RODE C37.60 Reclosers Working Group
Meeting Agenda
January 23-24-25, 2024 – Milan (Italy)

Chair: Ian Rokser
Secretary: Federico Di Michele

Meeting Agenda

1. Call to Order

Chair called to order at 09:22 of Tuesday 23rd.

2. Call for Patents/Copyrights

Chair shared IEEE slides about patent and copyright.

3. Introduction of Members/Guests

Members and guests introduced themselves.

4. Review of agenda

The chair proposed adding to the agenda the topic of normative references to IEEE C37.68 as requested by a member of the DLMT. Agenda revision 3 reflects this addition.
Revised agenda approved with no objections.

5. Review of minutes of last meeting

Minutes from last virtual meeting (Dec 11th) have been approved with no objections.

6. Current status & project plan

Chair showed the project plan and highlighted the main dates. We are now in the phase of create the verbiage of the new standard. Chair remembered that the deadline to introduce new technical topics to be incorporated in the new edition of the standard has expired. So no further changes will be accepted.
Chair is also explained that the goal is to have an internal ballot in August, with comment resolution at Fall PES meeting in October.
Here the link: https://ieee-sa.imeetcentral.com/c37-60/folder/WzIwLDE2NzU0NTc0XQ

7. Discussions

Making reference to the list of technical topics to be discussed, Chair divided them into different groups, depending on the complexity of the topic, to avoid long discussion consuming time.

- Group 1a:
  - Editorial changes (items 46 and 48) approved without comments.
  - Technical change (item 60) about tolerance on reclosing intervals. The group discussed the topic if it is needed and where to put a tolerance. At the end the chair proposed to have the declaration of tolerance on the rated operating

sequence, if any, up to the manufacturer. Note to be added in Annex E. DLMT accepted the revised proposal.

- Editorial change (item 61). The group discussed the sentence added by the chair to better clarify the topic. A first comment led to a change replacing the verbiage "main circuit" with "cutout mounting". After another discussion about possible confusion with the making capability of the cutout mounted reclosers, then the group decided to replace the word "cutout mounting" by "cutout fuse support" from IEEE C37-41:2016. New proposed verbiage is "Cutout fuse supports and bases do not have a fault closing rating. As such, cutout mounted reclosers that install into the fuse support with interrupting contacts in the closed position should not be installed into the cutout fuse support while the fuse support is energized". DLMT accepted this modification.
- Editorial change (item 65) approved with no objections.
- Editorial change (item 28) approved with no objections.
- Editorial change (item 56) approved with a comment to do not limit the optional information to just those listed in the standard.
- Technical change (item 57). Chair proposed a new structure for subclause 6.14 and it has been approved with no objections.
- Technical change (item 58) regarding submersion time approved with no objections, but a question was raised about whether depth should be defined from the base or top of the unit.]David Beseda volunteered to check any other standard references. To be revisited later in the week.
  ➔ Action: David Beseda (Completed)

- Group 1b:
  - Technical changes (item 36). After long discussion the group is deciding to remove the hipot requirement after STC, for following reasons:
    - It is different from other IEC/IEEE standards, which do not require hipot;
    - It is not covering all cases to understand if insulations or contacts have problems.
    - Common fault after STC is the melting of the contacts, so no possibility to open the contacts at first attempt.
    - Rated symmetrical test, clause 7.103, includes peak and short-time current and is already covering the check of contacts under more stressful conditions

    For what concern the specific requirements of point b), visual inspections of test objects and contacts, the group discussed what it implies for a practical point of view. The conclusion is that in case of recloser with contacts not accessible, then no further checks of the contact is needed. Following sentence has been added: "For reclosers whose construction makes disassembly difficult (e.g. welded construction and vacuum contacts), no check of the contacts is required". DLMT accepted the revised proposal.
  - General changes (item 59) regarding not combining STC and fault making approved with no objections, before they are different test.
  - Technical changes (item 47). Chair proposed to add a note clarifying the topic. A member suggests to modify slightly the note with "Electronic current metering used may be used providing it can accurately sense to 2,6 amps rms. Alternatively, a grounding fuse consisting of a 5 cm (2 in) long #38 AWG copper wire is sufficient to detect significant current to ground". Additionally the figure 2 will be modified too changing the verbiage to "Ground sensing circuit or fuse element" and

replacing fuse element in drawing with current sensor or rectangle. Also the equivalent mm^2 wire size will be added. DLMT accepted the revised proposal.

- Technical changes (item 67) regarding tolerance on C1/C0 ratio is still pending because the proposal is to have ±20%, but IEEE C37.62 is using ±10%. So further check of the ad hoc is needed.

➔ Existing Ad hoc still working: Harm Bannink and Frank De Cesaro

- Group 2:
  - Products without a ground connection (item 19): David Dart presented the changes needed to introduce the products without a ground connection. Changes have been approved with no objections. A member suggested to update also the figures taking into account these devices too. A member suggested to have "ungrounded" in the definition but to use "not earthed" in the other parts, to be in line with how the standard is built up (to avoid comments from IEC world).
    - A new tab has been created in the work list for "Figure changes." An action has been recorded to "modify all figures as needed to accommodate ungrounded reclosers."
    - The definition will be updated to "non-earthed recloser" / second line "ungrounded recloser (US)" in similar form to IEV 321-03-02. The term "non-earthed recloser" will be used throughout the document.
    - This ad hoc is closed. The chair thanks the members for their work.
  - Manual operating lever (item 49). Chair presented a proposal prepared by Mark Feltis. A member proposed to align "lock-out" and "lock-open". Another one to better define "reset". Another one to make a step back and just clarify that it is mandatory to the manufacturer to clearly define which are the different status of the manual operating lever, avoiding the to be detailed as the proposal is. David Beseda, Karla Trost and Chris Hastreiter volunteered to support Mark Feltis forming a dedicated ad hoc to update the proposal.

    ➔ Ad hoc: Mark Feltis, David Beseda, Karla Trost, Chris Hastreiter and Chris Ekpoudom
  - BIL preliminary shots (item 5): Stefan Micic presented the proposal prepared by the ad hoc. Few comments come from the group, in particular about:
    - To clarify what happen if the manufacturer is not providing the requested data
    - To modify the example to avoid confusion (or to remove the example if preliminary shots will be applicable only when manufacturer requests them)
    - To remove the tolerances
    - To change "product documentation" with "test report"

    Stefan Micic presented the updated document (on the last day).
    - A member commented that manufacturer could need to add a resistor in the circuit of the preliminary test, so the ad hoc will continue to meet to update the verbiage to this request and other comments above too.
    - It was also suggested that the example should either be removed or else defined as the baseline procedure to be followed if the manufacturer does not define a procedure, because otherwise it creates confusion for the labs.
    - Sergey Rogozhkin volunteered to join the ad hoc too.

    ➔ Existing Ad hoc still working: Stefan Micic, Frank De Cesaro, Marcos Botelho, Mohit Chhabra, Ganesh Balasubramanian, Sergey Rogozhkin and Kirk Smith
  - Updating of Fig.3 (item 9): new figure approved but some formulas should be revised (for example Z0=Zb +3Zn). It is useful to make reference to IEC 62271-306.

- On last day the group discuss again on the notes. However the discussion moved on the fact that this figure is only creating confusion, so the proposal is to remove subclause 7.103.1.4 and remove figure 3 and to add two notes with explanation of the earthing circuit with kpp=1,3 and kpp=1,5 making reference to IEC 62271-100 figures 27 and 28 on subclause 7.103.5.1 and 7.103.4.1.
- DLMT accepted the revised proposal.

- Partial discharge test timing (item 13): following sentence has been added "Maintain this voltage for a period of 10 to 60 seconds and then record the partial discharge level at the end of the duration". In addition replace "note and record" to just "record" and eliminate the sentence "In any case, the partial discharge… recorded" on 7.106.4. DLMT accepted the revised proposal.
- IEC 107 guide (item 23): SWC will be not affected by IEC 107 guide. No action – this topic is closed.
- Upper voltage above 38kV (item 53): Sergey Rogozhkin and Harm Bannink prepared a detailed document showing all parts which are affected by the removal of the upper voltage limit. Some of them are clear and need just editorial changes. Some of them need the attention of the group:
  - Items 1 and 2 are rejected because title is already revised (above 1000 V).
  - DC withstand voltage test: to decide if this is the occasion to remove the test at all. Chair proposed to have an ad hoc discussing the possibility to replace DC test with VLF tests. David Beseda, Joe Stemmerich and Harm Bannink volunteered for this ad hoc.

  ➔ Action: Chair will take responsibility to contact someone from utility.

  ➔ Ad hoc for DC / VLF: David Beseda, Joe Stemmerich and Harm Bannink
  - PF and BIL values: proposal preliminary accepted
  - Line/cable charging values: proposal preliminary accepted
  - TRV values. And ad hoc is needed to add the new values and review the old ones because some mistakes were found. In particular Harm Bannink suggested to make reference to IEC 62271-100 to use same formulas. Probably IEEE C37.62 made already the check, so it could be used as reference. Harm Bannink and Sergey Rogozhkin volunteered to this ad hoc (also Kirk Smith could be interested to join).

  ➔ Ad hoc for TRV: Harm Bannink, Sergey Rogozhkin
  - Notes are accepted in principle, including the reference to IEC 62271-100 for ratings above 72,5kV.
  - The original ad hoc regarding upper voltage above 38kV is closed. The chair thanks the participants for their work.
- Thermal runway test (item 68) accepted with no objections.
- VI in SF6 insulated equipment (item 69): Harm Bannink volunteered to make a proposal to revise the existing subclause 7.112.2, considering:
  - To extend the clause to other fluid too (other than SF6)
  - To evaluate after which test apply this further check (just duties or switching test and low current tests too)
  - To clarify when the further check is not required (for example T20 as last duty)
  - To compare with IEC 62271-100

  ➔ Action: Harm Bannink

- Group 3

- Test procedure to cover kpp=1,5 (item 70).
  - The current verbiage of 7.103.4.1 and 7.103.4.3 is creating confusion because it is not clear which are the operations which should have the maximum asymmetry (first opening or any of the other CO), when to reach the requested peak value and so on. The group is trying to identify which are the exact requirement for these subclauses and in particular the idea is that for T100 duty, minimum 2 operating sequences must start with maximum offset and hit the peak value to din the highest asymmetrical opening value. Requirements defined above for T100 covers the dynamic behavior of the recloser, so for T50 and T20 the point of closing the circuit needs not to be controlled from a peak prospective. Requirements for TRV are out of this discussion.
  - The proposed intent is as follows:
    - For T100: Min. 2 operating sequences start with max offset and hit the peak value to find the highest asymmetrical opening value
    - For T50: Point of closing the circuit need not be controlled from a peak perspective
    - For T20: Point of closing the circuit need not be controlled from a peak perspective
  - In case of fully duty is required by the manufacturer and performed with a double number of operations (8 operating sequences of T100), at least 50 of first operations in T100 shall achieve full asymmetry and rated peak current value.
  - DLMT agrees with the intent stated above.
  - To define the verbiage of these subclauses (kpp=1,5) and a similar procedure for kpp=1,3 an ad hoc group has been created. Stefan Micic, Marcos Botelho, Harm Bannink, Pedro Castillo and Sergey Rogozhkin volunteered.
    ➔ Ad hoc: Harm Bannink, Sergey Rogozhkin, Stefan Micic, Marcos Botelho and Pedro Castillo
    To be discussed later in the week the verbiage of the note b of table 11, used to define the half-life/full-life requirements of the recloser.
- Tolerance on T20 (item 71). Tolerances are indicated in annex E and specifically for T20 there is no upper limit (+0%), which could lead to invalid test over the tolerances (laboratory could need to increase voltage, and consequently current, to achieve the TRV requirements). The group discussed the topic, and the proposal is to keep the current tolerance on T20 but to duplicate the presence of the tolerances to Annex E and Table 11. DLMT agrees with the proposal.
- TRV values (item 72). Ad hoc defined for TRV will take care of this check.
  ➔ Ad hoc: Harm Bannink, Sergey Rogozhkin
- TRV values (item 73). Ad hoc defined for TRV will take care of this check.
  ➔ Ad hoc: Harm Bannink, Sergey Rogozhkin

- Group 4:
  - Phase simultaneity (item 35). David Dart prepared a presentation proposing the how to modify the standard to introduce this topic. The group discussed and most concerns are about applicability, so to which devices this applies and to which system application this applies (in particular some application would use this kind of solution, otherwise others application would avoid the use of this kind of solution) and acceptance of proposed numbers, taken by IEC 62271-100.
    So the idea is to add this section, add the proposed limits and address the phase simultaneity topic to an agreement between customer and manufacturer, however limits must be recorded in the test report.

Karla Trost, David Dart, Marcos Botelho and David Beseda volunteered to prepare a proposal to modify the verbiage of the current subclause. Additionally the ad hoc will take care of checking which kind of tests should be performed to verify the phase simultaneity.

➔ Ad hoc: Karla Trost, David Dart, Marcos Botelho and David Beseda

The group also wishes to find out where the limits in -100 came from. Harm agreed to ask.

➔ Action: Harm Bannink

- Testing of triple-single for single-phase duty (item 32). The group discussed the comment and they in agree in principle. Chair will check if standard is in line with this (Kirk Smith sent something about the topic).

  ➔ Action: Ian Rokser
- Testing of triple-single for three-phase duty (item 33). The group discussed the comment and they agree in principle. For what concern the testing requirements, if phase simultaneity is required, then tests are needed and phase simultaneity must be met. In the other cases no tests are required.

- Group 5:
  - X/R ratio (item 10). For higher current ratings (>16kA) the current X/R values are low and they will bring to tests that after the first opening will become immediately symmetrical (in case of generator fed laboratories). So the proposal is to create a new line of table 11, with higher X/R values. The group discussed the topic and Harm Bannink volunteered to check again where the current X/R values come from to evaluate if current values covers or not all ratings above 8kA.

    ➔ Action: Harm Bannink
  - Low current tests (item 12). Harm Bannink explained that low current test as is currently performed is not covering load tests. Group discussed how to face this problem with four possible scenarios:
    - Come back to previous edition, so with critical current replacing low current test
    - Modify the low current test into a more realistic load test
    - Remove the low current test
    - Keep everything as it is
    - A comment was made that we should not reinstate critical current – it was in the 2012 edition and was removed due to several negative ballot comments.
    - There was much discussion about whether load current should be a required test. Some technologies have had a known problem at this level, though in the experience of those in the room, vacuum interrupters (the predominant recloser technology) do not.
    - Defining a more accurate load current test would require significant work. No action taken at this time.

    Topic will be proposed again at the next meeting.
  - Operations to be used for TCC (item 14). Chris Hastreiter prepared a proposal to add further requirements to TCC test (fast curve) in order to cover also CO operations (and not only O operation, as it is now). Proposal has been approved in principle, however there is a concern to how to display the impact of the CO on the TCC. There is concern that the longer time of a CO may clash with the traditional idea of “protection” timing, so the CO time may need to be defined separately.
    - An ad hoc has been created to evaluate a proposal. Karla Trost, Chris Hastreiter, Chris Ekpoudom, and Sergey Rogozhkin volunteered. Mark Feltis

had expressed disagreement with the proposal by correspondence, and so while he was not present, Mark is invited to join the ad hoc.

➔ Ad hoc: Karla Trost, Chris Hastreiter, Chris Ekpoudom, Mark Feltis and Sergey Rogozhkin

- Extension of type test for control unit (item 54) and Extension of type test for switching part (item 55). Chair presented what has been prepared by the ad hoc of control unit, with the definition of three different scenarios to be considered. Sergey Rogozhkin presented a table prepared by the ad hoc of switching part which defines affected type tests depending on the change on the recloser functionality. The group discussed following topics:
  - Should the two ad hocs work together?
  - Should this be normative or just informative?
  - Should this focus on just few specific changes?
  - Would this topic have same impact on North America and Rest of the world?

  Key points from the discussion regarding next steps:
  - Making this normative will impact certification as it would imply that a full cert can be given with less than full testing.
  - To satisfy labs and certifiers, the requirements for extension of test results must be in the type test clause and must give technical reasons.
  - To satisfy these criteria, it will be best to define few (2-3) common cases more fully and include them in Clause 7. The tables could be combined and included in an informative annex regarding "guidance for extension of type test results."
  - The ad hocs will meet separately once more, then combine
  - The combined ad hoc should identify the most common / relevant cases and work to more fully define when they apply and what needs to be tested – for inclusion in Clause 7.

  The topic will be discussed again in the next meeting of the control unit, which will try to reply to questions above, which will prepare a definitive proposal for the next face-to-face meeting in Florida (IEEE PES Spring meeting). There we will decide if to continue with the topic or just disregard it (to be evaluate the possibility to create a new dedicated standard).

  ➔ Existing Ad hoc still working: Mark Feltis, Marcos Botelho, Karla Trost, Cody Marshall, Chris Ekpoudom, Christopher Hastreiter, Paul Found and Sergey Rogozhkin

- Group 6:
  - No-load operation after duties (item 64). Group discussed the additional requirement coming from STL (comparison between no-load operations before and after the tests). The current verbiage is not clear and it could be better to have a new verbiage also considering the updating made on IEEE C37.62. In principle, the DLMT agreed that mechanical characterization is not required after testing, only an operation to confirm the drivetrain still operates. An ad hoc group to evaluate the post-test conditions, compare to C37.62, and make a proposal has been formed. Chair will lead the ad hoc together with Kennedy Darko, David Beseda, Marcos Botelho, Joe Stemmerich and Chris Ekpoudom.

    ➔ Ad hoc: Ian Rokser, Kennedy Darko, Marcos Botelho, Chris Ekpoudom, David Beseda and Joe Stemmerich

- Multi-earthed wye system simulation (item 63). The group discussed the topic and there are four proposals:
    - Require this test for all three-phase reclosers at the end of T20, as condition check
    - Keep the test as optional for reclosers rated for kpp=1,0
    - Remove 7.103.1.3 at all
    - Require this condition at T20, T50, T100 for rating of kpp=1,0

  Chair will check the background about this subclause (reason for this test condition, and also reasons for the changes in 2018 edition) to take the right decision.

  ➔ Action: Ian Rokser
- Line/charging capacitive single-phase test (item 62). The standard says that three-phase reclosers should be tested with three-phase test. However in case of single-phase recloser used in three-phase system or three-single phase recloser with independent operating system, single-phase test are allowed with a phase-to-phase test voltage (STL is commenting to have a test voltage of phase-to-ground). Additionally, with the increase of the voltage upper limit, some laboratories could be not able to grant three-phase test, then an ad hoc group is needed to decide:
    - To remove or keep the need to perform three-phase test on three-phase recloser due to removal of the upper voltage limit
    - Which is the right test voltage to be applied in those cases in which single-phase are allowed. Do they always need to be tested at phase-to-phase voltage to account for usage as a three-phase set (reference 7.101.1)
    - To evaluate a procedure to be followed in case of three-phase reclosers not working simultaneously (reference to IEC 62271-319, still to be published)
    - Evaluate how IEC 62271-100 manage the test voltage for different earthing conditions

  Harm Bannink, Chris Hastreiter, Pedro Castillo, Sergey Rogozhkin and Marcos Botelho volunteered.

  ➔ Ad hoc: Harm Bannink, Pedro Castillo, Marcos Botelho, Sergey Rogozhkin and Chris Hastreiter
- Grounding connection (item 38). The group discussed the topic and rejected the comment, because the customer ground connection is subjected to agreement between users and manufacturers – or in many cases it is solely the user's decision.

- Additional topic
    - Verification of protection (item 76) approved, but there is the risk that IEC will push back the modification of this title.
    - Verification of protection (item 77) rejected, because there is no conflict.
    - Line/cable charging test (item 78) approved with no objections.
    - Normative reference to IEEE C37.68 (item 75). Chair presented to the group the possibility to include IEEE C37.68 requirements to our draft standard. A member pointed out that IEEE C37.68 is limited to 38kV, but IEEE C37.60 has removed the upper voltage limit. In principle the group agree to have a normative reference to IEEE C37.68 however some Imembers asked to have the document available in order to read the document as they are not aware of its content. Chair presented the list of points to be respected for ISO and IEC to accept normative reference different than ISO and IEC documents (given in ISO IEC Directives, Part 2, subclause 10.2). There is concern specifically about points a) and d), that someone would claim that these points are not met. The risk is that after a long work to adjust the draft standard to IEEE C37.68, then it would be pushed back at ballot stage. So possible options are:

- Normative reference, which means that IEEE C37.60 requires that the control comply with IEEE C37.68 (significant concerns on this option)
- Informative reference, which means that IEEE C37.60 may consider IEEE C37.68 for additional design requirements and tests on control unit (potential locations to refer: 6.4.1, 7.10 and 8.3)
- Pull in language and reference to IEC standard from C37.68 into new or existing subclauses of IEEE C37.60
- Reject the proposal and do not make any reference to IEEE C37.68

The group is thinking that the best way to approach the topic is an informative reference – option 2. DLMT agreed with option 2.

➔ Action – Karla: Upload latest draft of C37.68-2023 to iMeet Central for DLMT reference (Completed)

- Measurement of submersion depth (new item 79 which was raised Tuesday). IEEE C37.62 and IEEE C37.74 measure from the base, but IEEE C37.63 measure from the top. The group agree to reject the comment and keep the measure from the base.
  - Also the DLMT agreed to move the comments on chemical reactions in a below-grade environment from "Normal" to "Special service conditions" 4.2.7 in line with C37.74's recent decision.
- Table 11 – note b (new item 80). As it is written now, the note b can create confusion, because if full life test is performed and test object fails, then the expected half life of the test object is not represented by the standard operating duties. The DLMT feels that this is an outdated relationship and that passing the standard duty shown in Table 11 is sufficient. To avoid conflict, following options are available:
  - Reword "represents" to "should represent"
  - Move sentence 1 and 2 out of note b) to Annex F or G. new note b would be "See Annex F and Annex G for more information about calculation of device life for lines 2, 3 and 4"
  - Both previous options, together
  - Replace current verbiage with "Refer to Annex G for more information on duty factors and standard operating duties".

The group decided to go ahead with last proposal.

9. Next steps/ meeting(s):

Virtual meeting in March (still to be planned – doodle pool will be sent out soon)

Face-to-face meeting – IEEE PES Spring in Fort Lauderdale (April 2024) with 4 sessions (2 on Tuesday and 2 on Wednesday).

10. Adjournment

Meeting has been adjourned at 14:24 of Thursday 25th.

LIST OF ATTENDEES

Status	Last name	First name	Affiliation	Attended January 23rd-24th-25th 2024
Convenor	Rokser	Ian	Eaton - IEC USA	X
Secretary	Di Michele	Federico	CESI - IEC Italy	X
IEC Member	Bannink	Harm	G&W - IEC Netherlands	X

IEC Member	Botelho	Marcos	Siemens - IEC Germany	X
IEC Member	Dart	David	Noja Power - IEC Australia	X
IEC Member	Falkingham	Leslie	Representing VIL and S&C - IEC United Kingdom	
IEC Member	Kerr	Blair	G&W - IEC USA	
IEC Member	Khlyzov	Alexander	IEC Russia	
IEC Member	Kou	Zhengli	IEC China	
IEC Member	Manavar	Suresh	Brush - IEC United Kingdom	
IEC Member	Micic	Stefan	G&W - IEC USA	X
IEC Member	Rogozhkin	Sergey	Tavrida - IEC Russia	X
Member	Bush	Kelsey	ABB	
Member	Hirz	Harry	VESCO	
Member	Darko	Kennedy	G&W	
Member	Feltis	Mark	Schweitzer Eng	
Member	Kapitula	John	ABB	
Member	Li	Eric (Qian)	Powertech Labs	
Member	Neujahr	Jonathan	Eaton	
Member	Olivares	Roberto	Siemens	
Member	Riley	Caryn	NEETRAC	
Member	Schuetz	Rob	Eaton	
Member	Slattery	Christopher	First Energy	
Member	Trost	Karla	G&W	X
Member	Zhou	Xin	Eaton	
Member	Balasubramanian	Ganesh K	Eaton	
Member	Beseda	David	S&C	X
Member	Ekpoudom	Chris	Southern States	X
Member	Stemmerich	Joe	Trayer Engineering Corporation	X
Member	Herring	Ricky	Siemens	
Member	Castillo	Pedro	ABB	X
Member	Marshall	Cody	Schweitzer Engineering Laboratories	
Member	Sigmon	Hall	Siemens	
Member	Hastreiter	Chris	Eaton	X
Member	Pell	Stephen	Siemens	
Member	Chhabra	Mohit	S&C Electric	
Member	Kirkpatrick	Brendan	SCE	
Member	Dhawan	Anil	Allegis Groups	
Member	McKinney	Kenneth	UL solutions	
Member	Busilan	Dan	Dominion Energy	
Member	Found	Paul	BC Hydro	
Member	DeCesaro	Frank	DeCesaro Consulting Solutions	
Member	Agliata	Peter	S&C Electric	X