7.6 POWER TRANSFORMERS – TOM LUNDQUIST, CHAIRMAN

The Power Transformers Subcommittee met on Wednesday, October 28th, 2009 at 1:30 p.m. with attendance of 150; comprised of 57 members and 93 guests.

The minutes from the Spring 2009 meeting in Miami, Florida were approved with no changes.

The chairman asked if anyone was aware of any patent conflicts, none were voiced.

7.6.1 WORKING GROUP AND TASK FORCE REPORTS

7.6.1.1 TASK FORCE FOR REVISION OF C57.17, REQUIREMENTS FOR ARC FURNACE TRANSFORMERS – Dominico Corsi, Chairman

The revised document was uploaded to RevCom on Nov. 16, 2009. No meetings are scheduled until comments are received.

7.6.1.2 WORKING GROUP FOR DEVELOPMENT OF PC57.143, GUIDE FOR APPLICATION OF MONITORING TO LIQUID IMMERSED TRANSFORMERS AND COMPONENTS – Donald Chu and Andre Lux, Co-Chairmen

Meeting started shortly after 8 AM. There were a total of 95 attendees, 27 members and 7 requesting membership.

A reminder regarding the moisture section was made reaffirming:

- The balloted version was did not include the latest work of the working group (WG). Hence, this section will be replaced with the WG version for the next ballot circulation. Any comments on the moisture section should be re-submitted at that time and will be addressed in the next ballot resolution cycle.

Status of our ballot status was presented:

- The ballots from our first circulation were received and comments compiled.
- Balloting members who submitted comments: 35
- Of those who submitted comments, 21 were Approval Ballots and 14 were disapproval ballots.
- Total comments received: 426

Status of ballot resolution was presented:

- Ballot resolution committee convened 9 times since the ballot closed.
- At the present time, 91% of the submitted ballot comments have been resolved.
- Recognizing the 80/20 rule for projects such as this, we are just over half way done with the resolutions.
- There are no known contentious issues that will prohibit resolution of all outstanding comments.

Next steps were identified:

- Resolve outstanding comments (including attachments submitted) through continued meetings with the ballot resolution team.
- Assignments have recently been made for resolution of specific items. These revisions will be reviewed and incorporated once received.
- The document formatting needs review.
- The Bibliography needs to be reviewed.

We are confident that we will be ready to re-ballot the document before the end of the calendar year.

Meeting adjourned at 8:40 AM.

7.6.1.3 WORKING GROUP FOR DEVELOPMENT OF PC57.148, STANDARD FOR CONTROL CABINETS FOR TRANSFORMERS – Joe Watson, Chairman

The working group was called to order at 11:00 AM on October 26, 2009. There were 27 attendees, 15 members, and 12 guests, with 3 requesting membership.

1. Joe discussed the meeting agenda, which had been previously emailed to the group. The latest draft did not get emailed due to an apparent size issue with the AM system, and was handed out at the meeting.

2. The section on wire markers was discussed at length. Previous comments on this section concerned the size of the wire marker required to indicate both local and remote identification on the marker. It was pointed out that some manufacturers provide labels with only local identification, and others provide labels with remote identification. Users had preferences for one or the other of these methods. A user pointed out that they would not change the way they require labeling on wire markers to meet this Standard. Joe pointed out that this Standard is more for customers without specific requirements. A member requested that the Standard state this. After much discussion and voting, the group decided to go with both local and remote identification on each wire marker.

3. The section on current transformer circuits and terminals was discussed. The group discussed whether current transformer wiring was within the scope of the standard, as they are mounted outside of the control cabinet. Joe stated that he would look into this.

4. It was pointed out that the section on ground pads required the use of ground pad(s) on the control cabinet, yet contained the words “when installed”. These two extraneous words will be removed.

5. Joe informed the group that significant changes were made to sections 5.10 and 5.11, and that the group should review them and provide comments.

6. Joe stated that he would revise the document by November 4th and email it to the group. He would like comments back by November 18th.

7. The meeting was adjourned at 12:15 pm.

7.6.1.4 WORKING GROUP FOR DEVELOPMENT OF PC57.131, STANDARD REQUIREMENTS FOR TAP CHANGERS - William Henning, Chairman

The Working Group on Tap Changer Performance met on Monday, October 26, 2009 at 1:45 pm with 15 members and 21 guests present.

The working group chairman asked if anyone in the room had information on patents that may be essential for the implementation of C57.131, *Standard Requirements for Tap Changers.* It was noted that no one present at the meeting expressed knowledge of essential patents.

The working group chairman asked if there were any additions or corrections to the meeting minutes of April 20, 2009. There being no corrections, the minutes were approved.

The working group chairman gave a report on the status of the ballot on PC57.131/D1.5.

There are 117 people in the ballot group.
The ballot opened on October 16.
The ballot closes on November 15.
The statistics as of 7 days into the 30 day period are:

24	Affirmative votes (92% affirmative)
2	Negative votes
1	Abstention for lack of time

These results are preliminary, seven days into the ballot period. The two negative votes and one affirmative vote produced 17 comments. Most of the comments involve terminology, and we believe all the comments received so far can be resolved.

Under new business, the working group discussed a proposal by Steve Moore on LTC contact switching life. The only coverage of this subject in C57.131 is an informative note that says that the results of the 50,000 operation service duty switching test may be used by the manufacturer to demonstrate that the contacts used for making and breaking current are capable of performing, without replacement of the contacts, the

number of tap change operations guaranteed by the manufacturer at the rated through current and the rated relevant step voltage.

No further guidance or requirements are given in the standards. No standard method for extrapolation is given. There is no definition of the conditions and assumptions to be made. The working group discussed the merits of adding material to the standards. There were several comments indicating a need for standardization and a desire to know the basis for a contact switching life claim. The working group chair then asked if anyone present had a comment *against* the proposal. No comments against the proposal were offered. It was noted that more time may be needed for consideration of this proposal.

A second item of new business was brought up at the meeting. In certain distributed generation applications, there can be reverse power flow in the LTC, and the LTC does not operate. It was pointed out that this function is built into the LTC control. The scope of C57.131 does not include tap changer controls. It was concluded that this problem is not within the scope of this working group. LTC controls are covered in C57.15.

Now to report on a matter related to C57.131 that was discussed at the Task Force meeting on Functional Life Tests. Bengt-Olof Stenestam made a presentation that showed various reasons the functional life test is a very useful tool that should be made available to the industry as a development test that can be performed by tap changer manufacturers to evaluate alternative materials and designs. Viewing the curves generated by these tests clearly shows relative performance between alternatives. But Bengt-Olof also pointed out some difficulties with the test. Some of these considerations are statistical variability in the results, oil quality, whiping effect on the contacts. The pass criteria for the test may be too rigid. Bengt-Olof offered these as among reasons why the IEC did not adopt the functional life test when it revised IEC 60214-1. For these reasons, the test should not be used as a pass-fail standard test for tap changers.

When it came to the question of whether the test belongs in C57.131, a discussion ensued. It was the opinion of some that the material should appear in a separate document. Needed in this document are:

1. Presentation of the theoretical background and calculations involved in setting the test parameters.
2. A detailed test procedure that provides enough information for anyone to perform the test in a repeatable way.
3. The data collected by the Task Force so far should be published.

C57.131 would be modified to provide a reference to this separate document.

7.6.1.5 WORKING GROUP FOR DEVELOPMENT OF PC57.150, GUIDE FOR THE TRANSPORTATION OF TRANSFORMERS AND REACTORS RATED 10,000 KVA OR LARGER –Greg Anderson, Chairman

Greg Anderson, Chair of the Working Group for Transportation Issues Guide, PC57.150, called the meeting to order at 3:21 pm. Also present was the Vice Chair Ewald Schweiger and Secretary Susan McNelly.

There were 15 of 31 members present with 54 guests and 5 guests requesting membership. Working group members will only be added to the Guide as "Participants" when they contribute to the document. The following requested membership, although approval for membership is contingent upon actually contributing.

Daniel Blaydon
Jefferson Foley
George Kennedy
Syed Aslam Rizvi
Kenneth Skinger

Agenda:

1. Introductions/Roll Call
2. Patent Issues
3. Approval of Fall 2008 Minutes
4. Content still needed
5. Review of Contributor List
6. Adjourn

Member Roll Call and Introduction of guests present was done. Fifteen of the present 31 members were present, therefore a quorum was not achieved.
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. Sue McNelly indicated that Rickmers has indicated that they will provide an updated Figure of the six degrees of motion. They indicated that there is no copyright requirement for the figure.
Approval of minutes from the Spring 2009 Miami, Florida meeting was requested. A motion was made and seconded. The motion was approved.

Greg summarized the status of the Guide. The Guide is approximately 90-95% complete.

A new Draft 7 of the guide has been posted for review. Many updates have been made since the last meeting. Additional comments have been received in the past week that still need to be incorporated. Greg indicated that he would like to get any additional comments within the next couple of weeks. He would like to issue a straw ballot shortly so that the Guide can be sent out for ballot before the next meeting.

New wording for the scope and purpose were suggested. This would require a PAR modification.

Martin Heathcoat indicated that he would be willing to do an overall editorial review on flow and readability of the document.

Catherine Hurley indicated that the moving of older or existing transformers and reactors does not seem to be addressed. It appears that the guide presently only addresses new units. Also, issues like site access, rail siding condition, etc need to be addressed. It was indicated that the most recent draft has added some of the site and rail siding access items.

There was a suggestion from Joe Watson to address that intelligent reading of the impact recorder and associating the impact to a time to determine if excessive impacts are related to any specific issue such as the recorder being removed from the equipment. Also, what time zone is the impact recorder set for? This is important when trying to determine when an impact occurred.

Kipp Yule suggested that a log needs to be kept from start to finish for the move of the unit. This log may be critical to determining when a unit was moved from one transport to another, when it was offloaded etc.

Kipp Yule asked where the recommendation for mounting the impact recorder 3 m up on the tank. He indicated that he knows of an issue where the impact recorder was mounted near the top and lower impacts did not get recorded as a result.

Martin Heathcoat indicated that many of the recent changes have leaned more towards requirements, rather than recommendations. This is leaning the document away from being a guide.

Dave Wallach made a comment that often units with shipping covers don't always have the information available regarding the weight of the cover.

Meeting was adjourned at 4:16 pm.

7.6.1.6 TASK FORCE FOR FUNCTIONAL LIFE TESTS OF DE-ENERGIZED TAP CHANGERS – Phil Hopkinson, Chairman

The Task Force on Life Tests, De-energized Tap Changers was called to order at 9:35 AM on October 27, 2009. There were 42 attendees, 20 members, and 22 guests with 1 requesting membership. A quorum was not present. There were no patents to disclose. Reviewed the Agenda for the meeting, and the Minutes from the April 21, 2009, meeting in Miami, Florida, were approved.

1. A functional life test shall be performed as a Type Test to demonstrate the adequacy of the contact design to achieve long stable thermal life. No known field failures from tap changers that pass test.

2. Issues for test –
   - Test Validity. Suppose we wanted to define life as equal to oil-Cellulose. What time and temperature to have equal life as oil-cellulose (110 C for

180,000 hrs)? Calculations show that test to date not equivalent to insulation life.

Testing is currently being conducted with Ag-Sn and Sn-Sn contacts in FR3 have been stable for 14 days as of the date of this meeting. Test will need to be repeated in oil as previously unstable contacts have been stable in FR3.

- Issue of Oil Volume. Large liquid volume important for test validity and it is important to replicate real environment

3. Extended discussion on conducting the test. Earl Rawls wants to conduct a test, but needs more details to set up the test.

4. Bengt Stenestam presentation. There are considerations that need to be better defined in conducting the test. Examples are statistical variations (material quality), oil quality, wiping effect on contacts. Pass criteria for the test may be too rigid.

5. Agree on Technical Paper – not many comments have been received. Goal is for TF paper and not solely a Phil Hopkinson paper.

6. New Business - There was no new business.

The meeting adjourned at 10:55 AM.

7.6.1.7 WORKING GROUP FOR REVISION OF C57.135, GUIDE FOR THE APPLICATION, SPECIFICATION AND TESTING OF PHASE-SHIFTING TRANSFORMERS – Jin Sim, Chairman

The WG met with at 1:45 PM on Tuesday with 13 Members and 5 Guests in attendance. This did not constitute a quorum, but no issues were submitted to a vote of the WG.

A revised Figure 15 was discussed and it was agreed to add a third descriptive current label to one of the circuit legs for consistency in style. This change will be made to a new Draft 6.

It was pointed out that a table of figures from the current dual logo version of the Guide, which provides equivalent IEC and IEEE figures, was missing from this draft and needs to be included. This will also be added to Draft 6.

All of the References in the Guide are IEEE references and the need for IEC references was discussed. The Guide will be circulated through IEC to solicit input on this question.

Draft 6 will be circulated for a straw ballot before the end of this year.

The meeting adjourned at 3:00 PM.

7.6.1.8 WORKING GROUP FOR REVISION OF C57.12.10, STANDARD REQUIREMENTS FOR LIQUID IMMERSED POWER TRANSFORMERS – Gary Hoffman, Chairman

1. The meeting was opened at 9:30 AM.
2. Results of the ballot of Draft 4.3 was reviewed and reported:
    - Met 75% requirement for response rate
    - Received 87% affirmative ballots meeting the recirculation criteria
3. Status of PAR Status Reviewed
4. Fourteen person ballot resolution committee formed to resolve comments
5. Target March 2010 for ballot recirculation
6. Received two rogue comments during the question period. Once received in writing they will be reviewed by the ballot resolution committee

Meeting adjourned at 9:50 AM.

7.6.1.9 WORKING GROUP FOR THE REVISION OF IEEE STD 638-1992, IEEE STANDARD FOR QUALIFICATION OF CLASS 1E TRANSFORMERS FOR NUCLEAR POWER GENERATING STATIONS – Craig Swinderman, Chairman

Date: Tuesday, October 27, 2009 – 11:00 am to 12:15 pm.

Attendees: 2 members + 7 guests

The meeting began at 11:00 am.

The meeting minutes from the April 2009 meeting were approved.

The IEEE patent policy slides were shown. An opportunity was provided for the attendees to identify or disclose patents that may be essential for the use of the standard. No responses were given by the attendees of the meeting.

Topics discussed:
The latest version of the P638 document is now Draft #4. This latest draft was reviewed during the meeting. This draft #4 of the document will be posted to the transformers committee website shortly. The majority of the document is nearly complete, but a few remaining items need to be addressed.

In reviewing section 6.3 of the draft document that describes the Qualification Tests and test sequence, a suggestion was made to add Frequency Response Analysis to the list of tests. It was recommended to perform a baseline FRA test prior to any potentially destructive tests such as the short circuit test and seismic test, and then repeat the FRA test after the completion of the seismic test in order to more accurately determine if any movement of the core or windings has occurred. It was agreed that this suggestion will be incorporated into the next draft of the document.

An additional suggestion was made to survey if the scope of the standard as currently written will cover the anticipated ratings of the Class 1E transformers for the next generation of new nuclear plants now being planned. The scope currently covers single and three-phase transformers rated up to 15 kV and 2500 kVA self-cooled rating. A survey will be sent out to verify if these ratings are adequate to cover the new nuclear plants, or if the ratings should be increased. If the ratings need to be increased, a modification to the existing PAR will be required.

The working group is also still working on correcting a few of the figures in the Annex of the document, and this work should be completed soon.

The draft of the document will be circulated to additional users in the industry to try and gather any additional comments or suggestions to be incorporated into the document.

The current planned schedule for the working group is to have any new comments incorporated into an updated draft of the document completed by this December 2009. We will then send the document out for a straw vote in early 2010, and then submit the document for the Mandatory Editorial Review and hope to start balloting around the time of our next meeting in March 2010.

The meeting adjourned at 12:15 pm.

7.6.1.10 WORKING GROUP FOR DEVELOPMENT OF PC57.153, GUIDE FOR PARALLELING TRANSFOREMRS – Tom Jauch, Chairman

Attendance: 17 members, 2 guests, 8 new attendees requesting guest status

Minutes were discussed and approved.

Comments were invited on the first draft of the guide.

Tom Jauch presented material to further refine the goals of paralleling equipment and proposed using the final balancing quantities for naming the methods:

- Goals of paralleling
    - Balance VARS
    - Balance reactive current
    - Balance Total Current

- Match Taps
- Balance PF (power factor)
- An additional goal to minimize losses was proposed

A presentation was made for consideration of a previously proposed new method named “Circulating Reactive Current Method by Equalizing Calculated Transformer Power Factor”. This method uses measured PF to calculate the circulating reactive current as the method of control adjustment. This method was not originally included in the guide. No action was finalized.

Following the “new” method presentation and discussion, a proposal was made for consideration to remove the PF Method as a separate method. No action was finalized.

As part of the first draft, a recommended outline was proposed for use when writing the paralleling sections of the guide. Comments were requested from the members on the proposed format. A request was made to add phasor diagrams to the recommended outline for each method.

Copies of this presentation these minutes and the recommended outline will be redistributed to allow comments from those members not in attendance.

Meeting was adjourned.

7.6.1.11 TASK FORCE FOR TRANSFORMER TANK RUPTURE AND MITIGATION – Peter Zhao, Chairman

Meeting of the Task Force for Tank Rupture & Mitigation convened Tuesday morning at 8:00am. Chairman Peter Zhao presided.

Knowledge of patent concerns was requested, with none cited.

Attendance was 39 (17 members, 22 guests).

Chairman Zhao provided introductory remarks and previewed the agenda to be covered for the meeting. Present status of this effort is that a white paper has been submitted and approved for publishing, and we are presently developing a “scope” and “purpose” for submittal of a request for a PAR for the guide’s development.

Arnold Carlos indicated that in the report, we must be careful of the usage of “prevention” vs. “mitigation” as there can be legal implications by the use of the wrong word. Chairman Zhao confirmed awareness of this caution and that it will be considered in editing.

It was suggested that our focus is too much on rupture and should be more limited to fire. This suggestion received several responses that spill prevention may be just as important as fire prevention.

Reports were presented by representatives from each work team as follows:

1. Terry Lee presented suggestions for introductory sections of a possible Guide.
2. Bill Darovny presented draft wording for a section on Tank Construction.
3. Josh Hertz presented results of his team's study of Pressure Relief Devices.
4. User Specification content was presented by Dennis Marlowe.
5. Time did not allow presentation of findings/suggestions regarding the final area of coverage - Acceptance Evaluation.

Tom Lundquist commended the task force for good work, but cautioned that we must be careful to not get ahead of the standards process by developing a Guide without IEEE approval. Tom also inquired as to our intentions in regard to a previously-discussed tutorial to be presented. Chairman Zhao confirmed our intention to request a time slot on the Spring 2010 meeting for the tutorial, and committed to provide a list of presenters for that presentation.

The meeting was adjourned at 9:15am.

7.6.1.12 TASK FORCE FOR EVALUATING THE NEEDS OF TRANSFORMERS USED WITH SVC – Peter Zhao, Chairman

The work of this task force is concluded. A report was issued and it is being considered if an educational paper should be published.

7.6.1.13 TASK FORCE FOR DVP-GRID TRANSFORMERS – Hemchandra Shertukde, Chairman

Draft Minutes of TF meeting

The meeting started at 8 am in Lilac B/D with a total of 21 attendees: members (6) and guests (15) in attendance. The Chair introduced Mr. Mathieu Sauzay as the new Vice Chair for the TF as Mr. Amitav Mukerji from ABB has indicated that he may not be able to attend consistently the IEEE IC meetings. Per the IEEE guidelines any disclosures related to existing patents associated with the TF work were enquired from the audience. Barring none Mr. M Sauzay then introduced two documents

These two documents were:
1) IEEE 1277 – requirement for Dry Type and DC reactors
2) C-57 129 General requirements of test for high voltage transformers

Interesting information on a revision of a document related to HV DC transformers and smoothing reactors was also presented.
This relates to DPV transformers, as those are continuous sources of power–
Conclusion -We have to study Standards available that may have related topics and concerns.

Several Questions were posed to the TF membership in general:

1) All Stds that address problems related to DC loads or DC networks?
2) Anything that is associated with DPV Transformers should be addressed by the TF moving forward. It was suggested that SC on HVDC Transformers - with Mr. Richard Dudley, Chair could answer these questions – as suggested by Mr. Tom Prevost. The Chair attended Mr. Dudley's session later that day and presented the help our TF needs.

Ms. Jane Verner – indicated that at the moment they deal with 5 or 6 MW load on some PV transformers. There is voltage variation related to varying load conditions resulting in AC variation.

Mr. Bill Chu indicated that SCE on the West Coast has experienced similar conditions; in its entirety it is addressed as a System interaction issue.

Mr. Tom Prevost inquired what the charge of the TF was? –
How does the TF position itself as related to a Position paper User Guide or a Standard.

Per Mr. Tom Prevost 's request specific charge was read out

- What perceived problems may exist that are not addressed by existing papers, literature etc. – list of perceived problems should be created

Mr. T Lundquist elaborated that: Are the questions in the charge to the TF answerable?

Ms. J Verner indicated that Voltage Regulation? – as experienced at a 2 MW plant in NJ
Another example cited was in Washington, DC – 20 houses on the mall – competing on efficiency criterion!

There was a comment that DOE has a lot of stds related to smart grid – take a look at it.

Dr. H M Shertukde indicated that at the last Admin – Committee deliberations

- Smart Grid implications were discussed as indicated by Mr. Tom Lundquist. What Impact will this TF activity have on Smart Grid Business? Any other related activity of the OLTC group that may affect the activity and proceedings of this DPV TF.

TF on DPV Grid Transformers was also asked to take input from
Paralleling of transformers WG– especially related to distribution automation, automatic segmentation of power lines and redirection of power flow.

TF was advised to take a look at projects that can have similar activities related to two directional power flow and associated with the smart grid activity.

Additionally, solar power and windmill on a house creating a bi-directional power flow will have an effect on the transformer that provides the power tie resulting into a possible: dc bias on the transformer!

In summary, a matrix of perceived problems thirteen (13) and related standards seventeen (17) was created.

After the deliberations of the TF it was decided that at the next meeting of the TF at the IEEE TC meeting in Houston in Spring 2010, the results of the above evaluation of all the perceived problems related to the DPV Grid Transformers already covered or not adequately addressed in the specific standards will be presented. The aggregate coverage will be reported and cumulated to create a comprehensive document as a first part of satisfying the charge of the TF as laid down in its Porto, Portugal meeting in October of 2008.

Later this report will be submitted to the Admin committee of the IEEE IC, to pave the future course of action and further activity of the TF.

7.6.1.14 TASK FORCE FOR WIND GENERATOR STEP-UP TRANSFORMERS – David Buckmaster, Chairman

October 26, 2009 – Meeting was called to order at 9:30am.

Changed Name of TF from Alternative Energy Step-Up Transformers to Wind Generator Step-Up Transformers. Task Force discussed several items as reference documents for the TF to consider for our purpose statement.

Task Force Mission: Determine need for either a standard or guide to document the special requirements of Wind Turbine Generator Transformers and report to the Power Transformer Subcommittee.

Attendance: 13 members and 16 guests.

Resolved several issues and suspended meeting at 11:15am call to reconvene Tuesday at 11:00am.

Tuesday October 27, 2009 reconvened meeting at 11:15am. Laid out several administrative issues, reviewed the CDV document IEC 60076-16 *Transformers for wind turbines applications* and modeled our purpose statement accordingly as:

This standard applies to dry type and liquid immersed transformers for rated power 100 kVA up to 10000 kVA for wind turbines application having a winding with highest voltage for equipment up to and including 36 kV and at least one winding operating at a voltage greater than 1.1 kV.

Paul Jarman who is working on the IEC document has recommended that we utilize the CDV document as a joint approach and once the IEC document is ratified that the IEC committee immediately start the revision process in cooperation with IEEE TF. At that time the TF will apply to become a WG and also apply for the relevant PAR.

Work Assignments were made on a voluntary basis with a few unassigned which will be solicited via e-mail. Should no volunteers step forward they will be assigned by the chairman. The TF will have two conference calls between now and the Spring 2010 meeting in Houston. There are several assignments that are deliverables prior to the first conference call tentatively scheduled for mid December.

7.6.2 OLD BUSINESS

Regarding the motion at the last meeting to create a database of generic information for power transformer failures; the Transformers Committee Admin Committee discussed the subject and decided that the Power Transformers Sub Committee will not undertake this activity.

Previous items opened up under "New Business":

Fall 2009 - The following documents are up for balloting in the near future. The following members have volunteered to review the documents and determine if they need revisions or can be submitted on a re-approval ballot.

C57.16 – Tim Raymond
C57.125 – Wally Bender
C57.117 – Wally Bender
C57.140 – Joe Watson

7.6.3 NEW BUSINESS

EPRI is starting a research project on the through fault duty of power transformers. If you are interested in this study please contact: Ashok Sundaram by e-mail at asundara@epri.com.

7.6.4 STATUS OF "INACTIVE" GROUPS

WORKING GROUP FOR THE REVISION OF C57.93, INSTALLATION OF LIQUID-FILLED TRANSFORMERS - Michael Lau, Chairman

This group is not meeting; major work on this document is complete; waiting for publishing.

TASK FORCE FOR WIND FARM TRANSFORMERS – Joe Watson, Chairman

Work of this group is complete; the task force is inactive.