Distribution Transformer Subcommittee Report

Chair: Stephen Shull **Secretary:** Jerry Murphy

Meeting Date: 04/13/2011 **Time:** 9:30 – 10:45

Attendance:

Members	**34**
Guests	**36**
Guests Requesting Membership	**2**
Total	**71**

Meeting Minutes / Significant Issues / Comments:

Steve opened the meeting; rosters were passed out, introductions were made & a roll call of members showed we had quorum with 34 of the 46 members in attendance.

The minutes of the fall 2010 meeting of the subcommittee were presented and a motion was made by Ron Stahara, seconded by Said Hachichi to approve the minutes; the motion carried by unanimous acclamation.

The following is the reports that were submitted by the Working Groups and Task Forces.

- **C57.12.20 – Overhead Distribution Transformers**

  The membership requirements of the WG were reviewed. Attendance at 3 of the last 5 meetings or last 2 consecutive meetings is required for membership. Since the Fall 2010 meeting, 4 members have been removed and 7 new members added. Membership stands at 32. Attendance of the membership was taken and 27 members were present and a quorum was established.
  There were no patents disclosed that impact the work of this WG.
  The minutes of the Fall 2010 Toronto meeting were approved as submitted.
  The Chair reported that a one-year PAR extension has been granted by NESCOM.
  The Chair reported the results of the recirculation of the IEEE Sponsor ballot of PC57.12.20-D7 dated March 2011.
  - Ballot Open Date:16-Mar-2011
  - Ballot Close Date:26-Mar-2011
  - RESPONSE RATE: This ballot has met the 75% returned ballot requirement; 92 eligible people in this ballot group. 71 affirmative votes, 5 negative votes with comments, 0 negative votes without comments, 2 abstention votes
  - 78 votes received = 84% returned 2% abstention
  - APPROVAL RATE: The 75% affirmation requirement is being met. 71 affirmative votes 5 negative votes with comments
  - 76 votes = 93% affirmative
  - Comments: Document should be published by the end of 2011 pending REVCOM approval.
  - Discussed possible considerations for the next revision including; 1) gasket temperature limits, 2) natural ester fluids, 3) other ratings (e.g. 600Y/347 Volts), 4) tank pressure TF recommendations, 5) bushing requirements, and 6) weights and dimensions.

  Meeting adjourned at 10:00am

- **C57.12.28 – Enclosure Integrity**

  Introductions of members and guests

  No comments were provided to any patent relationships to the standard.

  A quorum of the Working Group's members was present (22 out of 33).

  The minutes of the March 9, 2010 and October 26, 2010 working group meetings were approved.

  A line item review of the C57.12.28 standard was then started.

  The definition of the Padlock was altered to state that the device will be specified and supplied by the user.

  Mounting procedures for the installation of pad mounted units were discussed based on a negative ballot received in 2005. Alternative methods were presented and reviewed. However, it was decided by the working group membership, that including an installation procedure was beyond the scope of this standard. Therefore, the security between the mounting surface and the unit will remain the responsibility of the installer-user.

  A concern was expressed by one of the members related to the security of the locking nut in a case where the penta-head bolt was not included in the closing of a device in the field. A wire could be inserted past the padlock and through the nut allowing contact with high voltage components on the front plate. A statement will be prepared requiring the back of the nut or the threaded bracket be sealed or covered.

  Two of the working group members reviewed the tools and component parts included in the standard to conduct the enclosure integrity tests. All of these devices and parts are still available for purchase and no changes were recommended.

  The working group was asked to review a test requirement for the doors to latch when the unit is closed and a lift and place test be added to the standard. After a discussion period, it was decided that the working group chairs would contact the requester and ask for further clarification.

  A modification was made to section 5.3.2 to require the coating systems to be retested when changes are made to the process or every two years.

  A problem was identified with the ability of Munsell to provide consistent pad mount green color standards. In Toronto, members were requested to bring samples of the colors currently applied to their products. Several companies provided samples which will be evaluated. Results will be presented at the next meeting. An alternative color standard company was also provided which will be investigated.

  The meeting came to a conclusion at 9:18 AM.

- **C57.12.29 – Enclosure Integrity-Coastal Environment**

  The C57.12.29 standard was not discussed at the meeting due to time constraints.

  However, all of the enclosure integrity tests and requirements were covered during the review of the C57.12.28 standard. These two standards are very closely related and share many of the same features.

  The membership will be contacted by e-mail related to one issue. There is only one source for outdoor coastal testing since the closure of the LaQue test site in North Carolina. Members will be asked to search for an alternative site and present their findings at the next meeting.

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- **C57.12.34 –Three Phase Padmounted Transformers**

  Ron Stahara called the meeting to order. To establish a quorum, the member list was displayed on the screen and those who saw their names were asked to hold up their hand. From this count of hands, a quorum was declared. Ron asked that everyone introduce themselves by giving their name, company and location. Also, an attendance roster was circulated. The IEEE Patent Policy was presented to the group by Ron Stahara. The group was asked if there were any patents that needed to be disclosed. None were announced to the group. A motion was made by Jerry Murphy and seconded by Gael Kennedy to accept the minutes of the past meeting. It was approved by acclamation with no corrections.

  The impedance levels were reviewed for the new sizes of 7.5 and 10 MVA. There was some discussion but only concerning the impedance ranges of the smaller unit sizes. Ron Stahara pointed out that there was a footnote that asked the user to insure that their requirements would be met when using this impedance range or value. There was some discussion concerning the correctness of the table reference but it was generally agreed that these values were acceptable. Steve Shull said he would verify this reference.

  The next item that was discussed was reference to the 600 A cable termination. Steve Shull explained that Ali Ghafourian had asked the question concerning the arrangement of a 600A elbow (TBody) in the cabinets. This would include proper clearances both horizontally in the cabinet and with the cabinet's depth. Gary King stated that it appears that the dimensions works now or the users were making it work. The Chair asked that task force be formed to determine what these dimensions should be using the following manufacture's products a reference: Elastimold, Hubbell Power, Cooper Power System and Richards Manufacturing. As well this group would verify that the secondary cabinet will handle the necessary cabling for these larger sizes. The leader of this group will be Jerry Murphy, and he will be assisted by Gael Kennedy and Chuck Simmons. They will report back to the group in the fall meeting.

  Gary King brought up the concern of the configuration of the H0/X0, X0, and H0 terminal. He said that his company had a request that they provide a deadfront elbow for this terminal. The group discussed this and determined that operationally this could provide a danger to operating personnel by them getting confused and terminating a neutral on hot phase. The consensus of the group was that a bushing should be used as it now is currently specified currently in the standard.

  This concluded the meeting.

- **C57.12.35 – Bar Coding for Distribution transformers and Step-Voltage Regulators**

  The working group met on Tuesday, April 12, 2011 at 9:30 am in the Toucan Room of the Catamaran Resort in San Diego, CA. There was a quorum present.

  The chairman reviewed the patent legal issue and asked whether there were any patents or patents pending that would affect the working group or standard. None were identified.

  The minutes from the previous meeting in Toronto, CA were approved.

  The chairman gave a summary of the results of a bar code and RFID survey sent to the working group and the distribution subcommittee. A general discussion of the results was held. The chairman asked for a motion NOT to amend the PAR to include RFID requirements in the standard; Bob Olen made the motion, Ron Stahara seconded it and the motion was approved.

  The chairman asked the group if a task force within the group was necessary to address the RFID requirements. The general consensus was not to form a taskforce because of

the results of the survey and the end-users in the meeting did not see the benefit of RFID at the present time.

There was a discussion on the use of different type's scanners. Bob Olen volunteered to propose a modification to Section 4.1.6 to address the use of different types of scanners.

The meeting adjourned at 10:30 am.

- **C57.12.36 – Distribution Substation Transformers**

  Jerry opened the meeting at 8:00 AM on Monday April 11, 2011, in the Boardroom of the Catamaran Resort Hotel in San Diego; introductions were made, and the attendance rosters were circulated. No new patents were disclosed. Quorum was reached with 12 of the 23 members present.

  Regarding the status of this working group, Jerry informed everyone that a PAR had not been approved yet, and therefore, anybody in attendance had the opportunity to request membership in this soon to be Working Group.

  There was a question of whether the present standard could be reaffirmed. Steve Shull informed the group that IEEE was in the process of changing the policies for revising standards. The proposal effective Jan. 1, 2012 is the reaffirmation process would be eliminated. He recommended that a new PAR be obtained.

  The minutes of the fall 2010 meeting were presented and a motion was made by Ron Stahara and seconded by Gael Kennedy to approve the minutes. Motion passed unanimously.

  Jerry mentioned the work for the new revision would be based on the comments made during the past balloting process. It was anticipated that most of the discussion would be focused on reviewing the requirements of accessories, considering the requirements of this standard, as well as those of the recently published C57.12.10-2010 standard for power transformers.

  Carlos Gaytan made a comment concerning the tank designs of these 2 standards regarding tank withstand and pressure relief. He pointed out that a comparison would be presented at the meeting of the Task Force on Tank Pressure Coordination.

  Jerry asked the group if they had any comments to send them to him, and he would work on having the PAR approved for the next meeting in Boston.

  The meeting was adjourned at 8:40 AM

- **C57.12.37 – Electronic Test Data Reporting**

  The meeting was called to order at 1:45pm in the Board Room at the Catamaran Hotel, San Diego, CA.

  Introductions were done. Roster was taken, and a quorum was not met.

  The Chairman will work to reduce the membership to those who are involved before the next meeting.

  Minutes were reviewed but could not be approved because quorum was not met.

  The chairman asked if anyone was aware of any patents that might affect the development of this standard. No patent disclosures were made.

  Old business:

  The changes to the standard were reviewed. It was asked if any other changes were known. None were offered. The document will be sent to ballet and review before the next meeting.

  New Business: None

  We adjourned at 2:05pm.

- **C57.12.38 – Single Phase Padmounted Transformers**

  The meeting was called to order by Ali Ghafourian.

  A roll call was conducted to determine if a quorum was present. Twenty-four (24) of the thirty-four (34) working group members were present. Therefore, a quorum was present.

  The members were asked if there were any patent issues that needed to be identified associated with the work on this standard and none were identified.

  The minutes from the October, 2010, meeting in Toronto were presented for review and were approved.

  Significant changes made in Draft 1.2 were discussed as follows:

  - In Figures 1C and 2C, the last two lines of the tables were revised to reference the applicable figures in IEEE 386 for the small (Figure 7) and large (Figures 8 and 9) interface connectors. This was in response to a suggestion from the Fall 2010 meeting. The change was deemed acceptable except that since referencing tables in another standard, the date of the standard referenced should be used. This will be done in the Normative References.
  - Figure 5 was added to the standard which shows low voltage bushing arrangements for the various low voltages now covered by the standard. At the Fall 2010 meeting there was discussion about whether or not the 240/480 volt and 120/240 volt bushing arrangements should be included. No decision was reached at that meeting. A motion was made (Ron Stahara) to include Figure 5 in the standard with the addition of 277/480 volts, which was missing, and seconded (Gael Kennedy). The motion passed with no opposition.
  - There was additional discussion about the possibility of including in the standard information on the amount of weight that the low voltage bushings can support. A group consisting of Justin Pezzin, Giuseppe Termini, and Chuck Simmons will study information available on this subject from bushing and transformer manufacturers and report back to the working group.
  - It was pointed out that Figure 4, Detail C for the low voltage terminal stud sizes had not been revised to reflect that the standard now covers up to 250 kVA units. It was also pointed out that since the standard now covers more low voltage levels, the stud size requirements need to be based on amperage rather than kVA size. This will be reviewed and incorporated before the Fall meeting.

  The meeting was adjourned at 11:40 p.m.

- **C57.15 – Step Voltage Regulators**

  At our last discussion at the C57.15 Fall meeting in Toronto we indicated an informative ballot in the IEC community for consideration of IEEE C57.15 for the IEC IEEE dual logo process laid down in AC 138, 2002 was given in May 2010. The purpose of this circulation was to make sure there were no inconsistencies between C57.15-2009 and any existing IEC TC 14 standards or projects. The result (14/642/INF - May 2010) of the inquiry (14/637/DC) was to adopt IEEE C57.15 as a dual logo standard. Nine (9) countries provided comments in addition to their vote while 18 countries voted without additional comments. 12 countries did not respond at all.

  Our Working group for C57.15 provided formal responses back to the countries that had provided comments regarding consideration of C57.15-2009 being a dual logo candidate. Discussion regarding these comments on C57.15-2009 acceptance and a dual logo candidate was discussed at the TC 14 plenary meeting in Beijing, China - November 2010. The chairman of IEC TC14, Paul Jarman, proposed that IEEE C57.15 should be submitted for vote for adoption as a dual logo standard under the IEEE/IEC agreement. All members present at the TC 14 meeting, except Japan, agreed to this proposal.

Distribution Transformer Subcommittee Report

Under the terms of the IEC-IEEE Agreement, the General Secretary submitted the following IEEE products to the SMB (STANDARDIZATION MANAGEMENT BOARD) Submission Procedure.

This submission to the SMB of the IEEE product is in accordance with Stage 2 of the procedure for the IEC-IEEE Agreement. As background information, Stage 1 was the submission of C57.15-2009 to the IEC General Secretary by the IEEE. This circulation to the IEC Standardization Management Board (SMB) is for a Question of Principle (QP) ballot. This ballot asks the members of the IEC SMB if the document should be submitted to IEC TC14 for vote as a Final Draft International Standard (FDIS). The closing date for this ballot was 1 April 2011. This was the next to last step in having the document adopted by IEC TC14. A Report (SMB/4456A/RV - 2011-04-04) of voting on document SMB/4456/QP was provided. Decisions of the Standardization Management Board taken by correspondence requires a two thirds majority of those voting, abstention is not considered as voting.

In this case, 8 members of the Standardization Management Board voted in favour, 4 voted against with 2 abstentions and 1 no reply. The SMB has therefore approved the 1 IEEE Product Std C57.15-2009, submitted under the IEC - IEEE agreement for publication as a double logo IEC/IEEE standard under the work programme of IEC TC 14, for its circulation under the fast track procedure at FDIS Stage, the last stage of the process.

For information only, comments on the QP for the Submission of IEEE product IEEE Std C57.15, under the IEC/IEEE agreement for publication as a double logo IEC/IEEE standard for consideration as dual logo candidate under the work programme of IEC TC 14 was as follows.

- The Japan National Committee was not in favor to support this document because limits of temperature rise of a power transformer indicated in Clause 5.2, Table 2 of the document under consideration, which is based on an IEEE Standard, are different from those of the IEC International Standard 60076-2. The IEC International Standard under consideration shall not define different values from those of the other IEC International Standard on the same subject.
- The Italian NC is interested in the document because a similar document does not exist in IEC TC 14. Anyway, we do not support the IEC-IEEE dual logo process, because the document requires a review to adapt it at IEC world (for example voltage levels, temperature rise limits, tests values shall be adapted for IEC standard values).
- Countries who voted for IEC acceptance of C57.15-2009 for dual logo were Austria, Canada, Germany, United Kingdom, Korea, Mexico, Netherlands and United States.
- Countries who voted against for IEC acceptance of C57.15-2009 for dual logo were China, France, Italy and Japan.
- Countries who abstained from the vote regarding IEC acceptance of C57.15-2009 for dual logo were Spain and Sweden. No reply from Brazil.

Stage 3 is submission to IEC: If the result of the vote on the FDIS is positive, then the document is published.

Steve Shull stated that this was the first dual logo IEC/IEEE International Standard and asked the Committee to give Craig a round of this accomplishment.

- **TF – Transformer Efficiency and Loss Evaluation (DOE)**

  A quorum was present. There were no patents to disclose. The Minutes from the October 26, 2010, meeting in Toronto, Canada, were approved as written.

  Mr. Hopkinson welcomed Matt Hartley and Hisham Araji from Navigant Consulting. Navigant Consulting is a contractor working for DOE on the distribution transformer efficiency rulemaking.

  Mr. Hopkinson reviewed slides from his presentation titled "Distribution Transformer Energy Efficiency Task Force." The presentation is posted on the IEEE Transformer Committee Website under the Distribution Transformers Subcommittee.

  Dates for the DOE Rulemaking are:

  - An ANOPR published March 2011
  - NOPR expected to be published by October 1, 2011
  - Final Rule expected to be published by October 1, 2012
  - Effective date 1/1/2016

  It was noted that the effective date may be earlier, but will be no later than 2016.

  Corrections were made to slide #53 and #73. The updated presentation will be posted on IEEE website.

  DOE is seeking comments on the distribution transformer rulemaking. The DOE website for rulemaking is:

  http://www1.eere.energy.gov/buildings/appliance_standards/commercial/distribution_transformers.html

  Public comments are due April 18, 2011. Interested persons may submit comments, identified by the notice title, the Notice of Public Meeting (NOPM) for Energy Conservation Standards for Distribution Transformers, and provide the docket number EERE–2010–BT– STD–0048 and/or regulatory information number (RIN) 1904–AC04. Comments may be submitted using any of the following methods:

- Federal eRulemaking Portal: www.regulations.gov . Please follow the instructions for submitting comments.
- E-mail: DistributionTransformers-2010-STD-0048@ee.doe.gov. Include EERE–2010–BT–STD–0048 and/or RIN 1904–AC04 in the subject line of the message.
- Mail: Ms. Brenda Edwards, U.S. Department of Energy, Building Technologies Program, Mailstop EE–2J, Public Meeting for Distribution Transformers, EERE–2010–BT–STD–0048 and/or RIN 1904–AC04, 1000 Independence Avenue, SW., Washington, DC 20585–0121. Phone: (202) 586–2945. Please submit one signed paper original.
- Hand Delivery/Courier: Ms. Brenda Edwards, U.S. Department of Energy, Building Technologies Program, 6th Floor, 950 L'Enfant Plaza, SW., Washington, DC 20024. Phone: (202) 586–2945. Please submit one signed paper original.

  Instructions: All submissions received must include the agency name and docket number or RIN for this proposed rulemaking

  Phil Hopkinson is working closely with Navigant Consulting and has noticed errors in the material prices and final transformer selling prices that were used in the engineering analysis of the Candidate Standard Levels (CSL's). Phil will be gathering inputs to provide a composite view of the errors to Navigant Consulting directly. Phil will welcome inputs from the manufacturers to try to develop a range of prices to the DOE so that they can correct the report. Please respond directly to Phil if you want to have your data included in the ranges. Phil will not divulge any names to the DOE.

  Certification and Compliance rules were published March 7, 2011. The document may be found at:
  http://www1.eere.energy.gov/buildings/appliance_standards/certification_enforcement.html

There was no new business.

The next meeting is planned for the fall in Boston. The meeting adjourned at 4:43 PM.

- **TF – Tank Pressure Coordination**

  Carlos opened the meeting at 3:15 PM on Monday April 11, 2011, in the Boardroom of the Catamaran Resort Hotel in San Diego; introductions were made, and the attendance rosters were circulated. No new patents were disclosed. Quorum was reached with 22 of the 30 members present.

  The minutes of the fall 2010 meeting were presented and a motion was made by Ron Stahara and seconded by Marcel Fortin to approve the minutes. Motion passed unanimously.

  Under Old Business, the status of the definition of Static Pressure Requirements was reported. The Standards C57.12.36 and C57.12.10 were added to the comparison table. In the fall 2010 meeting there was a discussion about the concerns that users had expressed about the PRV's flow rate for large distribution transformers. On the updated comparison table of particular interest from C57.12.36 and C57.12.10 was the consideration of Pressure Relief Devices (PRD). PRD flow rates are based on standard air (SCFM), but will typically release a combination of both oil and air. There is no conversion available to estimate true flow for mixed fluids (air / oil).

  Carlos asked the TF if there was a need to define an additional device for medium power transformers with flow rates between the PRV's used in distribution transformers and PRD's used in power and large distribution transformers. Carlos formed a group of PRV manufacturers for evaluation of PRV flow rates, and the following people agreed to participate:

  - Christopher Sullivan - Heartland
  - Josh Herz - Qualitrol
  - Justin Pezzin - IFD Corporation

  This group will convene sometime before the next IEEE committee meeting via a conference call. Carlos will coordinate this call. Participation from other transformer manufacturer's representatives is welcome. Giuseppe Termini mentioned there are no specific requirements for PRDs on single and three phase submersible transformers but he asked if this task force could cover this type of transformer. Carlos included this in the Task Force's scope of work. He asked that they consider all types of distribution transformers.

  Under New Business, the TF discussed Dynamic Pressure Requirements.

  Marcel Fortin made a presentation on Arc testing in distribution transformers as discussed in C57.12.22 which was specified originally for cover retention and oil spill testing. There was some discussion about the construction characteristics of the different types of distribution and power transformers. It was pointed out distribution Transformers have flexible walls, while Power Transformers have very rigid walls because they are required to withstand full vacuum filling. A copy of this document as well as the other documents on static pressure will be posted on the website of the Distribution Transformer Sub-Committee.

  Pad mounted fusing practices were discussed and comments from two manufacturers in the TF estimated that approx. 20% of padmount transformers built use a bay-o-net fuse and current limiting fuse (CLF) for protection, while the rest use a bay-o-net fuse and isolation link.

  A summary of the status of the WG Tank Rupture & Mitigation PC57.156 was presented. There was some discussion about how this task force could work in coordination with the PC57.156 Working Group.

Steve Shull asked the group if it would be beneficial to establish a scope and purpose before the next meeting and attempt to move the TF into a WG. Dan Mulkey felt it would be good to keep all the requirements in one standard. (i.e. combined with Power transformers). John Herz commented that the TF which had now become the PC57.156 WG may include in its version tank design or other methods for mitigation of tank rupture. He asked if this TF really wanted to expand our scope to include these types of items. Ali Ghafourian suggested the task force keep the PARs separate to ensure this TF can keep some control of development of this new distribution guide. Alan Wilks, Steve Shull, and others agreed that for distribution transformers we didn't need to mirror the scope of the PC57.156 WG. Ali Ghafourian made the motion to create a PAR for the TF to move it into a working group, and define the title, scope and purpose for this new WG. This would be presented for review at the next meeting. Motion was seconded by Marcel Fortin. Motion carried with no one opposed. Carlos will prepare these items with the input of other these members to be presented at the Fall 2011 meeting.

The meeting was adjourned at 4:25 PM.

Old Business:

Steve addressed the changes coming from the Standard Board as they will be eliminating the Reaffirmation and stabilization options. The reason was Ballot resolution groups simply dismiss comments on technical flaws by stating “reaffirmation doesn’t allow changes”. First, we don’t have any stabilized standards. Any reaffirmation must be done now. Starting in 2012, standards will have 10 year life. They must be complete ballot in the 10 year time frame. Details will be worked out later this year but the indication is the PAR extension will not keep the Document active. Brian Klaponski questioned this plan. He stated that he was concerned that the distribution transformer standards will lose their continuity and the individual knowledge that we currently retain by doing our standards through continuous revision. He asked that we express this concern and ask this plan be reconsidered. Not other action was taken on this comment.

Steve made a request and encouraged all attendees who were not members of the IEEE, Power and Energy Society, Standards Association, Transformers Committee and the Distribution Transformers subcommittee to please consider doing so. Steve pointed out for those who think they are members to check their badges. If they find they don’t have Committee Member ribbons on their nametags, they are not Transformer Committee members.

New Business:

Jerry Corkran brought up some safety information for those working in wind farms as ice which formed on the turbines and turbine blades has fallen and has caused significant damage to padmounted transformers located at their bases. This can be a very real hazard to those working near this location.

Jerry Corkran made a motion to request a change of the language in C57.12.90 so as not to require back to back heat run tests. He requested that this be in the form of a letter from this subcommittee to the Working Group (Paulette Payne). Brian Klaponski brought up the history behind this in that many members of the Dist SC do not attend the C57.12.90 meeting and are likely not aware of these issues. Marcel made a motion to amend this motion to add a comment requesting Paulette to include the Distribution Transformer SC members in any survey that she would issue on this standard, Said Hachichi seconded and 22 members voted in favor thus carrying the motion and adding the amendment. Phil Hopkinson pointed out that back to back heat runs are the most realistic testing method for simulating actual operations. Said Hachichi commented that at Quebec Hydro they have compared the two methods and found no difference in the testing. 27 members voted to pass the amended motion with no negative votes. Therefore Steve Shull, will send a letter to the Subcommittee chair with a copy going to the Working group chair requesting that this test not be mandatory and change

the wording from “preferred method” to “alternate method” and also request that the Distribution Transformer Subcommittee be included in any surveys that C57.12.90 may issue.

Marcel questioned how we can improve the communication between the other subcommittee meetings. Steve and Jerry recommended that the best way is to attend the Thursday full committee meeting.

A motion was made and seconded to adjourn the meeting with unanimous consent.

The meeting adjourned at 10:41am.

Submitted By: Jerry Murphy

Date: 04/13/2011