

Chair: Antone Bonner

Secretary: Frank DeCesaro

Meeting Minutes

1. Call to order and introduction:

- Meeting was called to order at 9:16 AM
- Patent verbiage was presented. The chair read the verbiage to the group while displaying it.
 - Call for patent claims were made and there were no claims raised.
- Roster sheet was started and each person introduced themselves and identified their affiliation.

2. Roster Check:

- Group has 32 members, 37 Attendees, of which 20 are members.

3. Previous Meeting Minutes:

- Minutes are on the PES website.

4. Meeting Highlights:

- Chair stated the red-line version of the draft was sent out on Saturday. He asked if anyone did not receive. Two members had not. They will discuss email address with chair.
- Some new items in this ballot
 - Updated clause references to C37.100.1
 - Add recommended changes from spring meeting – changes from C37.60 to SWC table, add figure for FI operation.
 - Added circuit diagram for capacitive current switching tests, missing reference, editorial corrections.
 - Moved TRV section and Standard Operating Duty table from ratings section to test section, as in C37.60
 - Added the criteria for preliminary impulses in BIL testing and restrike limitations for capacitive current switching from C37.60.
 - Moved partial discharge sub clauses to be more compatible with C37.60
 - Replaced the critical current test with the low current test from C37.60
 - Added a clause on field testing from C37.60
 - Added Annex A on X/R ratios from C37.60
- Not yet included.
 - Mechanical Operations submersion testing.
 - Removal of requirement for simulated surge arrester testing.
- Technical Changes in C37.60 to consider for C37.62
 - 36 changes to consider, most test related, only the 101, 102, 103, etc. items were reviewed.
 - Some C37.100.1 references are noted as “applicable “in 37.60 but not in C37.62.
 - Proposed to have a limited discussion
 - If unanimous it will be added

- If not, add it to your individual ballot comments.
- Group discussion of comments
 - Kpp factor – We have proposed to not put 1.3 testing in, just the 1.5
 - Design and construction – Clause 6 – no clause on counters in C37.62; C37.60 has one for reclosers.
 - C37.60-2012 stated that this feature is not required for fault interrupters.
 - Clause 7.101 - line and cable charging current interrupter tests all reference IEEE 1247.
 - Bring all the IEEE 1247 test material into this standard rather than wait for C37.100.2 to come out. Discussions on waiting for that to come out but consensus are to not wait. Put it in C37.62 now.
 - Remove the reference to IEEE 1247.
 - This was approved with no objections.
 - 7.101 – 3 phase independent pole trip devices.
 - You may have non-simultaneity on the switches. Do we want to bring this into the C37.62 standard for capacitive switches only (line or cable)? We should check with C37.100.2 to determine how they will handle this. Proposed to do what C37.60 has.
 - This was approved by the group with no objections.
 - 7.101 - C1/C0=1 (shielded 1 phase cable) versus C1/C0=2 (“belted” three phase cable) which C37.60 is using.
 - The application of C37.62 type of equipment is not typically in cable systems that use belted cables. However, FI may be used outside of North America where belted cable is used. We will leave it at 2.0.
 - This was approved by the group with no objections.
 - 7.101 - Current waveform – needs to be a fairly clean non-harmonic wave, i.e. cannot have more than two current zeros within a given half cycle of power frequency. C37.60 has comments on the content. C37.62 does not deal with this. Bring this in from C37.60
 - This was approved by the group with no objections. However, it should be noted that the text in C37.60 has errors which were noted but not corrected. They should be corrected.
 - 7.101- Restrikes – C37.60-2012 is same as C37.62 which says only 3 restrikes is allowed in the series of 40 opening operations. Latest revision of C37.60 has stated that there should be no more than 3 operations that have restrikes in them. Should C37.62 be the same as C37.60? Reason is that what happens in the lab does not necessarily represent the field experience.
 - There were no objections to pull into C37.62 as C37.60 has.
 - 7.102 - Making Current capability – C37.60 has wording related to a cutout mounted recloser that in the fault interrupter there is nothing similar to it. Should this be brought over to C37.62?
 - A member feels this should be included but we should add the duration of the fault current would also need to be specified.
 - Chair recommends leaving it the way it is where that comment is not in C37.62. There are members that feel since there are other references in C37.62 to cutout mounted reclosers. We decided to put this into C37.62
 - There were no objections to then pull this into C37.62
 - 7.103 - Fault duty testing – C37.60 added testing first pole to open factor Kpp =1.3. C37.62 has not adopted that.
 - This should be for both grounded and ungrounded. 1.3 is for effectively grounded systems and 1.5 for ungrounded systems. 1.5 is what we have traditionally used to

- handle both systems. C37.60 felt there was a need for a 1.3 factor since it could be worse case than 1.5 factor.
- Chair stated that on technical issues there should be good technical data on setting requirements.
 - One member felt to be consistent we should add it.
 - It was commented that lab testing on 1.3 with medium voltage circuit breakers has resulted in failures where 1.5 did not.
 - Leave it the way it is and people can enter comments at ballot time. No objections to this way.
 - 7.103 - X/R values – C37.60 states the values in tables are minimum values. If labs can't make you can test with higher values. If the higher values are necessary in the labs then methods to accommodate are provided such as delaying the opening.
 - There was not unanimous agreement on this topic. Therefore, it will remain out of C37.62. Those who want it can add to ballot comments. There were no objections.
 - 7.103 - TRV and the T3 values for T20's and T50's – C37.60 mainly has to do with overhead line operated devices with high rate of rise TRV and small T3's. Difficult to get them in the lab to get the time to peak. The statement says lab makes reasonable effort to achieve this you can have T3's up to the T100 value and do the best you can.
 - Chair stated he does not feel this needs to be included. There were no Objections.
 - 7.103 - C37.60 requires two peak and two symmetrical clearings. C37.62 only requires one of each.
 - In older version of FI studies the FI only had to make one. So this is a non-issue.
 - There are no objections to this.
 - 7.103 - Test procedure C37.60 states that 25 % of the closing operations have to be set for maximum offset timing for all test series. C37.62 only requires the T100's series. Not sure why there is a difference.
 - Chair is comfortable with the T100's only.
 - Numerically this appears to come out the same.
 - The load X/R at T20 and T50 means that the peaks will not be that high. So the focus is on the T100.
 - We will keep this the way it is. There no objections
 - 7.103 - The TRV section has a lot of data that is informative and necessary but not directly related to testing. It is informative. C37.60 has put this type of information into an Annex. C37.62 does not have it. We will move this into an informative annex.
 - We will put some parts this as an information annex. There were no objections.
 - 7.104 - Low current test versus Critical current test. C37.60 substituted the low current test for the critical current test.
 - This has been added to C37.62. There were no objections.
 - 7.108 - Time Current test. More information in C37.60 now than what was in C37.62. Do we want to include this additional information?
 - This will be left out for now and see what the ballot pool says. There were no objections.
 - 7.108 - Just reorder the way sub clauses are in.
 - No need to deal with this. Leave it the way it is.
 - 7.108 - C37.60 provides $\pm 10\%$ plus +30 ms on time. The 30 ms is different from C37.62
 - This appears to have arcing time added in.
 - This will not be changed. There were no objections.
 - 7.109 - Mechanical duty tests. C37.60 does not specify when the mechanical characteristics tests need to be done except that one set needs to be done before the mechanical duty test and one set after. It gives leeway to do it in another test bed. C37.62 has it as the first

and the last operation of the mech duty test which constrains it to the same test setup you are using for the test.

- The chair recommends not including and looks for the ballot comments. There were no objections.
- 7.109 - There are four different things on the mechanical life test that is in C37.60 and not in C37.62. Do we pull it all into C37.62? Does it apply to fault interrupters?
 - It lists that it has to be tested with a control. Is it with the control that is tested with the unit on this test and you need to retest the mechanical with every different control that can be used on the device? If so, that does not make sense to pull into C37.62.
 - The chair recommends not including and looks for the ballot comments. There were no objections.
- 7.110 - Ice loading tests. C37.62 allows outdoor testing. C37.60 does not allow it.
 - C37.62 will be changed to exclude outdoor testing. There were no objections.
- 7.110 - Acceptance criteria. Add d) of 7.110.5 of C37.60
 - This will be added. There were no objections.
- 7.111 - SWC test. Table 19 of C37.60 was added to C37.62.
 - This has been added
- 7.111 - Simulated surge arrester operation.
 - Some research has been performed on this with the Chair and Nenad Uzelac. They have not had time to discuss yet. This will be tabled for now.
 - Discussion on this since Antone Bonner and Nenad Uzelac are here and they looked into this subject.
 - This test was initially placed because old Silicon Carbide arresters had gaps that sparked over before they protected. That does not occur with newer MOV arresters.
 - Eaton Feedback on testing pad mounted gear.
 - Surge entered from the top corner of the pad mount tank.
 - Exited at the bottom corner on the opposite side to ground.
 - 120 Vac control was internal to the tank.
 - Control was located inside tank, no hardwire connections to outside of tank.
 - 4 designs of controls tested.
 - Results
 - Controls did not sustain damage or misoperate.
 - Unanswered questions
 - Results different if surge came through a phase cable?
 - Characteristics of the surge?
 - Vault environments different?
 - Effect of external hardwire connections?
 - Remove, replace, or modify test?
 - If we are to propose/replace or modify the test it will be a different test. This is something we would like to start collecting the data and review after the issuing of the standard.
 - We should put a note in the standard that we should collect data on this for future.

- For now, this will be kept in C37.62 and a task force will be created by RODE to do testing specifically pad mount and underground submersibles. There were no objections.
- 7.110.2 - Applicability. Take 7.110.2 from C37.60 and put this into C37.62.
 - This will be done and there are no objections.
- 7.112 - C37.60 more clearly ties current carrying capability to Contact resistance measurements
 - Chair stated new version of C37.60 was clearer. However it was pointed out that the 2012 version of C37.60 allowed for resistance measurements and gave what the allowable differences can be.
 - We will leave this the way it is and people will need to put comments into ballot. There were no objections.
- 7.112 - C37.60 defines the dielectric tests for non-interrupter gap devices such as cutout mounted FI
 - Chair feels this was in the 2012 C37.60 version and we extracted it but did not put it back in. This will be put back into C37.62. There were no objections.
- 7.112 - C37.60 allows failures to occur during testing that are caused by assembly or maintenance but not design related you can correct and continue on with the test.
 - C37.62 will not be added. There was no objection to this.
- 7.112 - NSDD's – This is just a statement that we have used time and time again. It was not observed in C37.62.
 - It was settled a long time ago that they were allowed. This is just a statement confirming this. Chair recommends not doing anything at this point but he will put something into the ballot. There were no objections.
- 7.112 - restrikes during fault duties. Issue is that this is for capacitor switching also and it has been stated for capacitor switching there can be more than one restrike. Do we need a statement like this in fault interrupters?
 - The wording from C37.60 on this will be pulled into C37.62. There were no objections to this.
- 7.113 - Pressure withstand test. C37.62 added this.
- 7.113 - C37.60 defines a thermal runaway test for post fault duty verification of capability if needed. Question was isn't that a better test than pressure test? How do you test for solid dielectric?
 - This will be put in. There were no objections.
- 8.1 - Dielectric routine Test - C37.60 states that the gas pressure (if applicable) shall be set to the minimum functional pressure. C37.60 – 2012 has it also. C37.62 does not make reference to the pressure. Should we add this?
 - This will be added. The chair will look to see if it is in there already. There were no objections.
- 8.2 - Resistance of the main circuit - C37.60 states that C37.100.1 is not applicable but C37.62 states that it is applicable.
 - C37.62 will reference C37.100.1. There was no objection.
- 8.3 - Tightness Test - some differences regarding C7.100.1
 - There was a working group session on this in the past. We do not need to deal with this. It will stand as it. There were no objections.

- Additional Clauses - C37.60 has clauses required by the IEC -selection of recloser, info for tenders and orders, transportation, installation, maintenance, safety, environment
 - We will not put these into C37.62. There were no objections.
- C37.62, clause 6.14.101 – Enclosure design and coating system requirements. WE are referencing C57.12.28-2014. Should we revert this back to 2005 so it uses the same verbiage that C37.74 does.
 - This was changed to 2014 at some earlier time. We did address the difference in 2014 by taking out the time period of retesting.
 - We will ship back to the verbiage of 2005 for consistency with C37.74. It will be extracted as an exact replacement from C37.74. There were no objections.
- Draft 5, with these changes, should be ready to go out to ballot since the ballot pool is formed.
 - Comment resolution committee will include Dave Beseda, Karla Trost, Antone Bonner, Ian Rokser

5. New Business;

- None.

6. Next meeting:

- April 22 - 27, 2018
 - Disney's Contemporary Resort, Lake Buena Vista, FL

7. Meeting was adjourned at 4:55 PM

Minutes Submitted by:

Name: Antone Bonner

Date: 10/23/2017

Annex: Member Attendance

Role	First Name	Last Name	Company	10/9/2017
Chair	Antone	Bonner	PAS Consulting	X
Secretary	Frank	DeCesaro	Eaton's Power Systems Division	X
Member	Peter	Agliata	Hubbell Power Systems	X
Member	Chris	Ambrose	Federal Pacific (Div. of Electro-Mechanical Corp.)	X
Member	Herman	Bannink	KEMA Netherlands	X
Member	David	Beseda	S&C Electric Co.	X
Member	William	Ernst	Thomas & Betts	X
Member	Paul	Found	BC Hydro	X
Member	Jeffrey	Gieger	Thomas & Betts	X
Member	Travis	Johnson	Xcel Energy	X
Member	Chris	Lettow	S&C Electric Company	X
Member	Wangpei	Li	Eaton	X
Member	Donald	Martin	G&W Electric Co.	X
Member	Steven	Meiners	GE	X
Member	Larry	Putman	Powell Electrical Systems Inc.	X
Member	Ian	Rokser	Eaton Corp	X
Member	Francois	Soulard	Hydro-Quebec	X
Member	Tom	Stefanski	KEMA Powertest	X
Member	Karla	Trost	G&W Electric	X
Member	Nenad	Uzelac	G&W Electric	X
Guest	Paul	Barnhart	Underwriters Laboratories	X
Guest	Sterlin	Cochran	Hubbell Power Systems	X
Guest	Kennedy	Darko	G&W Electric Co	X
Guest	Anil	Dhawan	ComEd	X
Guest	Mark	Feltis	Schweitzer Engineering Laboratories, Inc	X
Guest	Peter	Glaesman	PCORE Electric Company, Inc.	X
Guest	Harold	Hirz	Thomas and Betts	X
Guest	Brendan	Kirkpatrick	Southern California Edison	X
Guest	Ryan	Kowdley	Pacific Gas & Electric	X
Guest	Benson	Lo	Toronto Hydro	X
Guest	Christopher	Morton	Powertech Labs Inc.	X
Guest	Alan	Peterson	Utility Service Corporation	X
Guest	Mark	Peterson	Xcel Energy	X
Guest	James	Ruebensam	S&C Electric Co.	X
Guest	Jon	Spencer	Utility Solutions	X
Guest	Bruce	Venne	Rockwell Automation	X
Guest	Robert	Warren	DNV GL - KEMA Laboratories	X