North America (NA) Standards Spring 2015 Meetings
01 April 2015, 1400 – 1700 Pacific Time
SEMI Headquarters in San Jose, California

TC Chapter Announcements
Next TC Chapter Meeting
NA Standards Meetings at SEMICON West 2015
Wednesday, July 15, 2015; 1400 – 1700 Pacific Time
San Francisco Marriott Marquis Hotel in San Francisco, California

Table 1 Meeting Attendees
*Italic*ics indicate virtual participants

**Co-chairs:** David Bouldin (Fab Consulting), Mark Frankfurth (Cymer)

**SEMI Staff:** Michael Tran

<table>
<thead>
<tr>
<th>Company</th>
<th>Last</th>
<th>First</th>
<th>Company</th>
<th>Last</th>
<th>First</th>
</tr>
</thead>
<tbody>
<tr>
<td>BestESD Technical Services</td>
<td>Kraz</td>
<td>Vladimir</td>
<td>SEMI</td>
<td>Amano</td>
<td>James</td>
</tr>
<tr>
<td>Consultant</td>
<td>Busing</td>
<td>David</td>
<td>SEMI</td>
<td>Escobar</td>
<td>Gene</td>
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<td>Fab Consulting</td>
<td>Bouldin</td>
<td>David</td>
<td>SEMI</td>
<td>Tran</td>
<td>Michael</td>
</tr>
<tr>
<td>Hitachi Kokusai</td>
<td>Matsuda</td>
<td>Mitsuhiro</td>
<td></td>
<td>Tran</td>
<td>Michael</td>
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<tr>
<td>Tokyo Electron</td>
<td>Mashiro</td>
<td>Supika</td>
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Table 2 Leadership Changes

<table>
<thead>
<tr>
<th>Group</th>
<th>Previous Leader</th>
<th>New Leader</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
<td></td>
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</tbody>
</table>

Table 3 Ballot Results

**Passed** ballots and line items were submitted to the ISC Audit & Review Subcommittee for procedural review.

**Failed** ballots and line items were returned to the originating task forces for rework and reballoting.

<table>
<thead>
<tr>
<th>Document #</th>
<th>Document Title</th>
<th>Committee Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>5819</td>
<td>Reapproval with Editorial Revisions of SEMI E114-0302E (Reapproved 0309) - Test Method for RF Cable Assemblies Used in Semiconductor Processing Equipment RF Power Delivery Systems</td>
<td>Failed TC Chapter review</td>
</tr>
<tr>
<td>5820</td>
<td>Reapproval with Editorial Revisions of SEMI E115-0302E (Reapproved 0309) - Test Method for Determining the Load Impedance and Efficiency of Matching Networks Used in Semiconductor Processing Equipment RF Power Delivery Systems</td>
<td>Failed TC Chapter review</td>
</tr>
<tr>
<td>5750</td>
<td>Revision to Add a New Subordinate Standard: Specification for Product Time Measurement for Material Control Systems to SEMI E168-1114, Specification for Product Time Measurement</td>
<td>Passed TC Chapter review with editorial changes</td>
</tr>
<tr>
<td>5751</td>
<td>Revision to Add a New Subordinate Standard: Specification for Product Time Measurement for Transport Systems to SEMI E168-1114, Specification for Product Time Measurement</td>
<td>Passed TC Chapter review with technical and editorial changes</td>
</tr>
</tbody>
</table>

Table 4 Authorized Activities

<table>
<thead>
<tr>
<th>#</th>
<th>Type</th>
<th>SC/TF/WG</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
<td></td>
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</table>

Note: SNARFs and TFOFs are available for review on the SEMI Web site at: http://downloads.semi.org/web/wstdsbal.nsf/TFOFSNARF

Table 5 Authorized Ballots

<table>
<thead>
<tr>
<th>#</th>
<th>When</th>
<th>SC/TF/WG</th>
<th>Details</th>
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<tbody>
<tr>
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Table 6 New Action Items

<table>
<thead>
<tr>
<th>Item #</th>
<th>Assigned to</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015 Apr #01</td>
<td>Michael Tran</td>
<td>Prepare Ratification Ballot for Document 5751 by the Cycle 4, 2015 ballot submission deadline (April 10).</td>
</tr>
<tr>
<td>2015 Apr #02</td>
<td>Michael Tran</td>
<td>Contact Kat Gavigan at SEMATECH for copyright releases for Documents 5750 and 5751.</td>
</tr>
<tr>
<td>2015 Apr #03</td>
<td>David Bouldin</td>
<td>Follow up with Equipment Training and Documentation TF leaders on current TF status.</td>
</tr>
<tr>
<td>2015 Apr #04</td>
<td>Michael Tran</td>
<td>Coordinate with Metrics GCS members and determine schedule for GCS meeting at SEMICON West.</td>
</tr>
<tr>
<td>2015 Apr #05</td>
<td>David Bouldin</td>
<td>Contact Arnie Steinman for an ESDA liaison report update.</td>
</tr>
</tbody>
</table>

Table 7 Previous Meeting Actions Items

<table>
<thead>
<tr>
<th>Item #</th>
<th>Assigned to</th>
<th>Details</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Welcome, Reminders, and Introductions

David Bouldin, TC Chapter cochair, called the meeting to order at 2:07 PM. After welcoming all attendees, a round of introductions followed. The SEMI meeting reminders on membership requirements, antitrust, patentable technology, and meeting guidelines were then presented and explained.

Attachment: 01, SEMI Standards Required Meeting Elements

2 Review of Previous Meeting Minutes

The TC Chapter reviewed the minutes of the previous meeting held November 5 in conjunction with the NA Standards Fall 2014 meetings.

Motion: Accept the minutes of the previous meeting as written.
By / 2nd: Vladimir Kraz (BestESD Technical Services) / David Busing (consultant)
Discussion: None
Vote: 3Y-0N in favor. Motion passed.
Attachment: 02, NA Metrics Fall 2014 meeting (November 5) minutes
3 Ballot Review

Passed ballots and line items will be submitted to the ISC Audit & Review Subcommittee for procedural review. Failed ballots and line items were returned to the originating task forces for re-work and re-balloting.

NOTE 1: Committee adjudication on Cycle 2, 2015 ballots are detailed in the Audits & Reviews (A&R) Subcommittee Forms for procedural review. These A&R forms are available as attachments to these minutes. The attachment number for each document is provided below the summary tables.

3.1 Cycle 2, 2015 Ballots

<table>
<thead>
<tr>
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</tbody>
</table>

Action Item: 2015Apr #01, Michael Tran to prepare Ratification Ballot for Document 5751 by the Cycle 4, 2015 ballot submission deadline (April 10).

Attachment: 03, Ballot Review for Doc. 5819
04 Ballot Review for Doc. 5820
05, Ballot Review for Doc. 5750
06, Ballot Review for Doc. 5751

4 Task Force Reports

4.1 Electromagnetic Compatibility (EMC) Task Force

Vladimir Kraz reported for the EMC Task Force. The key items were as follows:

- Industry Update
  - EMC:
    - IEEE EMC Meeting in Santa Clara, CA
    - Not many new papers on the subjects relevant to our effort
    - Discussion with IEEE Standards regarding harmonization
  - ESD:
    - ESD Association will hold its Spring Standards session in May in Reno, NV – the site of the ESD Symposium in September
    - International Electrostatic Discharge Workshop (IEW), May 3-7, 2015, Lake Tahoe, CA
    - End of June: ESD Factory Level Symposium in Korea
- Relevant EMI Survey Documents in the Industry
  - IEEE 473-1985
    - Recommended Practice for an Electromagnetic Site Survey (10 kHz to 10 GHz)
The document sets good foundation but is obsolete
- IEC 61000-4-39
  - Radiated Fields in Close Proximity Immunity Test
  - Still in development
  - Immunity and radiated only
- EPRI TR-102323
  - Guidelines for Generic Plant Emission Measurements
  - Originally written for nuclear power plants
  - Some aspects are applicable to our field
- IEEE Std 1100-2005 “Emerald Book”
  - Powering and Grounding Electronic Equipment
  - Power and ground are a significant source and conduit of EMI problems

Summary of Meetings
- Communication breakdown – we were connected to a wrong meeting. We are perpetually jinxed when it comes to communication setup.
- No off-site attendees were able to connect.
- Will try to reconvene in April.
- The first ballot is still far away due to the amount of work required to put together a good document.

Additional Committee Discussion:
- Vladimir asked whether there is a process for sharing SEMI’s Standards with other organizations. Supika Mashiro responded that there is currently no framework on how SEMI Standards work with other standards developing organizations (SDOs). She suggested forming liaisons with these SDOs. Vladimir pointed out that being unable to share standards with other organizations would impede on his work. James Amano raised the issue of being able to manage/control how the standards are shared. He stated that the problem is similar to people buying one copy of the Standard and sharing it with others.
- It was also reported that Mark Frankfurth no longer has support from ASML to participate in SEMI Standards. While Mark has not officially resigned at this time, it is possible that the TF will soon have an open TF leader position.

Attachment:  07, EMC Task Force Report

4.2 Wait Time Waste (WTW) Task Force
David Bouldin reported that Lance Rist, WTW TF leader, has disengaged as he no longer has a contract with SEMATECH. However, David pointed out that Lance has not officially resigned yet. Lance did recommend contacting TY Lee and Bill Ross at SEMATECH to see whether they would be able lead this TF. David and Michael Tran sent a message to TY and Bill, but have not heard back from them at this time. David noted that he was not clear what will happen to the WTF TF. The TF will need an active leader.

James Amano asked whether there is a SEMATECH contact to follow up with on the copyright releases for the WTW TF ballots. It was pointed out that Kat Gavigan was the previous contact. Michael will contact Kat Gavigan and request for copyright release for the WTW Documents.

Action Item:  2015Apr #02, Michael Tran to contact Kat Gavigan at SEMATECH for copyright releases for Documents 5750 and 5751.

4.3 Equipment Training and Documentation Task Force
Mark Cohran reported that he has been extremely busy with projects at Intel and has been unable to focus on TF work. It was reported that Malthi Venkat of Nikon is also in a similar situation.
Action Item: 2015Apr #03, David Bouldin to follow up with Equipment Training and Documentation TF leaders on current TF status.

4.4 Electrostatic Discharge / Electrostatic Charge (ESD/ESC) Task Force
The ESD/ESC Task Force is currently inactive per Arnie Steinman’s request.

4.5 Equipment Reliability, Availability, Maintainability and Productivity (RAMP) Metrics Task Force
David Busing reported for the Equipment RAMP Task Force. The TF is currently working on SEMI E10 and SEMI E79 educational webinars:
- Proposing 6 installments in 2015
- First prototype webinar recorded by David Bouldin!
- SEMI Marketing/Sales plans rollout of first webinar in May.
- Planned Equipment Performance Webinars
  “Free” Webinars
  - Overview of Metrics Global TC and Equipment Performance Standards
    - RECORDED
  - Overview of E10
    - PPT 100%, script 100%, and under review
  - Overview of E79
    - PPT 100%, script 0%
  “Charged” Webinars
  - Sample Calculations in E10, Part I: Sample Scenario and States
    - PPT 100%, script 50%
  - Sample Calculations in E10, Part II: Fundamental Quantities and Metrics
    - PPT 100%, script 0%
  - Sample Calculations in E79
    - PPT 100%, script 0%

Attachment: 08, Equipment RAMP Task Force Report

5 Liaison Reports
5.1 Europe Equipment Automation TC Chapter (Information & Control, Metrics, Physical Interfaces & Carriers)
Michael Tran presented the Europe Equipment Automation liaison report. The key items were as follows:
- Next meeting:
  - SEMICON Europa 2015 (Dresden, Germany)
- E48 Revision TF has been disbanded.
- Two documents to go inactive
  - SEMI E54.14-0309, Specification for Sensor/Actuator Network Communications for PROFINET
  - SEMI E54.8-0309, Specification for Sensor/Actuator Network Communications for PROFIBUS-DP
In early June, 2014 the PV Automation Global Technical Committee (GTC) and the ERSC validated a motion to make the following transformation. This has been validated by the ISC:

- PV Automation GTC → Automation Technology GTC
- New Chairman: Christian Hoffmann (PEER Group)
- Staff Contact: Andrea Busch (abusch@semi.org)

Additional Committee Discussion:
- Alfred Honold has requested scheduling a GCS meeting at SEMICON West. Michael Tran to coordinate with Metrics GCS members and determine schedule for GCS meeting at West.

Action Item: 2015Apr #04, Michael Tran to coordinate with Metrics GCS members and determine schedule for GCS meeting at SEMICON West.

Attachment: 09, Europe Equipment Automation Liaison Report

5.2 Japan Metrics Committee
Supika Mashiro reported that the TC Chapter has not met in a long time.

5.3 Technical Editors Board
David Bouldin reported that there are no meetings planned for the TEB. All the work of the TEB has been done through email. David is working with Shannon Austin (SEMI Standards Publication) on resulting Style Manual updates per the recent Regulations and Procedure Manual revisions.

5.4 Technical Architects Board
David Bouldin reported that there have been no TAB updates since Jackie Ferrell postponed activities.

5.5 ESDA Liaison Report
Action Item: 2015Apr #05, David Bouldin to contact Arnie Steinman for an ESDA liaison report update.

5.6 SEMI Staff Report
Michael Tran (SEMI) gave the SEMI Staff Report. The key items were as follows:

- 2015 Global Calendar of Events
  - SEMICON Southeast Asia (April 22-24, Penang, Malaysia)
  - Advanced Semiconductor Manufacturing Conference [ASMC] (May 3-6, Saratoga Springs, New York)
  - Intersolar Europe (June 10-12, Munich Germany)
  - SEMICON Russia (June 17-18, Moscow)
  - SEMICON West (July 14-16, San Francisco, California)
  - SEMICON Taiwan (September 2-4, Taipei)
  - European MEMS Summit (September 17-18, Milan, Italy)
Strategic Materials Conference [SMC] (September 22-23, Mountain View, California)

- SEMICON Europa (October 6-8, Dresden, Germany)
- SEMICON Japan (December 16-18, Tokyo)

- NA Standards Spring 2015 Meetings (March 29 to April 2)
  - Global technical committee TC Chapter meeting at SEMI Headquarters (San Jose)
    - 3DS-IC | EHS | Facilities & Gases | HB-LED | Information & Control | Liquid Chemicals | MEMS/NEMS | Metrics | PV Materials
  - SEMI thanks Intel (Santa Clara) for hosting the Physical Interfaces & Carriers (PIC) TC Chapter and task force meetings.
  - SEMI thanks KLA-Tencor (Milpitas) for hosting the Silicon Wafer TC Chapter and task force meetings.

- Upcoming North America Meetings (2015)
  - 2015:
    - NA Compound Semiconductor Materials TC Chapter Meeting (May 20 in conjunction with CS MANTECH, Scottsdale, Arizona)
    - NA Standards Meetings at SEMICON West 2015 (July 13-16, San Francisco, California)
    - NA Standards Fall 2015 Meetings (November 2-5, San Jose, California)
  - 2016:
    - NA Standards Spring 2016 Meetings (April 4-7, San Jose, California)

- Technical Letter Ballot Critical Dates for NA Standards meetings at SEMICON West 2015
  - Cycle 4: due April 10 / Voting Period: April 21 – May 21
  - Cycle 5: due May 8 / Voting Period: May 22 – June 22

- Standards Publications Report

<table>
<thead>
<tr>
<th>Cycle</th>
<th>New</th>
<th>Revised</th>
<th>Reapproved</th>
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<td>November 2014</td>
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<td>December 2014</td>
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<td>4</td>
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<td>January 2015</td>
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<tr>
<td>February 2015</td>
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- Total in portfolio – 928 (includes 110 Inactive Standards)

- New Requirements/Process Reminders for TC Chapter Meetings
  - Standards Document Development Project Period
    - Project period shall not exceed 3 years (Regulations § 8.3.2).
      - SNARF approval to TC Chapter approval
    - If document development activity is found to be continuing, but cannot be completed within the project period, the TC Chapter may grant a one-year extension at a time, as many times as necessary.
  - SNARF Review Period
A submitted SNARF for a new, or for a major revision to an existing, Standard or Safety Guideline is made available to all members of a TC Chapter’s parent global technical committee for two weeks for their review and comment. (Regulations ¶ 8.2.1)

- If the SNARF is submitted at a TC Chapter meeting, the TC Chapter can review and approve it, but the SNARF will need to be distributed for two weeks and then approved via GCS.

  - New SNARF & TFOF forms [embedded in Staff Report, see Attachment 10 of these minutes]
  - Procedures for Correcting Nonconforming Titles of Published Standards Document (Procedure Manual (PM) Appendix 4)
    - Some Standards qualify for a special procedure where a line item change can be used to correct the titles. Otherwise, the corrective action will likely require a major revision.
  - Table of Content (TOC)
    - No section of a Standard or Safety Guideline may contain a list of section numbers and titles (e.g., similar to a Table of Contents).
    - Table of Contents can be approved editorially during Reapproval.
  - Assignment of Draft Document Numbers
    - Upon successful publication of a Document, or termination of work on it by the TF, Standards staff retires the Document number and its associated SNARF, and they are not to be used for further Document development activity.
    - For a Document with Line Item(s) that passed while others failed, the same SNARF may be used to reballot only those failed Line Item(s).
    - A new SNARF is required to introduce new Line Item(s).
  - SNARF
    - SNARFs may be submitted and approved for new, revised, reapproved, or reinstated Documents that have been approved by the TC Chapter, but not yet published (i.e., no new Publication Date Code exists yet). (PM NOTE 8)
  - Minority Report (MR)
    - The motion passes if a simple majority of the total GCS voting membership (i.e., not just those who return votes) approve the motion (Regulations ¶ 9.9)

- Latest Approvals/Next Revisions
  - Follow-up revisions of the Regulations and Procedure Manual were published on 27 March, 2015 for use in NA Spring Standard meetings.

- Regulations/PM Ballot Revisions

<table>
<thead>
<tr>
<th>Group #</th>
<th>Title</th>
<th>Regulations</th>
<th>PM</th>
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<tbody>
<tr>
<td>1</td>
<td>Clarification on Standards Document Development Project Period</td>
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<td>2</td>
<td>GCS Voting Period for Minority Reports</td>
<td>Y</td>
<td>Y</td>
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<td>3</td>
<td>Improvement on Minority Report Handling for Shorter Time to Publication</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>4</td>
<td>TC Membership Requirement</td>
<td>Y</td>
<td>N</td>
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<tr>
<td>5</td>
<td>Ballot Adjudication Process Improvement</td>
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<td>6</td>
<td>Revision to Procedural Review</td>
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<td>Clarification of TC Chapter Review and Adjudication Term</td>
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<td>8</td>
<td>Clarification of Procedure Guide to Procedure Manual</td>
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<td>Miscellaneous Changes of Regulations</td>
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<td>11</td>
<td>Add New Guidance Related to Note</td>
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<tr>
<td>12</td>
<td>Clarification on SNARF and TFOF submitter</td>
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</table>
## NA Metrics TC Chapter 9 April 1, 2015

### Meeting Minutes  SEMI Headquarters in San Jose, California

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<tr>
<td>13</td>
<td>Clarification on SNARF approval procedures for New Standards/Safety Guidelines and major revision of existing Standards/Safety Guidelines</td>
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<tr>
<td>14</td>
<td>Update Appendix 4 Related to Correction of Nonconforming Titles</td>
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<td>15</td>
<td>Clarifications of Procedures Related to Table of Contents</td>
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<td>16</td>
<td>Clarifications on Use of Shall, Must, and Should</td>
<td>Y</td>
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<tr>
<td>17</td>
<td>Miscellaneous Changes to Procedure Manual</td>
<td>Y</td>
<td>N</td>
</tr>
</tbody>
</table>

Indicates follow-up from Oct-Nov 2014 Regulations ballot

- **Ballot Adjudication Process Improvement (Group 5)**
  - **Problem**
    - Publications of Documents can be delayed by the need to go through another cycle of Letter Ballot issuance and adjudication at a TC Chapter meeting to make any technical change.
  - **Proposed Solution**
    - Allow TC Chapter to make technical changes on balloted Standard Document during its adjudication under certain conditions. Conduct a Ratification Ballot in order to ensure global consensus on supporting the technical changes made by the TC Chapter.
  - **NOTE:** This Group was originally proposed as Group 10 in the previous Regulations Ballot to ISC and failed.
    - Taking suggestion of ISC at its SEMICON Japan 2014 meeting in December, the scope of the Ratification Ballot is now limited to technical changes made by TC Chapter during adjudication of a Letter Ballot.

- **GCS Voting Period for Minority Report (Group 2)**
Problem

- Voting period for Minority Report is too short to solicit sufficient votes from GCS voting members.

Proposed Solution

- To let GCS member have 2 weeks voting period, which is same length as the Minority Report submission window.

NOTE: This problem was raised by the NARSC at its Fall 2014 meeting at which the ISC Ballot on Regulations change was discussed. Following-up on this problem by additional changes in the Regulations was suggested by the Regulations SC Chair at the time.

Improvement on Minority Report Handling for Shorter Time to Publication (Group 3)

Problem

- Despite the rare occurrence of MR submission, every Document approved by the TC Chapter has to wait at least a month before it qualifies for A&R procedural review, which in turn results in a longer time to publish.

Proposed Solution

- Expedite the process by allowing A&R procedural review to be commenced as soon as record of ballot review made available.
- If an MR is submitted on a Document, Publication will be on hold until responsible parties reach conclusion on the MR. If the Document is returned to the TF for rework based on consideration of the MR, A&R approval is nullified.

NOTE: This problem was raised by JARSC at its SEMICON Japan 2014 meeting. ISC members expressed their support on improvement toward faster publication.

Attachment: 10, SEMI Standards Staff Report

6 Old Business

6.1 Documents Due for 5-Year Review

Michael Tran reported that the following Metrics Documents are due for 5-year review:

- SEMI E104-0303 (Reapproved 0211), Specification for Integration and Guideline for Calibration of Low-pressure Particle Monitor
- SEMI E141-0705 (Reapproved 0211), Guide for Specification of Ellipsometer Equipment for Use in Integrated Metrology
- SEMI E114-0302E (Reapproved 0309), Test Method for RF Cable Assemblies Used in Semiconductor Processing Equipment RF Power Delivery Systems
- SEMI E115-0302E (Reapproved 0309), Test Method for Determining the Load Impedance and Efficiency of Matching Networks Used in Semiconductor Processing Equipment RF Power Delivery Systems

SEMI E104 and E141 are the responsibility of Europe Metrics TC Chapter. SEMI E114 and E115 are being addressed by ballots 5819 and 5820, respectively.

7 New Business

7.1 New SNARFs & TFOFs

None.
7.2 *New Ballot Submission Authorization*
None.

8 **Action Item Review**

8.1 *Open Action Items*

Michael Tran (SEMI) reviewed the open action items. These can be found in the Open Action Items table at the beginning of these minutes.

8.2 *New Action Items*

Michael Tran (SEMI) reviewed the new action items. These can be found in the New Action Items table at the beginning of these minutes.

9 **Adjournment**

The next NA Metrics TC Chapter meeting is scheduled for July 15 in conjunction with SEMICON West 2015 in San Francisco, California. The tentative schedule is provided below:

**SEMICON West 2015 Meetings**
July 13-16, 2015
San Francisco Marriott Marquis Hotel
780 Mission Street
San Francisco, California 94103
U.S.A.

Monday, July 13
- Wait Time Waste TF (3:00 PM to 6:00 PM)

Tuesday, July 14
- Equipment T&D TF (9:00 AM to 12:00 PM Noon)
- EMC TF (5:00 PM to 7:00 PM)

Wednesday, July 15
- Equipment RAMP Metrics TF (9:00 AM to 12:00 PM Noon)
- NA Metrics TC Chapter (2:00 PM to 5:00 PM)

Having no further business, a motion was made to adjourn the NA Metrics TC Chapter meeting on April 1 in conjunction with the NA Standards Spring 2015 Meetings. Adjournment was at 6:10 PM.

**Respectfully submitted by:**
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*1 Due to file size and delivery issues, attachments must be downloaded separately. A .zip file containing all attachments for these minutes is available at [www.semi.org](http://www.semi.org). For additional information or to obtain individual attachments, please contact Michael Tran at the contact information above.