrajan

Ajith Varghese
Arturo Nunez
Tony McGrail
C. Clair Claiborne

Agenda

1. Roster was distributed
2. Introductions were given
3. Minutes to last meeting were approved
4. Scope was reviewed with a brief history of the TF
5. A review of past data was given – 6 slides

   Comments/questions on the past data include the following:

   Slide1: JS asked how the 4% moisture in the solid insulation was obtained. Valery D said DFR, so they believe it is the bottom of the transformer. Top windings were estimated at 3%. He clarified the water content (ppm) was calculated from the relative saturation. After a question was asked about moisture distribution throughout the paper, Valery indicated that the DFR measures only a lumped parameter value.

   Slide2: Bob commented that the question is at what temperatures do the water content (ppm) values as listed in C57.106 have meaning. Jim Thompson asked Bob Rasor how the "average temperature" in the slides was obtained. Bob replied that the bottom oil sample valve temperature was taken then they added 5 degrees C to that temperature to estimate the "average" transformer temperature.

   Slide3: Shows fluctuation of ppm values in winter vs. summer. Data is based on KF, with percent saturation being calculated.

   Slide4: Again, shows seasonal variation of KF but with more than 20,000 sample points.

   Slide5: Shows response of relative saturation of the oil with two different percent moisture in solid insulation examples. Data was done in a test laboratory, not a transformer. Percent moisture in the solid insulation was done by pulling paper samples. The idea was to show if temperature is constant, equilibrium may be near and equilibrium curves may apply.

   Slide6: BR stated the Classification Chart is just one example of methods to estimate moisture in a transformer. VD clarified this chart is only for Karl Fischer samples and only for like new oil. There are different equations for used oil.

   Bob reiterated that there are tools to estimate moisture. They may not be perfect, but can give indication – especially for transformer owners than cannot put an online monitor on each transformer and can only pull samples for KF analysis.

6. New case study was presented by Claude Beauchemin.

   Moisture is most controversial as he has seen in the past years. C57.106 has room for improvement. Data examples provided in the past and today all try to explain there is relation between moisture in oil and paper.

   Case study was of a failed transformer due to moisture ingress from a leak. Transformer was energized in past, but taken out of service for many months. DGA was run prior to maintenance and oil screen was run after maintenance on this transformer. All data looked ok. Maintenance and installation of an online monitor was performed while de-energized. Before energizing, a KF

sample was also drawn. Temp was very low at 1°C with 11pm water content. Percent saturation calculated from the KF and measured by the online monitor indicated around 40 percent saturation. However, the water content was below the value given in C57.106. The customer energized the transformer and temperatures increased – within 2.5 days, the transformer failed. If the correlation between moisture in oil and moisture in the paper is ignored, vital information may be thrown away. There is a need for some correlation, despite not being at equilibrium. The transformer should not have been put back in service.

Many questions/comments followed. Names were not provided by all those that spoke.
Q: Was transformer oil filled? A: Yes, was filled 4 months prior to start up.
Q: Was there nitrogen or conservator tank? A: Unknown, but suspect a free breather based on DGA data.
Comment: Laboratory experiments have shown bubble temperature can be very low.

Q: Why was dielectric good with reasonably wet transformer? A: Dielectric test was different than standard methods and moisture only a factor in dielectric.

Q: Why was DGA run before maintenance – this does not show condition after maintenance?

A: Yes DGA was before processing. Last KF and online monitor data was after maintenance. PPM was 11 at 1C and that is the point.

JT: Stated that the warning box in C57.106 pertains to percent saturation. He said the guide says to do calculation for cold start up.
CB: The curve is not provided in the standard. Failure was due to bubbling, not dielectric loss. Guide needs improvement.
BR: Agrees that work needs to be done.
JT: Indicated that there are serious errors in this case history analysis. He indicated that one is the lack of looking at the cold startup warning in regards to the dielectric breakdown strength of the oil, and another even more important was the lack of using proper solid insulation testing prior to energizing of the transformer. He indicated that there should have been a Doble test performed on the solid insulation prior to energization.
DP: Have to disagree with CB conclusion. Suggests all test data was invalid because not taken when the unit failed. They didn't retest before putting back in service.
CB: Agrees that test after would have helped.

Q: What is definition of cold? JT: Most manufacturers recommend 50F warm up of oil prior to energizing.
CB: Are you saying everyone does this?
JT: Need to warm until 50F, this is standard procedure for his company.
CB: Temperature was above this temperature when the unit failed, so he doesn't understand.
JT: C57.106 is for fluid oil quality only. Power factor (electrical testing) should have been checked.
Time ran out – so discussion was halted.

7. At least once formally in the meeting and in other discussions before and after the meeting Sue, Dave, Bob, Claude, Hali and others thought about where the group was going - what might be the

endpoint of our data and some of the solutions that have been introduced or could be introduced. Bob's note: the idea of doing a group of questions to the members may give us some additional ideas, or at least see how everyone is thinking on certain topics. This may be done between meetings and ready for Milwaukee.

8. Meeting was adjourned at 4:55pm

10.6. TF on Consolidation of Insulating Fluid Guides - Chair: Tom Prevost

The TF Report given at the Sub-Committee Meeting presented by Bob Rasor:

Tom Prevost presented. No TF meeting was held as the member recruitment was not initiated. Tom then asked for volunteers at the SC IF meeting. The following volunteered:

Claude Beauchemin, Paul Caronia, Clair Claiborne, Jim Graham, David Hanson, Rick Ladroga, John Luksich, Hali Moleski, Tony McGrail, Patrick McShane, Jim Thompson, Jerry Reeves, Jimmy Rasco, Bob Rasor.

Question: What is the purpose of the proposed consolidation? Answer: Many IF guides refer to same ASTM Tests, mostly a repeat of same information. Purpose is for the task force to make a recommendation for how this is to be done. Tom Lundquist made a report that resulted in forming a TF, which was approved at last meeting. So need to form a scope and purpose.

Sue McNelly: The previous TF recommended that consolidation of these standards be would be desirable and recommended going forward on the project, while the purpose of the new TF, is to determine if such a consolidation can be a practical endeavor (not a given) and if so, how best to do it. This would be a relatively lengthy project.

Dave Hanson: It was mention at last meeting; current PARs involving any of these standards are to continue. Will not impact, not stop current activities. The consolidation issue is looking far out.

10.6.1. Old Business:

New TF of the Standards Subcommittee has been formed to study and report on Nomenclature Consistency for Insulating Fluids. Chair: Patrick McShane.

Presented by Patrick: The Standards SC approved the formation of a TF to issue a white paper to identify and suggest solutions to the various forms of referring to dielectric liquids and gases within the entire C57 standard set. Patrick requested volunteers from the SCIF to partner with volunteers from the Standards Subcommittee to review and make suggestions to be included in a white paper. After approval of the white paper by the SC Stds, the paper will be distributed to chairs of all the subcommittees for consideration for the next revisions of standards under their jurisdiction.

10.6.2. New Business:

Sue McNelly mentioned that she encourages SCIF members to consider participating in the Technical Tutorials for future TC Thursday Meetings. Tom Prevost is the TC officer responsible for the Tutorial schedule and selection process.

Sue also brought up the topic of data base issues: How to store and security that would be needed to ensure that the data bases used to develop or revise standards are not used for other than for development or update of the Transformer Committee Standards or Guides.. Other groups will have similar issues. The issue will be reviewed by the Admin SC. The need has been identified due to recent revision activities have had difficulties obtaining the data used for the existing standards, which makes it difficult to judge if the data used to substantiate the standard is still valid.

Valery Davydov indicated that people have asked for copies of his moisture presentation given at the insulation life subcommittee meeting. Sue indicated that she can post this, but suggested he go through the insulation life SC for approval first.

SC IF Adjournment 4:15PM

Respectfully Submitted:

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