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QUALITY

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CORRECTIVE ACTION RESPONSES: JUST TELL ME WHAT YOU WANT ME TO PUT DOWN

BY ROBIN DUDASH

One of the keys to continuous improvement is permanent corrective action. I have seen various levels of corrective action responses, but very few that follow through and permanently resolve the problem. Hence, the organization continues to operate in "fire-fighting" mode chasing a problem that returns again and again.

There are several reasons why these problems recur. Most of them I am sure you know already: 1) allowing interim actions to fix the root cause, 2) more than one root cause, 3) verification that the action was taken, or 4) controls in place to prevent them from happening again.

In responding to corrective action requests, there are two options with their own consequences. The quality manager can try to respond to the corrective action requests, but discover that not all of the information is available, or does not have the authority to make the needed changes. The next option is assigning the corrective action to the persons responsible for the solution. Of course, we all know that these people blame the operator for the problem and that the problem is considered closed.

The next logical step is to conduct a Corrective Action Training Class. Everybody in the organization attends the class, and then they will be able to resolve the corrective action requests. The class even runs through some actual examples.

Everyone appears to understand until the first corrective action response is read by the quality manager *after the class*. This is only slightly better than before the class. Verdict: What you don't use, you lose.

This is why I developed a Corrective Action Response Checklist tool (see p. 3) to be used "after the class," so that an appropriate response can be formulated by answering the questions.

Define the Problem

Take time to adequately define the problem (who, what, when, why, where, how much, and how often). Sometimes it is also easier to define the problem by clarifying what it is not.

Interim Actions

Once a problem has been detected, the first priority should be to contain the problem, and prevent shipment to the customer. If the product has already shipped, the customer needs to be notified for the organization to avoid further liability.

Root-Cause Analysis

The key to resolving a problem is identifying the true root cause or cause(s). Don't be afraid to ask the basic WHY? five times. (Of course, everyone knows it was the operator's fault.) My
(cont. on p. 2)

CHAIR'S CORNER

BY DOUG HAMILTON

Introduction and looking ahead...

My name is Doug Hamilton and I am the new Software Division chair. I have been the chair for the CSQE Exam for many years and have turned over the reins to a very qualified committee. I am an executive with Accenture in the State and Local Government Operating Unit with responsibility to work with project teams to implement the practices of the Capability Maturity Model Integration. Sometimes it feels like I am the quality police, but the challenge is to help people embrace the concept of quality and deliver on time and on budget.

Software is a fascinating industry we work in since everything

changes so rapidly. The way I stay up to date is through my volunteer activities with ASQ. I always learn something at CSQE workshops and any ASQ meeting I attend by hearing about the experiences of other software quality professionals. Our volunteers come from many industries, geographies, and backgrounds so if you are interested in helping, let me know. We can always use some new ideas and fresh energy !!!

The 14th International Conference on Software Quality is also a great opportunity to learn, talk to other software quality professionals, and establish professional contacts. The conference will be held March 21-23, 2005, in Orlando. I hope to see many of you there. For more information, visit <http://www.asq.org/softwareforum/conferences>.

I look forward to leading the Software Division the next two years. Please pass along any ideas you have for improving the division and for making it more valuable to our members.

CORRECTIVE ACTION RESPONSES

CONTINUED

favorite answer that is offered during this interview is, "I didn't know." There may be several underlying causes for this answer: a new operator, a change in procedure, or another "rush job" circumventing the system.

Permanent Actions

The process should be reviewed to arrive at a solution for correcting the root cause. This review should engage the seven basic quality tools. The solution may involve longer term planning, requiring milestone dates, capital justification, training, and/or approval from the customer. It is good to review progress in management review to assure accountability after the Interim Actions have "stopped the bleeding."

Verification

Perhaps in their haste to close the action, or willingness to trust the word of colleagues, most organizations find closure in just having taken the corrective action. Checkpoints in the process should be created to verify effectiveness. This could be accomplished by inspection, dock audits, internal audits, and/or measurement. It has been my experience that verification should take a period of at least three months, because sometimes it takes longer to incorporate procedural changes that involve people (which all organizations have!).

Control

If mistake proofing was not part of the solution then a measurement to detect the root cause early should become part of

the system. A procedural change should become part of the system by updating the work instruction and training for accountability. Consider putting a reaction plan in place should the problem recur.

Prevention

Very few organizations reach this step. For example, all the above steps are completed, yet the problem returns six months later. Perhaps, a new operator shows up who may have been qualified through on-the-job training without verification of their competency. Or the filter was replaced as part of the solution, but it is dirty again and hasn't been placed on the preventive maintenance schedule.

Conclusion

With organizations cutting back, they cannot afford to subsidize fire-fighting. It is anticipated that this Corrective Action Response Checklist will assist organizations in making the permanent action part of the system for effective closure. This one's for everyone who ever said to me during an audit—"Just tell me what you want me to put down!"

Robin Dudash currently owns her own company which conducts consulting for ISO 9001 and sector-specific quality system development, training services, and internal quality auditing services. She is certified by ASQ as a quality manager, quality engineer, reliability engineer, and software quality engineer. She is also a subcontract lead assessor for a registrar. Dudash has degrees in computer science and applied mathematics, and a master's degree in business administration, concentrating in finance, from the University of Pittsburgh. She may be contacted at www.iqps.net.

Corrective Action Response Checklist

Submit your response after you have completed all questions.

Complete

Define the Problem

Does the problem description identify:

- What is wrong with what?
- Where the problem was first seen?
- When was the problem first seen?

Have you considered what the problem is not?

Have you investigated whether the problem has been seen before or since this problem was first reported?

Interim Actions

Have all potential locations of defective product been included in the containment plan? (production floor, inventory, distribution center, in-transit, customer locations)

Does the containment plan protect the customer against further escapes until a permanent corrective action can be implemented?

Does the customer need to be contacted?

Root Cause Analysis

Have you identified the most relevant potential cause(s)?

- was man, machine, method, materials, and environment considered?
- were relevant data gathered in determining cause(s)?

Have you asked 'WHY' 5 times of the identified cause to determine the root cause?

Can you turn the problem on and off by introducing and removing the suspected root cause?

Does the root cause explain all we know about the problem description as described in Step 1 (what/where/when)?

Permanent Actions

Has a plan been developed that includes specific milestones and people responsible for implementation?

Have error-proofing techniques, preventive measures, and/or visual aids been considered?

Verification

Have you developed methods to verify that the corrective action eliminates the root cause over at least a 3-month period (audits, measurement)?

Is there evidence that the permanent corrective action totally eliminates the defect associated with the root cause?

Control

Have you considered instituting measures or inspections such that the problem does not repeat?

Have the changes associated with the corrective action been documented in work instructions, specifications, drawings, and/or procedures to institute this change?

Have all appropriate personnel been notified and trained on the change?

Has a reaction plan been established if problem should recur to contain problem?

Are the controls in place to assure the corrective action does not produce undesirable results?

Prevention

Has the new change become part of the training for new hires?

Has the change become part of preventive maintenance?

Have you investigated whether similar nonconformances could be produced in other products, operational processes, or locations?

Have changes been made that will prevent similar nonconformances from occurring?

Note: "Told the operator to be more careful" does not satisfy Control.

www.iqps.net

AEROSPACE SOFTWARE QUALITY PANEL

14th INTERNATIONAL CONFERENCE ON SOFTWARE QUALITY

ORLANDO, FL
March 21–23, 2005

“The Future of Software Quality”

Michael Kress—Moderator
Boeing Commercial Airplane
Immediate Past Chair,
ASQ Software Division



The 14th annual International Conference on Software Quality proudly announces an event that should capture the interest of everyone in the aerospace industry. The conference will include a panel discussion featuring members of the aerospace industry, Dept. of Defense, NASA, the Federal Aviation Administration, and academia. Invited panelists include representatives from Carnegie Mellon University, Lockheed, Boeing, Honeywell, FAA, NASA, the DOD, and other aerospace organizations. The panel will deal with issues of the day that are changing the way software-supported systems are built today. Rather than the legacy “build from scratch,” Requirements-Design-Code-Integrate life cycle, systems today are “assembled with previously used “components, including modified and unmodified COTS components for applications such as Real Time Operating Systems and TWL (terminal wireless LAN) applications. As commercial and military aircraft become more sophisticated, so do the control processes. Outsourcing of software development to places like India, China, and Singapore are creating new challenges for software quality practitioners and regulatory authorities. Learn the latest collaborative efforts being undertaken by the regulatory authorities and the AAQG/EAQG. Avail yourself of the opportunity to be part of the discussion. Topics such as the impact of FAA Order 8110.49—FAA expectations for integrated modular avionics, complex hardware, database control, control of software changes, field loadable and user modifiable software, COTS RTOS research, AAQG standards, and a host of other topics will be discussed.

Topics and questions such as the following will be discussed:

“With the proliferation of COTS and other reused software components in today’s systems, what do you see as the greatest challenge to software quality practitioners and how do you feel they should be addressed?”

Aerospace software standards and guidelines (AS9006/AS9005) are interpretive of AS9100 for software. The EAQG is currently working on a blending of these documents into one risk-based standard for all software. What are your thoughts on a “blended” or “merged” standard?”

The CMM is being sunsetted. The SEI CMMI is gaining steam in some circles as either a recommendation or a requirement by acquirers. What are your thoughts on the

effectiveness of the CMMI? Do you see it as a one-size-fits-all framework for process maturity for all software developers regardless of size, complexity, and criticality of their products?”

There is a new DOD scholarship program on information assurance covering:

- *System/network administration and operations*
- *Systems security engineering*
- *Information assurance systems and product acquisition*
- *Cryptography*
- *Threat and vulnerability assessment, including risk management*
- *Web security*
- *Operations of computer emergency response teams*
- *Information assurance training, education, and management*
- *Computer forensics*
- *Defensive information operations*

How do you see traditional software quality (design reviews, code inspections, walkthroughs, testing, defect containment/prevention, six sigma, etc.) changing if at all to accommodate the emergence of these topics?”

How is “outsourcing” of software affecting operations that you have responsibility for? How does increased outsourcing affect the quality and conformity of software products both deliverable and nondeliverable?”

These questions and others from you, the attendees, will be discussed in the hopes of helping all of us prepare for advancing technologies and methodologies for developing software in the future. Be sure to visit our Web site at <http://www.asq.org/softwareforum/conferences> for a complete brochure on the conference program.

FDA COMPLIANCE CORNER

BY DAVID WALKER

This column provides a concise update each quarter on computer validation subject matter. The goal of this column is to provide valuable information to Software Division members employed in FDA-regulated industries such as medical devices, laboratories, clinical research and development, and manufacturing of food, drugs, and cosmetics.

As expected, risk management is heating up in all sectors of the FDA-regulated industry. Age-old, proven techniques such as Hazard Analysis, HACCP, FMEA, FTA, HAZOP not only assist in safety management, but provide guidance in prioritizing work.

“Should I write a test plan for using this off-the-shelf software?”

“How much documentation does this test fixture need?”

“We only have one more week. Where should we focus our tests?”

Risk analysis can provide answers to these questions. Qualitative approaches require expert judgment regarding severity and probability. In the end, testing can verify that judgment.

Must Reads:

ISO 14971: Risk Management—Part 1: Application of Risk Management

FDA Guidance: General Principles of Software Validation

FDA Guidance: Guidance for Industry, FDA Reviewers, and Compliance on Off-the-Shelf Software Use in Medical Devices

IEC 60601-1-4: Medical Electrical Equipment—Part 1: General Requirements for Safety-4. Collateral Standard: Programmable Electrical Medical Systems

Great Sites:

Software CPR

A collection of Searchable Software 483s.

<http://www.softwarecpr.com/warningletterframepage.htm>.

Yahoo CFR21 Part11 Discussion Group

Excellent discussion of various computer validation topics, primarily e-records & sigs

<http://groups.yahoo.com/group/21cfrpart11/>.

Please send me more great stuff to share in this column; send to David.Walker@Stryker.com.

INSIGHTS FROM AN ASQ EDUCATION CHAIR

BY ROBIN DUDASH

Through the last seven years, the ASQ Education Program has certainly changed. But one thing hasn't changed. As the education chair for Pittsburgh, I have always enjoyed helping people, whether it's giving advice on certifications, finding a training class (even if not with ASQ), or answering general ASQ questions. With that in mind, I would like to offer the following information, which may enable your organization to be more effective.

Education Committee Operations

Looking back, my first task as an education chair was to document the policies by which the Education Committee would operate. Procedures are reviewed and approved by the Education Committee, instructors, and Executive Board. These procedures are still in effect today. Subsequent revisions are approved by the group, and all changes are documented in a revision log.

Education Procedure

This procedure describes:

- Education committee, formation, and planning
- Instructor qualification and evaluation
- Course qualification and evaluation
- Course certificate qualification and issue policy
- Payments and discount policies
- Expenses reimbursement policy.

The first few years as chair require hands-on program operations, such as taking registrations and receiving payments.

However, a career change for me meant significant traveling. That would mean that students had to leave messages on an answering machine. The thought of students and other potential ASQ clients leaving messages—as their *first contact* with ASQ—was unacceptable. After much discussion and thought, the services of course registration and payment were subcontracted, thus freeing my time to manage the group, rather than do it all. To effectively communicate the requirements of the Education Committee, a draft of an education signup procedure—which proved to be very beneficial in training the subcontracted registration service, and even better, in organizing volunteer response—was implemented.

Education Signup Procedure

This procedure describes:

- Signup steps
- Confirmation of registration notification
- Payment steps
- Cancellation policy and steps
- Refund steps
- Certificate distribution
- Instructor contact information.

For a nonprofit organization, finding a cost-effective service proved to be no easy task. ASQ Pittsburgh was very fortunate to find the Engineers' Society of Western PA. (ESWP). Through a short learning curve, the ASQ/ESWP provided the section and its members exceptional personal service in registering for courses and dinner meetings. David Teorsky and his staff are very familiar with this effort. David Teorsky may be reached at 412-261-4300 or d.teorsky@eswp.org.

Education Programs

The current education program has certainly changed over the last seven years. Class size and the number of courses have diminished because of more competition from external training, consultants, and educational institutions. However, the certification courses remain strong, as local sections continue to provide cost-effective solutions for those individuals seeking certification training courses. In the Pittsburgh area, this solution can certainly be attributed to the excellent instructors and their exam pass performance rates—Dick Kish (CQA), Nick Skovran (CQE), Teresa Whitacre (CQT/CMI), Jeff Otte (CQManager), Robin Dudash (CSQE), and our most recent instructor, Brad Nelson (CRE).

In particular, the Certified Quality Manager refresher course experienced a big reduction in attendance when ASQ headquarters announced the self-study program. Jeff Otte assisted the ASQ Pittsburgh area with CQManager refresher courses. Our course also takes advantage of the distinction of using certified materials from ASQ HQ that can be taught only by approved instructors. These instructors have attended a class taught by ASQ and have the approval of their section or division.

In another case, the Certified Quality Auditor refresher course experienced a small reduction in students, due to competition from—*just about everybody*, in particular the RAB Internal Auditor Certification from Dick Kish. Although the student base has eroded, this class has remained strong thanks to Kish's teaching abilities and greater than 85% exam pass

(cont. on p. 6)

INSIGHTS FROM AN ASQ EDUCATION CHAIR CONTINUED

performance rate. From a personal perspective, I did not pass the CQA exam the first time, opting for the self-study method. I sadly discovered that “what you do internally at work” and “what is commonly accepted as the right way” can be two different exam answers. Instructor interaction, again, proved very important for the CQA exam. This interaction is also true for all exams. The instructors can provide practice questions and detailed explanations—so the students learn how to APPLY the information, not just pass and exam.

A few years ago the Education Committee combined the Certified Quality Technician and Mechanical Inspector refresher courses. With the reduction in enrollments, neither course had enough students to run on its own. We decided to take advantage that the instructor, Teresa Whitacre, has been certified in both areas, and that the body of knowledge for both certifications is similar. This decision turned out to be a win-win for all concerned. The CQT/CMI refresher course also continues to be one of the more popular on-site courses. It is worth noting that Whitacre was our first instructor to offer an alternative to the classroom experience. She offers a correspondence version of the CQT/CMI for long distance learning. Several individuals have taken advantage of this opportunity.

Internet

With the steady increase of Internet usage, the importance of an updated Web site has been a prominent communication tool for the education program. The ASQ Pittsburgh Section Web site is also capable of accepting registrations and credit card payments online. This function is tracked and processed through ESWP and coordinated with us. This feature has been extended such that members can now register electronically for the monthly dinner meetings.

A few years ago, the Certified Software Quality Engineer (CSQE) refresher course was placed online. Noting the infancy of this certification and availability of competing courses, the opportunity was taken to offer this course in its entirety over the Internet (visit www.iqps.net). This course is the same successful course that has been publicly offered, over the last six years. The public course has enjoyed a 95% exam pass rate performance rate, since the course's inception. The ASQ CSQE certification competes with several existing software certifications. However, those existing certifications are very knowledge specific—i.e., testing, etc. The ASQ software certification presents a more comprehensive body of knowledge to promote the management and improvement of the software development process. The ultimate key to success for the CSQE certification will be marketing.

Future—Marketing, Marketing, Marketing

The future of the ASQ education program will rely on ASQ headquarters' (as well as other prominent business groups) ability to market not only the importance of employing certified individuals, but also on promoting quality based methodologies. With recent layoffs and cost-cutting measures, I think it is safe to say that quality has taken a step back. There

are still a few companies where quality is considered an investment to make the company cost-competitive. These companies know that quality is NOT an expense. These companies should come out of the recession even stronger, and will be ready to invest in training for new hires. Several Pittsburgh companies now require the Mechanical Inspector or Quality Technician certifications to qualify their inspectors and QA staff.

Furthermore, the ASQ organization needs to build awareness with Generation X. These are the up and coming individuals who may or may not be aware of, or appreciate, the quality methods, networking, and education that ASQ has to offer its members. To help address this issue, the section participates in the Young Engineers' Society Conference every year.

The Pittsburgh Education Committee has taken a few steps of its own in marketing—steps I believe have assisted in maintaining a successful program. I wrote a few articles. In particular, an article “Why Should I Be Certified?” communicating the importance of certification to both those who are concerned about/who have already lost their jobs, and to companies on the importance of hiring certified individuals. We, as a section, have also become a knowledge resource for acquiring state funding for on-site training. Our marketing efforts have made companies aware that our courses are eligible for state funding. Of course, the on-site courses are tailored toward the individual company's needs. This was most recently evidenced for the Certified Reliability Engineering Refresher course where the actual application of reliability tools for a product being designed was part of the classroom activities.

Conclusion

Local ASQ education committees offer certification training and professional learning experiences for individuals as well as companies. These courses are taught by recognized, certified leaders in their field. Certification is your way to have your skills and expertise recognized by your professional peers and by your employer. Given the memorable tire recalls (and the proliferation of product liability lawsuits) drives home a seemingly mundane truth as only a crisis can—QUALITY STILL MATTERS.

Robin Dudash has been an ASQ Senior member since 1994 and the ASQ Pittsburgh education chair for the last eight years. She has also taught the CSQE refresher course based on the ASQ BOK. Dudash has degrees in computer science and applied mathematics, and an MBA, concentrating in finance, from the University of Pittsburgh. Dudash holds CQManager, CQA, CQE, CRE, CSQE, QS-LA, and QS-9000 certifications. She may be contacted at www.iqps.net and iqps@aol.com for more information on the resources mentioned in the article.

STANDARDS CHAIR REPORT

BY SCOTT DUNCAN

This column is written to report on the IEEE Software and Systems Engineering Standards Committee (S2ESC—Executive Committee and Management Board) meeting in Ft. Lauderdale, FL, in mid-August and the US SC7 TAG meeting in Pittsburgh, PA, at the Software Engineering Institute (SEI) in mid-September.

IEEE S2ESC Meeting Notes

The New Name and Department of Defense Software Assurance

As reported in a previous column, the SESC voted to change its name to S2ESC in February, adding “and Systems” to its name. One of the primary reasons for this was to address the fact that the committee covers standards for software development as well as “systems containing software.” An important aspect of this is to acknowledge the close cooperation between S2ESC and the DoD’s latest efforts in software assurance. Joe Jarzombek is deputy director of software assurance and the DoD liaison to the S2ESC Executive Committee. Discussion at this meeting covered the DoD initiative from the perspective of safety and security. As taken from the official meeting minutes, activities included would be:

- Establish a process to prioritize assets that require high assurance
- Establish a threat assessment capability focused on software suppliers
- Offer security evaluation criteria for supplier SW development capabilities
- Develop software assurance guidelines for high assurance system engineering
- Institutionalize an enhanced risk management process to address risks attributable to software vulnerabilities and threats
- Provide explicit authorities to exclude untrustworthy suppliers
- Invest in software evaluation tools and in engineering capabilities to:
 - Effectively diagnose and mitigate software risks and make software security more operationally compatible/supportable
- Establish DoD executive agent for software vulnerability and mitigation and discovery
- Establish a federated, national High Assurance Software Tech and Eval. Center
- Foster a work force culture that demands software integrity: Integrate software security in:
 - IT acquisition and PM education and training.
 - Coordinate with standards bodies and academic institutions.

One consideration was the comprehensiveness of evaluation of software: What does software do that it does not advertise as a feature? A presentation, by Bill Beckwith, on software evaluation and associated assurance levels was given. (Also see <http://csrc.nist.gov/cc/> on Common Criteria for Security Evaluation.) Using methods with increasing rigor, up to and including formal proofs, levels could be assigned to software based on such an evaluation. There were also associated comments on the need for style guides for safe and secure subsets of programming languages, i.e., subsets more safe and secure than the entire language. (For example, ISO 15942 addresses Ada’s™ use in critical systems.)

Another aspect of the discussion included software maintenance, which Jarzombek mentioned he preferred to see referenced as “sustainment” because of that word’s broader context for the entire life cycle of a system. It was recommended that IEEE 1219 and ISO 14764 need to merge as maintenance standards.

It was also noted that Jarzombek will continue as chair for IEEE 1062 (an RP on software acquisition) though it is an area that is no longer his main work focus in the DoD.

Revision of IEEE 730 on Quality Assurance

The revision of this document will begin sometime next summer. The anticipated chair for this work is Ron Dean of Galaxy Scientific. This will be a fine opportunity for ASQ Software Division members to be actively involved in the work on a standard.

IEEE Online Balloting

Early in 2005, the IEEE Standards Association will begin online balloting of and commenting upon standards. The new system, known as MyBallot™, will address registration for balloting groups as well as submitting ballots. Working group chairs will be able to review ballot status and comments through this system as well.

Study Groups/Liaisons

The High Integrity Systems Study Group, led by Deborah Sparkman, will develop a detailed strategy to include a suggested document outline for an expanded IEEE 1228 revision. A proposal is expected at the S2ESC’s October teleconference.

John Walz, of the Quality Management Study Group, presented a summary on the progress of the group. A presentation had been made to TC176, which ASQ administers to handle the ISO 9000 series, and was received well by that TC with regard to cooperative review and comment on IEEE’s version of 90003. Recall that the ISO/IEC 90003 is a revision of ISO 9000-3 which became an SC7 document but required the number change.

Mary Beth Christis, SEI liaison, suggested that S2ESC should contact SEI partners (i.e., assessment and training consultants) regarding use of IEEE standards to support process improvement.

S2ESC Strategic Planning

How does S2ESC best market its standards collection? What’s the business model for getting people interested in using the standards?

S2ESC will check the feasibility of a student-watermarked version of the collection and draft a business case with other possible incentives for students who purchase the collection.

S2ESC needs to form a study group to research and pursue the translation of IEEE standards into other languages as IEEE CS is currently the only transnational computer society.

Agile Methods Guidance for Acquirers

This project (P1648) is about to start drafting the actual content of the Recommended Practice.

Those who wish to be involved with the editorial effort, as opposed to just balloting, need to contact me now to join the Working Group if you have not already done so and formerly submitted a roster entry.

Other Items

IEEE Book Series—Roger Fujii gave a presentation. The series is moving ahead, slowly but surely. John Horch is working on the Software Quality Assurance volume and we have offered the division’s help in reviewing it. Would our division want to propose volumes on software methodology design or software quality engineering?

(cont. on p. 8)

STANDARDS CHAIR REPORT CONTINUED

IEEE SE-Online Portal—This Web site has been implemented but is in need of content on various topics.

CASE Standards Adoption—Carl Singer, who chairs the IEEE 1775 series on CASE tool interconnection, will investigate adoption of ISO/IEC 14102 and 14471 on CASE tool evaluation and selection.

International Certification of Software Developers—Steve Seidman will chair a study group on this topic and certification compatibility. The focus will be on ISO 19759, the international adoption of the Guide to the Software Engineering Body of Knowledge (SWEBoK).

The official minutes of this meeting, and some of the presentations given, can be found at http://standards.computer.org/sesc/s2esc_excom/minutes/2004-08/Minutes-Onsite-MBExCom-2004Aug.htm.

US TAG Pittsburgh Meeting Notes

Last minute family emergencies and work demands plus the loss of three members (i.e., ARINC, Medtronics, Northrop Grumman) resulted in lower attendance at this meeting compared to others in the recent past. There was, however, no lack of activity in a variety of areas.

New Work Items Proposed to SC7

One NWI was to develop a guidance document on applying ISO 9001 to system engineering as ISO 90003 now exists for applying it to software. Another NWI was to develop a meta-model for software development methodologies based on an Australian definition of “language.”

A third NWI had to do with developing a data quality model along the lines of the product quality model in ISO/IEC 9216.

Task Groups (and related international Working Group topics)

TG2—Work is being done on the CD for ISO/IEC 15289 related to system and software information items. There is an issue as to where processes for user documentation need to go. WG2 handles documentation as a product, not a process, but WG7 and WG10 have no current place for this. Perhaps it should simply be regarded as a subset of the whole documentation process.

TG6—The New Work Item proposal on a data quality model seems particularly targeted to e-government and e-commerce data. Standards do exist internationally and in the United States on this topic in specific domains (e.g., aerospace, medical records, financial transactions) that could affect any SC7 work. The U.S. government has initiatives in this regard, including working through IEEE on a standard related to voting machines/data. There would seem to be interest in the topic, but perhaps not from current TAG members. [Are there division members with an interest in this topic (i.e., as an international standard)?] Other WG6 work is the continuing effort to develop the SquaRE (ISO/IEC 250nn) series to combine/replace 9126 and 14598. There are also still issues with ISO/IEC 12119 related to COTS software “testing” and the demands placed on user packaging and documentation with regard to their use as testing “specifications.”

TG7—Work continues on the very significant harmonization effort between 12207 and 15288. As these documents change, there will be impacts on others such as the 15504 series and standards for user documentation. Coordination with WG10 and WG2, in particular, become important in this regard.

TG9—Work is being done on a variety of items related to software risk, safety, security, and dependability issues. Much of the material is being coordinated with related IEEE standards and work in these areas.

TG10—ISO/IEC 15504-5 (the exemplar model) still appears to be two years from completion. The rest of the document set should be done by early 2005. The “normative” part (15594-2) already exists as an IS, for example. WG10 has two proposals to develop a New Work Item to add the concept of “Organizational Maturity” to its work program. One seeks to add a “staged” model to take 15504 assessment profiles and produce an organizational “level” while another covers a broader definition of what “organizational maturity” might mean. If WG10 could do the latter for organizations in general, not just software development, it would be significant. As 15504 is not limited to software process assessment, adding “organizational maturity” would require a broad definition of what that means. Existing organizational models like the Baldrige Award and EFQM (an organizational quality model used in Europe), as well as others, address this, but go far beyond the product development domain.

TG22—WG22’s work is to develop a new SC7 vocabulary starting with all existing terms in SC7 materials plus IEEE’s vocabulary standard (610.12), which has been offered to SC7 for this work. There was some discussion at the TAG meeting of “ontologies” that exist to handle vocabulary and the ISO 9000 annex on vocabulary. There is a target (but not absolute) date of April 2005 for a first version of the new vocabulary. It will be available in print as all other ISO standards, but the “living” version will be a database (of some sort) accessible through the Internet.

Other Items

TR 15846 (Configuration Management) has been withdrawn and SC7 will refer to IEEE 828 instead.

As always, those interested in any of the topics mentioned above, or other standards-related issues, can contact Scott Duncan by e-mail (sduncan@computer.org or sduncan@acm.org or scott.duncan@gmail.com or softqual@mchsi.com) or phone (706-649-2345, weekdays, 706-562-1256, evenings and weekends).

GLAZER ELECTED ASQ FELLOW

Joel Glazer was elected Fellow by ASQ’s board of directors and was thus recognized as having achieved professional distinction and preeminence in the technology, theory, education, application, or management of quality control. His citation reads as follows:

“For outstanding contributions and support of ASQ, the Baltimore Section, and the Software Division, with particular recognition of efforts to found and mentor that division; for continuing support as officer and



advisor to the Baltimore Section; and for expertise and willingness to train and mentor in the emerging field of Software Quality.”

Joel Glazer is a fellow engineer in the Software and Development Quality Engineering group of Northrop Grumman ES. From the central Asian Republic of Kazakhstan—through post-WWII Europe’s Displaced Persons camps and Israel—Glazer came to the United States at the age of 17. He earned a bachelor’s degree in aerospace engineering from the University of Maryland, and master’s degrees from Johns Hopkins University in management sciences and computer sciences. Glazer was instrumental in establishing what

has become the ASQ Software Division. He assumed leadership roles in the ASQ Baltimore Section and has participated in the Software Division’s Region 5 council. He has earned four ASQ certifications: quality auditor, quality manager, software quality engineer, and reliability engineer. Glazer’s broad employment experience includes Martin Marietta, Fairchild Hiller, Computer Sciences Corp., and E.G.G. With these companies, his projects ranged from aircraft design, rocket and space probes design, space travel, orbital dynamics, and earthquake predictions. As a software quality engineer, Glazer has participated in establishing national and international software standards and served on several national committees.

MARK YOUR CALENDARS FOR THE 14TH INTERNATIONAL CONFERENCE ON SOFTWARE QUALITY (ICSQ)

This year’s Software Quality Conference provides a forum for individuals and organizations seeking technologies, concepts, and techniques to improve the quality of their software products, processes, and services, as well as networking and learning opportunities. Attend any of the offered 24 sessions including a special Aerospace Software Quality Panel addressing “The Future of Software Quality.”

14ICSQ Overview

- Sunday—Certification Exams
- Monday—Tutorials/Courses
- Tuesday—Conference Sessions
- Wednesday—Conference Sessions
- Thursday—Courses
- Friday—Courses

Full program available at
www.asq.org/softwareforum/

Where: The Wyndham Orlando Resort in Orlando, Florida

When: Conference, March 22-23, 2005

To Register:

- Fax or mail your registration form in this edition of *Software Quality*, or
- Log on to www.asq.org/softwareforum/ or
- Call 800-248-1946.

Keynote Speakers

Mark Paulk

“Best Practices Sourcing”

Linda Westfall

“Communicating Our Way to Better Software”

Conference Sessions

Session A

Project Risk Management

James A. Ward

Session B

Measurement Adventure

Carol Dekkers

Session C

Risk Based Software Testing T

Theresa Hunt

Session D

Comparing the CMM, CMMI, and Related ISO Standards for Improvement and Measurement

Mike Kress

Session E

Software Quality and Change Management

Frank Voehl

Session F

Methods Panel

Scott Duncan

Session G

Cost of Quality & Return on Security

Taz Daughtrey

Session H

Systems Engineering and Systems Management Minimum Process Set for Mission Success

Mike Dimario

Session I

It’s Still the Requirements

James Ward

Session J

Evolution of Software Quality Assurance

Michelle Pierce

Session K

Tricks for Designing Test Cases

Karen Bishop-Stone

Session L (3-5pm)

Aerospace Panel—The Future of Software Quality

With Mike Kress, Michelle Pierce, Mark Paulk, Dave Zubrow, Joe Jarzombek, Martha Wetherholt

Session M

Management’s Role in Achieving Predictable Software Development

Steve Rakitin

Session N

Our Path to a Quality Management System

Sue Carroll-McGrath

Session O

Requirements and Business Rules

Karen Bishop-Stone

Session P

Identifying Risks to System-of-Systems Integration Efforts

Dave Zubrow

Session Q

Six Sigma Software

Richard Biehl

Session R

10 Things Every Software Tester Should Know

Mike Kress

Session S

Good Enough Software

Scott Duncan

Session T

Educating Software Quality Professionals

Trudy Howles

Session U

Exhibitor Presentation

The Westfall Team

Session V

Achieving CMMI Level 4

Doug Hamilton

Session W

Traceability in Data Transaction Algorithms

Evelyn Richardson

Session X

Modeling CMMI Process Improvements

Tony Timbol

www.asq.org/softwareforum/

CERTIFIED SOFTWARE QUALITY ENGINEERING QUIZ

1. Put the following training needs analysis tasks in the order in which they should be performed.
 1. Create a training plan to address identified deficiencies
 2. Determine the knowledge or skills required to perform the job activities
 3. Determine what tasks are required to performed the job
 4. Perform a skill/knowledge gap analysis
 - A. 1, 3, 2, 4
 - B. 2, 1, 3, 4
 - C. 3, 2, 4, 1
 - D. 4, 3, 2, 1
2. An audit report includes all of the following EXCEPT the:
 - A. detailed audit finding.
 - B. corrective action plans.
 - C. standards used for the audit.
 - D. scope and purpose of the audit.
3. Which of the following would most likely have a B to E system architecture?
 - A. An intranet site used to provide personnel with access to quality management system documentation
 - B. An Internet site used to provide information about their products and services to potential customers
 - C. A software product that provides transaction-based applications for inventory control
 - D. A relational database product that provides customizable information system capability
4. Earned value metrics are used to measure the variance between estimates and actuals for which of the following two project parameters?
 - A. Product functionality and product quality
 - B. Productivity and defect density
 - C. Task effort and task duration
 - D. Project cost and project schedule
5. Which of the following measures the extent to which a software module performs a single task or function?
 - A. Coupling
 - B. Complexity
 - C. Cohesion
 - D. Completeness
6. Which of the following would NOT be considered when determining the verification and validation tasks that should be iterated as a result of corrective maintenance done on a software product?
 - A. The changed software components' level of coupling
 - B. The priority of the defects that were corrected
 - C. Schedule and cost constraints for the maintenance project
 - D. The required integrity level of the software product
7. The revision number of a software component should be incremented when:
 - A. a new software build is created that includes that component.
 - B. new functionality is added to that software component.
 - C. a corrective change is made to that software component.
 - D. that software component is released to the end-users.

Answers can be found on p. 12

FROM THE REGIONS

Region 4 Chris FitzGibbon

During the last two years as the ASQ Software Division regional councilor for Canada, I have tried to use this column to provide members with information on relevant events in Region 4. There has been no shortage of interesting activities ranging from world-class conferences to informal gatherings of software quality professionals. If you have information that you would like to share with fellow **ASQ Software Division** members, or you would like to get involved with the division, contact me at chris@orioncanada.com or 613-563-9000. I would love to hear from you.

Conferences & Events

The conference not to miss is the **14th International Conference on Software Quality (14ICSQ) March 21–23, 2005**, in Orlando, FL. A very strong lineup of speakers and presentations make this a conference you won't want to miss. You can review the conference program at www.icsq.org. The prospect of spending a few days in sunny Orlando in March should be quite attractive.

While you are budgeting for conferences to attend in 2005, you will also want to consider the **ASQ World Conference on Quality and Improvement**. It replaces the ASQ's **Annual Quality Congress**, and remains the premier conference for quality practitioners. The conference will be held in Seattle, WA, May 16-18. There will be a software track and many other excellent speakers. More information is available at the ASQ Web site: <http://www.asq.org/ed/conferences/cqi/2005/>.

Calgary, Edmonton, and Vancouver

The Calgary **IEEE/ASQ Discussion Group for Software Quality** has several events scheduled for this fall. Topics include "Mixing AGILE and Traditional Approaches," "The Role of the QA Manager," and "Criteria Based OO Design Evaluation." The group meets every two weeks at the Calgary campus of the DeVry Institute from September through May. All sessions are free and advance registration is not required. Additional information is available from their Web site, www.software-quality.ab.ca.

Recent meetings of the **Software Quality Assurance Vancouver User**

Group (VanQ) included presentations on Design for Six Sigma with ISO 90003:2004 (ISO 9001 for software engineering) and ISO 9126 (software quality characteristics). Contact me for copies of the presentations. VanQ meetings are held at the Burnaby campus of the British Columbia Institute of Technology. The schedule of events is available from their Web site: www.vanq.org.

Toronto and Southern Ontario

The **Toronto Association of Systems and Software Quality (TASSQ)** holds dinner meetings the last Tuesday of each month at the Sheraton Centre Toronto Hotel across from City Hall. Information on upcoming events is available at www.tassq.org.

The **Toronto SPIN** hosted a panel discussion September 9 on the reasons why product and service quality appear not to be improving despite the increased use of quality-driven models. The afternoon session in downtown Toronto was interesting. Additional information is available under "Events" on the Toronto SPIN Web site: www.torontospin.com.

Ottawa, Montreal

The calendar of events for the **Ottawa Software Quality Association** (www.osqa.org), the **Ottawa SPIN** (www.spin.org), and **Montreal SPIN** (www.spin-montreal.org) should appear on their Web sites soon.

Region 6 Tom Gilchrist

If you're in the Seattle area on the third Thursday of every month (except December), SASQAG holds monthly public meetings in the area at Attachmate in Factoria. SASQAG also supports certification and study groups. If you are in the area and want to attend, please look at www.sasqag.org for upcoming events, directions, and meeting time.

If you have information on local software quality and testing events in your area of Region 6, please send them to me for our events calendar. I am looking for more information about activities and events in California. Visit <http://www.tomgtomg.com/asq6> for information on events around Region 6.

Tom Gilchrist, Region 6 ASQ Software Division, tomg@tomgtomg.com.

Region 10 Nancy Poma

It is time to start planning for fall conferences, refresher courses, and monthly meetings—all with a software quality focus.

If you want to invest in your own professional development, keep reading to see if any of these activities interest you.

CSQE Refresher Sessions—The ASQ Greater Detroit Section 1000 offers a CSQE refresher course, and more information is available at www.asqdetroit.org.

GL-SPIN Monthly Meetings—GL-SPIN meetings alternate between U-of-M Dearborn and Oakland University, and more information is available at www.gl-spin.org.

Send me information on other opportunities and I will pass them along to the rest of Region 10 Software Division.

Region 14 Bill Trest

For information on DFW activities, follow this link:

<http://www.asqfortworth.org/>.

ANSWERS TO THE CERTIFIED SOFTWARE QUALITY ENGINEERING QUIZ

- 1. Answer C is correct.** Training needs analysis starts by defining the job performance requirements and critical job outputs/accomplishments in order to determine what tasks are required to be performed by the individuals to perform the job. The skills and knowledge required by each individual to correctly perform his or her assigned tasks (job activities) must then be determined. A skill/knowledge gap analysis is then performed to determine any major gaps between required skills/knowledge and the skills/knowledge possessed by the individuals who are assigned to perform the tasks. After the gaps are identified, a training plan can be developed to address those gaps. **CSQE Body of Knowledge Area: I.D.3**
- 2. Answer B is correct.** The corrective action plans are created by the auditee's organization in response to the audit report. **CSQE Body of Knowledge Area: II.C.3**
- 3. Answer A is correct.** A company's intranet site used to provide its employees with information is an example of a Business to Employee (B to E) architecture. **CSQE Body of Knowledge Area: III.A.2**
- 4. Answer D is correct.** Earned value compares the Budgeted Cost of Work Performed (BCWP) to the Actual Cost of Work Performed (ACWP) to measure the variance between estimated and actual project cost. Earned value also compares the Budgeted Cost of Work Performed (BCWP) to the Budgeted Cost of Work Scheduled (BCWS) to measure the variance between estimated and actual project schedules. **CSQE Body of Knowledge Area: IV.C.2**
- 5. Answer C is correct.** Cohesion measures the extent to which a software module performs a single task or function. Coupling measures the degree of interconnection among modules in a software structure. Complexity measures the degree to which a system or component has a design or implementation that is difficult to understand and verify. Completeness measures the extent to which a system or component provides a full implementation of the functionality required. **CSQE Body of Knowledge Area: V.B.3**
- 6. Answer B is correct.** The priority of a defect would be taken into consideration along with other factors when determining whether or not to include corrections of a defect in the current maintenance release or defer it to another release. However, once that correction has been made, priority does not have an impact on the level of verification and validation (V&V) iteration. The more coupled the changed software components are, the more those changes might impact other parts of the software product and therefore more V&V task iteration may be required. V&V task iteration is typically risk based where a balance must be maintained between quality, schedule, and cost so schedule and cost constraints must be considered. The required integrity level of the software also impacts this balance. For example, more V&V tasks would typically be iterated for software systems where a failure could potentially impact health or safety than for software that didn't have that level of potential hazard. **CSQE Body of Knowledge Area: VI.A.1**
- 7. Answer C is correct.** A revision is a change to a software entity that only corrects defects and does not impact that entity's functionality. Therefore, the revision number of a software component would be incremented when a corrective change is made. Creating a new software build containing a software component does not cause change to that component. For example, the software can be rebuilt with a set of identical components to ensure repeatability of the build. Adding new functionality to a software component would increment its version number and cause the revision number to be reset to its minimum value (e.g., 03.04 would become 04.00). Releasing a software component to the end-users typically does not impact either its version or revision numbers. **CSQE Body of Knowledge Area: VII.B.2**

OFFICERS

Doug Hamilton, Chair
Accenture
312-693-0308
douglas.b.hamilton@accenture.com

David Walker, Chair-elect
Stryker Instruments
269-323-7700
david.walker@stryker.com

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Nominating Chair
425-717-7038
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703-573-7466
Eva.Freund@nara.gov

Yvonne Kish, Secretary
469-441-6149
yvonne_kish@yahoo.com

Theresa Hunt, Vice Chair Programs
407-834-5825
theresahunt@earthlink.net

Karen Bishop-Stone, Vice Chair
Technology
952-925-1156
karen@testware-assoc.com

Hank Sobah, Vice Chair Membership
Services
412-937-7687
hsobah@innovativesystems.net

CHAIRS & OTHER CONTACTS

Sue Carroll, Examining and
Awards Chair, Journal Editor
SAS
919-677-8000, ext. 17032
Sue_Carroll@Bellsouth.net

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Chair
703-531-6589
evelyn.richardson@ngc.com

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412-341-7926
gregsim@telerama.com

Linda Westfall, Bylaws Chair
The Westfall Team
lwestfall@westfallteam.com

Theresa Hunt, 14ICSQ Chair
407-834-582
theresahunt@earthlink.net

Taz Daughtrey, Liaison Chair
540-568-2778
daughtht@jmu.edu

Patricia McQuaid, World Congress
California Polytechnic State
University
805-756-5381
pmcquaid@calpoly.edu

Carol Dekkers, World Conference
on Quality and Improvement
Track Chair
Quality Plus Technologies, Inc.
727-393-6048
dekkers@qualityplustech.com

Rufus Turpin, Marketing Chair
Carpe Diem Infomatics, Inc.
613-715-9146
rufus@carpedieminfo.ca

Scott Duncan, Standards Chair
706-649-2345
softqual@knology.net

REGIONAL COUNCILORS

Region 1—Eric Patel
RapidSQA
877-749-4586
epatel@rapidsqa.com

Region 2—Jean Burns
Universal Instruments
607-779-7868
burns@uic.com

Region 3—OPEN

Region 4—Chris FitzGibbon
Orion Canada, Inc.
613-563-9000
chris@cyberus.com

Region 5—Joel Glazer
Northrop Grumman ES
410-765-2346
joel_glazer@md.northgrum.com

Region 6—Tom Gilchrist
The Boeing Company
425-234-4865
tgilchrist9@attbi.com

Region 7—OPEN

Region 8—Michael S. Kiefel
Abbott Laboratories
614-624-7973
Michael.kiefel@abbott.com

Region 9—OPEN

Region 10—Nancy Poma
EDS
248-265-0456
nmpoma@comcast.net

Region 11—OPEN

Region 12—Irv Segal
SysGen, Inc.
847-205-5349
Irv.segal@sysgeninc.com

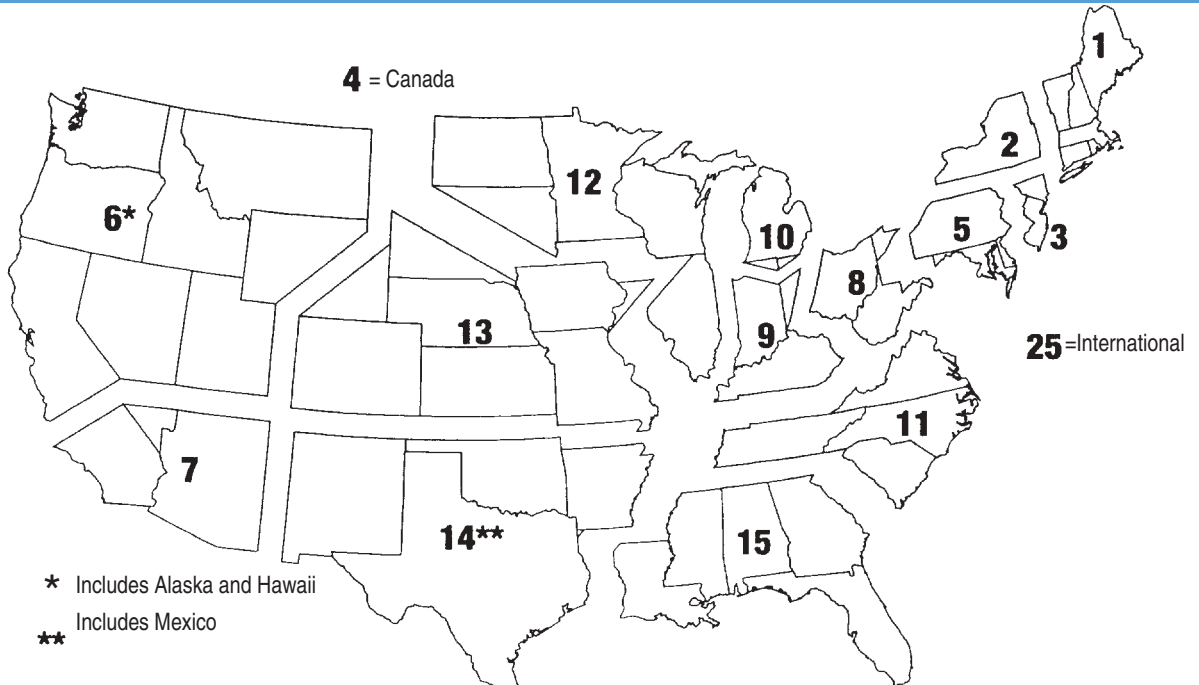
Region 13—Granville Jones
JVJ Enterprises
303-969-0228
granville.jones@att.net

Region 14—W. L. 'Bill' Trest
Lockheed Martin Aeronautics
Company
817-777-7598
bill.l.trest@lmco.com

Region 15—Mark Neal
Alcon Laboratories, Inc.
407-384-1659
mark.neal@alconlabs.com

Region 25-International—
Zigmund Bluvband
A. L. D. Ltd
+972-3088-5100
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zigmund@ald.co.il
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Regional Map



SOFTWARE QUALITY

SUBMIT ARTICLES FOR THE NEXT ISSUE OF *SOFTWARE QUALITY* BY FEBRUARY 14, 2005.

EVELYN V. RICHARDSON
PHONE: 703-531-6589 • FAX: 202-628-0599
E-MAIL: EVELYN.RICHARDSON@NGC.COM

DON'T FORGET TO MARK YOUR CALENDARS

CSQE EXAM

Location	Exam Date	Application Deadline
Orlando, FL, at 14ICSQ	March 20, 2005	February 25, 1005
ASQ Local Sections and International Sites	June 4, 2005	April 1, 2005

EDITOR

EVELYN V. RICHARDSON
Northrop Grumman Information Technology
Federal Enterprise Solutions
voice: 703-531-6589
fax: 202-628-0599
e-mail: evelyn.richardson@ngc.com

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Please circle the sessions you wish to attend. (See p. 9 and conference Web site for list of sessions.) Although you are not bound by these choices, this will provide an expected group size to conference organizers. You will receive a confirmation letter of your registration via the U.S. Postal Service.

Tuesday, March 22, 2005

10:30 am – 11:30 am				
Sessions:	A	B	C	D
1:30 pm – 2:30 pm				
Sessions:	E	F	G	H
3:00 pm – 4:00 pm				
Sessions:	I	J	K	L

Wednesday, March 23, 2005

10:30 am – 11:30 am				
Sessions:	M	N	O	P
1:30 pm – 2:30 pm				
Sessions:	Q	R	S	T
3:00 pm – 4:00 pm				
Sessions:	U	V	W	X

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 \$795.00 - Nonmember

One-Day Registration

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 \$395.00 ASQ Member \$495.00 Nonmember
- (TUT02) Software Testing Techniques – Theresa Hunt
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- (TUT03) Software Document Preparation – Karen Bishop-Stone
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- (TUT07) Software Requirements Engineering – Linda Westfall
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Half-Day Tutorials – March 21, 2005

- (TUT08) 8:00 am – Noon – How to Define Short, Usable Processes
 – Tim Olson
 ___ \$245.00 - ASQ Member/SW Division Member
 ___ \$345.00 - Nonmember
- (TUT09) 1:00 pm – 5:00 pm – Using a Measurement Framework to Successfully Achieve Measurable Results – Tim Olson
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