Quality Assurance Exchange

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U.S. DEPARTMENT OF ENERGY | OFFICE OF QUALITY ASSURANCE POLICY AND ASSISTANCE

HSS

Exchanging ideas and sharing experiences to foster continuous improvement in QA implementation within the Department of Energy.

Quality Software Development and Success Through Project Management and Six Sigma

Background

The following article discusses the Idaho National Laboratory's Advanced Mixed Waste Treatment Project (AMWTP) process improvements in facility availability and cost avoidance through an improved software management process. This information is very positive and highlights a Department of Energy (DOE) project that simultaneously improved quality, reduced project costs, and regained schedule.

In 2005, the AMWTP was experiencing significant operational issues due to the low availability and inadequate performance of key systems utilized in the processing of waste. These issues were largely attributed to the poor quality of the plant automation and waste tracking system software and the high failure rate of software modifications after deployment.

By first analyzing the situation and then using a six sigma process improvement team, a more controlled software management program was developed and implemented. This enhanced program included:

- A system of performance metrics that demonstrated continuous process improvement, which in turn gave plant management further reason to support the enhanced software management process.
- A clearly defined software change process that provided an efficient and consistent workflow and incorporated clear lines of communication between organizational departments.
- A fully functioning test bed capable of simulating plant operations in a non-production environment. This test bed helped to drastically reduce the number of plant stoppages due to software errors by allowing software modifications to be properly tested and refined before deployment. The test bed is also used to provide hands-on training to plant operators in a secure

(Continued on next page)

Director's Note

The Office of Quality Assurance Policy and Assistance (HS-23) began in 2011 with a focus on the revision to Department of Energy (DOE) Order (O) 414.1C, *Quality Assurance*. In November 2009, the Office of Health, Safety and Security (HSS) began the reform effort to streamline requirements and eliminate directives that do not add value to safety and security. DOE O 414.1C, *Quality Assurance*, is on an expedited review schedule. I am happy to report that as of February 11, 2011, DOE O 414.1D has completed the RevCom process. This version of the Order has been streamlined, requirements have been clarified, and where appropriate, requirements that are covered in other directives are simply referred to instead of repeated. I am expecting the issuance of the revised Order by April 2011.

The DOE Quality Council is in the process of finalizing quality assurance (QA) training material for DOE Headquarters employees. Upon issuance of DOE O 414.1D, this training material will be revised to incorporate the clarification of requirements in the revised Order. The training is intended to assist Offices to better understand what QA is, how DOE implements QA, and why QA is important for all organizations within DOE to meet their respective missions. This training is anticipated to be available by August 2011.

Finally, as a reminder, my office's mission is to provide assistance in the areas of management assessments, QA program development, QA program plan reviews, and other QA-related activities. Please contact me, or my staff, for assistance with your QA needs.

– Colette Broussard, Director, Office of Quality Assurance Policy and Assistance (HS-23)

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environment, thereby improving the level of operator training and reducing the occurrence of plant malfunctions due to operator error.

The revised software management process contributed to the AMWTP going from being three years behind the production schedule to three years ahead. During this five-year period, software staff augmentation cost was reduced by 80%, plant malfunction due to software errors was reduced by 80%, and the plant has not had a Waste Isolation Power Plant recertification audit finding in the last four years.

Initial Conditions

Upon assumption of the AMWTP contract in May 2005, Bechtel BWXT Idaho (BBWI) commissioned a Tiger Team to investigate the causes of automation system failures in the plant's integrated control systems and the waste tracking system. The Tiger Team report described the following organizational and technical flaws in the work processes that supported AMWTP automation:

- The lack of a clearly defined software change process with specifically assigned roles and responsibilities resulted in ineffective and inconsistent decision-making within the organization. There was likewise no coordinated software development workflow, resulting in the absence of configuration control for the production system documentation and software. This led to continual re-work, wasted resources, and defective software.
- The absence of a software test bed significantly inhibited testing capabilities and required that the majority of the functionality testing be performed using the production system after software implementation had already taken place. This resulted in a high level of software failures and caused costly system downtime and data integrity concerns.
- A mounting backlog of software change requests with unrealistic completion estimates attested to the lack of a functioning software change management process.
- User confidence in the waste tracking system was so low that several users created their own informal tracking tools with desktop spreadsheets and databases, leading to inaccuracies and data integrity issues.
- Plant management and the DOE customer expressed their continuing disappointment with the AMWTP's automation performance, and many believed the project was destined for failure unless a serious and concerted effort was made to correct software development problems.
- Plant automation was viewed as a separate entity and was blamed for virtually all of the AMWTP production problems. Line management treated plant automation as a source of problems, as opposed to a potential solution, resulting in a lack of process ownership and line management contribution.

AMWTP Control Room in the Treatment Facility is the nerve center of treatment production operations.

Management

The Tiger Team assessment report and the proposed remedial actions were reviewed by senior BBWI management. BBWI management recognized the seriousness of the problems and supported a corrective action plan and dedicated resources for the remediation of software development processes.

The corrective actions supported the project's schedule recovery and garnered strong management support. BBWI management also commissioned a Six Sigma Process Improvement Project (PIP) to reduce the error rate of software changes on AMWTP automation systems. BBWI Vice President and Deputy General Manager Scott Raish, working as Plant Manager at that time, was designated as the Six Sigma Champion of this PIP, and John Muirhead, BBWI Chief Information Officer, served as Six Sigma Green Belt and the PIP Team Leader.

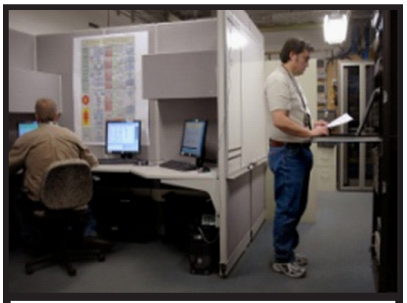
Actions

The PIP team created process maps of critical software development workflows and established metrics to monitor work processes.

One of the discoveries that the PIP team made during its investigation was that there was no effective process for screening and prioritizing Software Change Requests (SCRs). With no work assignment priority, the programming group was constantly interrupted as requesters had unrestricted access to their preferred programmers. The ineffectiveness of this process led to a huge backlog of SCRs. The absence of prioritized work also resulted in a chaotic and poorly controlled software work flow process, and caused plant production to operate in a reactive mode.

To address the issue of the existing backlog, further analysis was performed of SCRs and Software Data Change Requests (SDCRs). This analysis revealed that of the initial 474 requests in the work queue, more than 50% were non-essential and would not improve safety, compliance, or production even though many were designated as "urgent" or "high priority." BBWI management adopted the PIP team's recommendation and scrubbed the backlog to remove unnecessary and outdated requests.

To help address the issue of screening and prioritizing future SCRs, a Software Change Group (SCG), comprised of members from Plant Automation, Transuranic Waste (TRU) Programs, Quality Assurance, and Operations, was established to review and prioritize SCRs. The SCG utilizes specific software change request details, including User Requirements Specifications driven by the end user, to better understand the scope of changes and their impacts to the project and to allow managers to make more informed decisions. The SCG meets weekly via video conference to discuss software changes and establish their prioritization. Since its implementation, the SCG meeting has received praise from both DOE officials and Carlsbad representatives and has been described as the most effective software change control board within the complex. Furthermore, because line management is part of the SCG, line management and plant automation now work together as a production enhancing team, resulting in a major culture shift within AMWTP.



The AMWTP Software Testbed is a fully functional, non-production test and training environment.

As noted previously, due to the lack of a method for testing software changes, the engineers had to test software directly on the production system, often with a negative impact on the plant and

production. To alleviate this, a test bed was implemented to enable software engineers to construct and test necessary changes outside of the production system, thereby eliminating virtually all plant downtime caused by faulty software. The test bed also provided a tool for providing user training. By training users on software changes within the test bed, plant down time due to operator error was dramatically reduced.

Software reliability is critical to successful operations in the AMWTP Control Room.

The PIP team also discovered that with no accurate software development history, the estimates to complete changes were wildly inaccurate and exaggerated. This affected the size of the software group's staffing, which could not be accurately determined, resulting in hiring more programmers than necessary. By creating a comprehensive set of production metrics, the group was able to establish a baseline against which the impacts to production could be observed. These development metrics enabled the management team to better estimate the cost and schedule of software operations.

The establishment of rigorous software configuration processes and procedures dramatically reduced software malfunctions. This increased plant user confidence eliminated the user-constructed spreadsheets and databases.

Plant production system stability, previously plagued with automation problems, was greatly improved by repairing the network wiring and by creating a troubleshooting guide to rapidly diagnose system faults.

A graphical description of the AMWTP software development process can be found through the following link from the NE/EM/SC Software Quality Assurance Support Group web site: http://www.id.doe.gov/sqa/LessonsLearned.htm.

Consequences

After making several vital changes to the software development and maintenance processes, the performance metrics listed below were implemented to provide early indicators of emerging problems, demonstrate success, and provide process visibility for management.

- Primary Metric: Monthly Contract Programmer Cost
- Secondary Metric: AMWTP Direct Hire Labor Cost
- Tertiary Metric: Software Implementation Failures

These metrics provided management with information they could count on. Because these measures showed sustained improvement over time, management support of plant automation improvements never wavered.

Enhancements made to the screening process for SCRs and implementation of software configuration procedures have made remarkable improvements in AMWTP's software development program. By eliminating non-essential SCRs, and utilizing the SCG for prioritization of work, the project has been able to reduce the average monthly cost for programmer staff augmentation from $187,000 in 2005 to $42,000 in 2010, an 80% reduction in cost. (See Figure A).

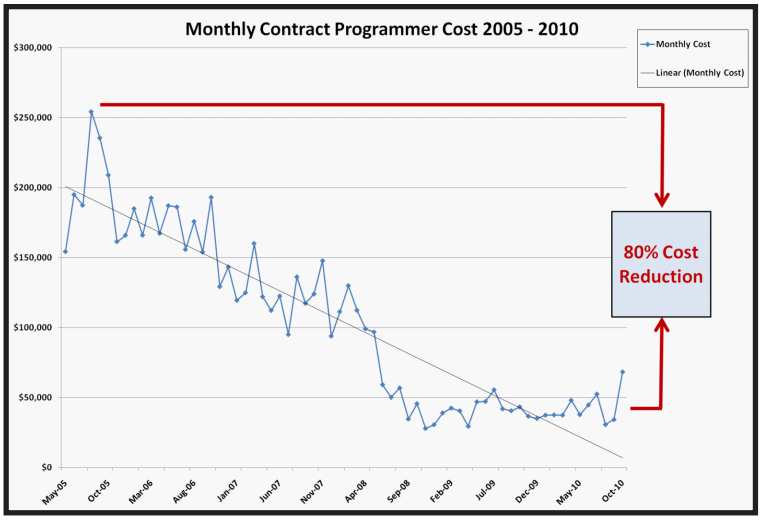


Figure A. Cost Savings from Contract Programmer Destaffing

During the same time period, the direct hire labor cost has remained virtually unchanged (Figure B) showing that most of the augmented staff was not required for baseline operations.

Year	Direct Hire labor Monthly Cost	Staff Aug Monthly Cost	Staff Aug Percent of Labor Costs
2005	$250,692	$187,035	
2006	$257,201	$183,915	42%
2007	$257,110	$134,164	34%
2008	$280,046	$94,480	25%
2009	$296,053	$41,812	12%
2010	$243,858	$42,129	10%
Total Savings $8,943,880			

Over a 5-year period, BBWI has been able to save almost $9 million in staff augmentation labor costs.

Figure B. Cost Comparison of Direct Hire and Staff Augmentation Destaffing

These software configuration changes and resulting cost savings have been sustained over the five-year period that BBWI has operated AMWTP.

Software implementation failures resulting from defective software changes installed on the production system is the secondary metric. AMWTP progress made reducing software implementation failures is displayed in Figure C.

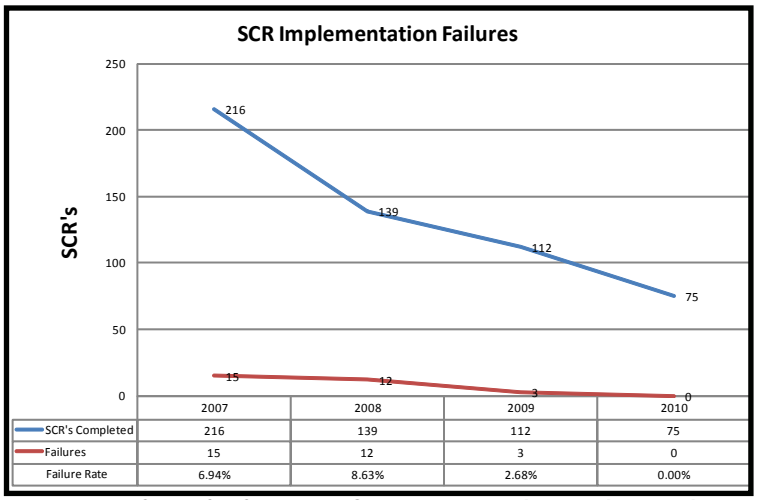


Figure C. Effects of Software Configuration Control on Product Quality

The PIP team attributed the reduction in software implementation failures to improved screening of SCRs, improved software testing, improved training, and a strict adherence to BBWI's software development procedures.

To monitor the overall health of the plant's automated system, BBWI management also monitors the number of Temporary Software Overrides (TSOs) implemented each month. TSOs are used to isolate automated equipment to accommodate system maintenance, or to compensate for hardware and/or software malfunctions.

Figure D illustrates that from January 2006 to October 2010 there has been a 56% reduction in the number of times automated equipment has been isolated via TSOs.

Temporary Software Overrides		
Monthly Average	Time Frame	Overall Reduction
22.46	2006, 2007	56%
13.75	2008, 2009	
9.9	2010	

Figure D. Effects of Software Configuration Control on Plant Systems Stability

Improvements in the software management process greatly improved overall plant productivity, as demonstrated by the significant increase in the rate at which stored transuranic (TRU) waste has been processed since the implementation of these improvements (See Figure E).

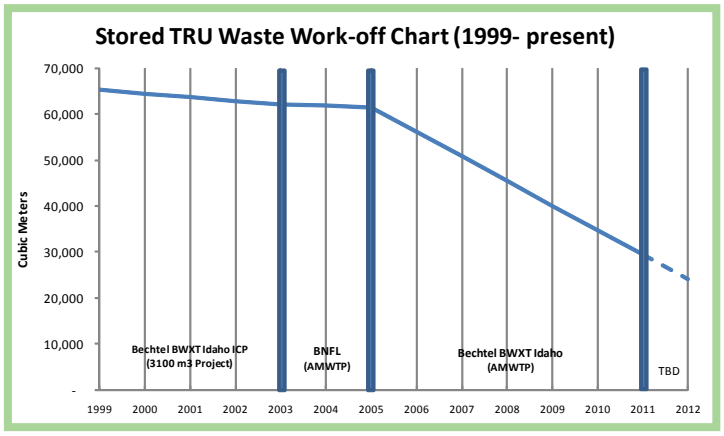
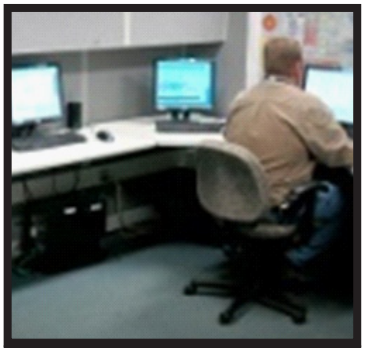


Figure E. Software Stability Impact on Project Productivity

In May 2005, BBWI was three years behind schedule. Today, AMWTP is nearly three years ahead of schedule.

In its annual Waste Isolation Pilot Plant recertification audits, DOE's Carlsbad Field Office has not identified a finding since 2006 at the AMWTP. During the 2010 certification audit, the BBWI software quality assurance process was commended by the audit team, with specific emphasis placed upon the use of metrics in trending performance and the use of the SCG in communicating and setting work priorities.

The productivity improvements and system stability enhanced facility user and DOE's confidence in BBWI's management and operation of AMWTP. This confidence is reflected in DOE and the State of Idaho approving AMWTP processing radioactive waste shipped to Idaho from other DOE sites.



The AMWTP Software Testbed has proven to be the key to successful software testing and training.

Contributions to this article were made by:

- *Bob Blyth, DOE-ID, Software Quality Assurance Lead;*
- *Scott C. Raish, BBWI Vice President and Deputy General Manager;*
- *W. John Muirhead, BBWI Chief Information Officer;*
- *Jared Hawley, BBWI Integrated Control and Waste Tracking Systems Manager.*

For more information on the AMWTP Software Testbed success story, please contact Bob Blyth at blythrl@id.doe.gov, or 208-526-1181, or W. John Muirhead at muirwj@amwtp.inl.gov, or 208-557-6489.

Quality Assurance Activities

Safety Software Quality Assurance

Software Quality Assurance Safety Advisory

During the last quarter of 2010, a Safety Advisory was issued to address a firmware defect in a programmable logic controller (PLC) at the Savannah River Site (SRS). SRS experienced a failure, (ORPS NA--SRSO-SRNS-TRIT-2010-0004) in a safety significant PLC processor module for a tritium air monitor in the Metallography Test Facility. The triple modular redundant (TMR) T8110B PLC processor module [with firmware version build (b) 115] which is designed to provide visual/audible alarms to alert workers of increased tritium activity was displaying only a visual alarm in the process room. An investigation revealed that the processor had unexpectedly gone offline and the system, as designed, went to a safe configuration to energize the visual alarm.

The vendor, ICS Triplex (a Rockwell Automation Company), had earlier issued a Product Notice in mid June which indicated that TMR T8110 processors with firmware versions b115 through b127 were defective. Since the installed system had a processor model TMR T8110B (with firmware version b115), no further action was taken because the Product Notice did not include model TMR T8110B.

Diagnostic information obtained from the TMR T8110B processor was relayed to the vendor to assist with the failure analysis. At that time, the vendor informed SRS that the Product Notice was also applied to the TMR T8110B processor with firmware version b115.

The vendor attributed the problem to a defect in the processor module firmware for

(Continued on next page)

versions b115 through b127; therefore, it affected both TMR processor modules T8110 and T8110B with the same firmware version b115. The vendor provided an updated copy of the firmware (version b128) to correct the problem.

Questions related to the ICS Triplex PLC processor should be directed to Tracy Waller at tracy.waller@srs.gov, or Susan Messick at susan.messick@srs.gov. For other questions, please contact Subir Sen at subir.sen@hq.doe.gov.

DOE-STD-1172-2011, Safety Software Functional Area Qualification Standard

DOE-STD-1172-2011 has been submitted for publication to the Federal Technical Capabilities Panel. This standard was reviewed within the Technical Standards RevCom process and all comments have been appropriately resolved and concurred.

Review of GENII Safety Software for Listing as a Toolbox Code in the Central Registry

From September 20 – 22, 2010, the GENII Code Review Subgroup of the Safety Software Expert Working Group (SSEWG) conducted a software quality assurance (SQA) review of GENII Version (V) 2.10 at the Pacific Northwest National Laboratory (PNNL). The purpose of the review was to determine if GENII V2.10 with FRAMES V1.7 could be listed in the DOE Safety Software Central Registry as a DOE approved Toolbox code. The GENII Code Review Subgroup made several recommendations to PNNL related to improving the SQA documentation to bring the GENII code in compliance with the DOE O 414.1C, Quality Assurance. The Office of Science and PNNL staffs have accepted the recommendations of the GENII Code Review Subgroup and upon completion of the PNNL actions to address the recommendations, it is expected that GENII V2.10 with FRAMES V1.7 will be listed as a Toolbox code.

For more information on the Safety Software Functional Area Qualification Standard, GENII Safety Software, or other safety SQA issues, please contact Subir Sen at subir.sen@hq.doe.gov, or 301-903-6571.

Quality Council: Annual Meeting Held in Germantown, Maryland

From December 7-9, 2010, the Office of Quality Assurance Policy and Assistance (HS-23) hosted the Annual Quality Council Face-to-Face Meeting in Germantown, MD. The purpose of this annual meeting is to plan 2011 Council activities, discuss status of existing activities, share information from the Office of Health, Safety and Security (HSS) (i.e., the status of the revision to DOE Order 414.1C), and hear about quality assurance (QA) initiatives from various Program Offices/Sites. All formal presentations and descriptions of current Council activities are available on the Quality Council webpage: http://www.hss.doe.gov/nuclearsafety/qa/council/events.html.

Mr. Bill Eckroade, Deputy Chief for Operations, Office of Health, Safety and Security (HS-1, on behalf of Glenn Podonsky), welcomed all participants and extended his appreciation to all involved in the Quality Council effort. He acknowledged the difficulties associated with strategizing ways to promote and share the benefits of QA across the Complex. He referenced the success of the 2009 Survey on Quality Assurance Implementation and the on-going efforts for revising the DOE Order 414.1C, both of which had Council participation. He acknowledged the Council's activity to develop a good set of metrics to measure QA program effectiveness as being important in maintaining and achieving organizational goals.

Mr. Andy Lawrence, Office of Nuclear Safety, Quality Assurance and Environment (HS-20), followed Mr. Eckroade, welcoming the group and expressing his support of the efforts of the Council, while thanking Colette Broussard for her continued work and leadership of this group. He agreed that performance metrics are imperative in achieving QA, and both Mr. Eckroade and he stated how impressed they were over the success of the work done thus far by the Council members.

Colette Broussard then took the opportunity to welcome the group and proceeded to give an update on the status of revising DOE Order 414.1C. Although the revised Order is more streamlined, no requirements were deleted.

Several Program Offices/Sites presented talks on various topics.

- Steve Chalk, Richland, shared a presentation on Suspect Counterfeit Items and their impact on our lives.
- Sam Johnson, National Nuclear Security Administration (NNSA), presented NNSA's Enhanced Oversight Activities
- Bob Toro, Office of Environmental Management (EM), shared a discussion of EM's Oversight Practices and talked about putting Performance Metrics on a "real-time-basis" to use as an Integrated Safety Management System (ISM) declaration process.
- Pat Carier, Office of River Protection (ORP), presented ORP's Performance Metrics Method.

If your organization is interested in participating in Quality Council activities, please contact Colette Broussard at 301-903-5452 or Colette.Broussard@hq.doe.gov for more information.

Quality Council Members
Back: (from left to right) Bob Blyth, Pat Carier, Matt Cole, Steve Chalk, Terry Dunn, Darrell Huff, Jeff Martus, Rick Dubose
Front: (from left to right) Caroline Polanish, Thanhtan Van Ober, Colette Broussard, John Adachi, Debbie Rosano, Donna Riddle, Anita Leivo

Commercial Grade Dedication of Nuclear Safety-Related Items, Services, and Software

In recent years, Department of Energy (DOE) Headquarters (HQ) and Site Offices identified that various Office of Environmental Management (EM) site contractors, their sub-contractors, and suppliers were not implementing commercial grade dedication (CGD) of nuclear safety related items, services, and software in accordance with DOE and American Society of Mechanical Engineers (ASME) Nuclear Quality Assurance (NQA)-1, *Quality Assurance Requirements for Nuclear Facility Applications* requirements and nuclear industry guidance. As a result, nuclear safety related items and services that were not produced or performed under an approved NQA-1 program were suspect in their ability to perform their safety function. This has resulted in significant additional cost to projects because several of the required CGD process steps were performed after the fact, and in many cases performed incorrectly, or not at all. The CGD process steps were subsequently performed as required or corrected as rework. These process steps had to be performed correctly to develop reasonable assurance that the item or service would perform their intended safety function.

There are two primary contributors to this problem. The first is that the country's nuclear material supply chain supported by NQA-1 vendors who are experienced in nuclear material fabrication and commercial material upgrade activities are very weak and not as broad based as compared to 20 years ago. Currently, there is very little nuclear fabrication work available making it cost-prohibitive for vendor shops to implement and maintain an NQA-1 program. The second is that prime contractors and their sub-vendors are not knowledgeable of DOE requirements and expectations for implementation of a CGD program.

In 2009, the EM Corporate Board championed the development of a standardized training course that is based on DOE requirements and established industry guidance. The training course is structured to address engineering and quality expectations for proper implementation of CGD by prime contractors and sub-tier vendors. To assist in the development of the material, EM conducted benchmarking of three commercial nuclear power generators recognized as having strong CGD programs. The course curriculum was reviewed and approved by the EM Corporate Board. A small number of experienced individuals have been prepared to teach the standardized training through participation in the "Train the Trainer" course taught by EM. The integrity of the training course is being maintained by management of the training material and the small number of trained individuals conducting the training. The training course has been offered several times at EM sites to DOE prime contractors and sub-contractors. The course was taught in December 2010, and two presentations are being planned for February 2011. The training is available to any EM or National Nuclear Security Administration (NNSA) site/facility that is performing CGD as part of its procurement strategy.

DOE/EM is also in the process of developing a guide as a companion to and driver for the approved training. This draft standard is in the first round of broadbased review and comment and addresses CGD of fabricated items including digital equipment, services, and stand-alone software. The standard is based on ASME-NQA-1a-2009 and supporting Electric Power Research Institute (EPRI) guidelines. The guide and training are based on the fundamental principle that CGD is made up of two parts: 1) Technical Evaluation; and 2) Acceptance Activities. The standard and training provide information that will support the DOE community in performing the following tasks:

- Technical evaluation of the item or service being dedicated;
- Development of critical characteristics for acceptance;
- Selection of the appropriate method(s) of acceptance from the allowed four;
- Completion of the acceptance method;
- Discussion of lot homogeneity as it relates to item testing;
- Sub-tier vendor performance;
- Digital equipment and software dedication (additional needs);
- Lessons learned and sample dedication plans; and
- Documentation of successful dedication activities.

The Energy Facility Contractors Group (EFCOG)*, made up of site prime contractors, with support from EM, is working to develop standardized implementing procedures detailing how CGD should be performed for various items and services. The procedures are based on the above mentioned draft DOE/EM guide, EM training, and facility specific experience in CGD.

Additionally, the DOE Quality Council, representing both EM and NNSA sites, is working to develop a broad based, consistent approach to implementation of DOE requirements for CGD. It is DOE's intent to leverage lessons learned from EM work with the CGD guide, the training, implementing procedures, and field implementation across the DOE complex through the DOE Quality Council. DOE oversight activities have identified improvement for those sites that have put significant effort into improving their CGD program. DOE's efforts in this area are not complete but are maturing, taking advantage of lessons learned to improve CGD activities.

This article was contributed by Pat Carier, DOE/EM.

For additional information or for assistance in setting up training, please contact Mr. Pat Carier, DOE/EM Lead for the CGD Initiative, at 509-376-3574, or patrick_p_carier@orp.doe.gov.

***EFCOG is a volunteer organization, directed by senior level executives from DOE contractors, sustained by working level personnel from member contractors, and supported and funded by DOE.**

For more information on EFCOG and the Engineering Practices Working Group CGD Subgroup, visit: www.efcog.org/wg/ep/index.htm

The Intergovernmental Data Quality Task Force

The Intergovernmental Data Quality Task Force (IDQTF) is made up of representatives from the U.S. Environmental Protection Agency (EPA), the Department of Defense (DoD), and the Department of Energy (DOE). Chaired by the Director of the EPA Federal Facilities Restoration and Reuse Office (FFRRO), the Intergovernmental Data Quality Task Force (IDQTF) was established in 1997 to address issues related to the management of environmental data quality at Federal facilities. The goal was to improve data quality while making Quality Assurance Project Plan (QAPP) development and approval more efficient and effective.

The IDQTF was originally formed in response to a report from the EPA Office of Inspector General (*Laboratory Data Quality at Federal Facility Superfund Sites*, E1SKB6-09-0041-7100132, March 20, 1997). One of the main findings in the report stated that "Because of the problems with EPA oversight and Federal quality assurance systems, it is our opinion that laboratory analyses conducted to date at DoD and DOE sites cannot be presumed to be of appropriate quality for cleanup decision making." The full report is available on the web at: **epa.gov/fedfac/pdf/epaoig.pdf.**

The representatives of DoD and DOE made it clear that their priority was to improve the process and coordination of data quality activities for environmental measurements between the three organizations. In particular, DoD and DOE were interested in the consistent implementation and approval processes for QAPPs amongst the ten EPA regional offices. The first product of the Task Force was the *Uniform Federal Policy for Implementing Environmental Quality Systems* (EPA -505-F-03-001; DOE/EH-0667). This Policy is based on the National Consensus Standard American National Standards Institute/American Society of Quality Control (ANSI/ASQC) E-4 (1994), *Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs*. The Policy was signed by EPA, DoD and DOE. The second product was developed as guidance for Federal agencies, the *Uniform Federal Policy for Quality Assurance Project Plans* (UFP-QAPP), (EPA-505-B-04-900A). This document is being highlighted by senior management in EPA and DoD for saving time and money while improving the quality of environmental measurements.

The cost-effectiveness of using the UFP-QAPP has been documented in EPA Region 2, based on several years of its use across both Superfund and Resource Conservation and Recovery Act data collection projects. Notable statistics include:

- >10% cost savings in QAPP preparation by EPA and EPA contractors
- 80% reduction in QAPP revisions prior to approval
- 50% reduction in time for QAPP approval
- Increased field audit frequency and efficiency
- Increased QAPP reviews (35%) with existing resources

The State of Alaska (Alaska Department of Environmental Conservation (ADEC)) found the use of the UFP-QAPP valuable, contributing to the following notable results.

- More initial collaboration with DoD, thereby streamlining QAPP development process.
- Two munitions projects completed in 2008 on Adak received minimal comments from ADEC/EPA.
- Project Plan requirements are clearly spelled out for everyone to understand and follow.
- Quality Assurance/Quality Control documentation is well organized, complete, and verifiable.
- Success has led to use of the UFP-QAPP in other ADEC Programs.

The Navy was the first service to implement the UFP-QAPP, and its experience is consistent with EPA Region 2. The Navy found the initial application of the UFP-QAPP was somewhat more time consuming, but the fast learning curve resulted in significant benefits immediately thereafter. The use of the UFP-QAPP is now mandatory across all Defense Environmental Restoration Program cleanup sites.

In order to facilitate the adoption of the UFP-QAPP, EPA has partnered with the Naval Civil Engineer Corps Officers School to develop and deliver training on its use. The training has been funded by EPA, the Navy, the Army, and the Air Force. In the future, DOE may also provide training opportunities for program line organizations and field site managers and staff through Interagency Agreements with the EPA and DoD. Current training opportunities are potentially available to DOE personnel on a space-available basis.

The DOE field element sites, in working with their applicable EPA Regional Offices, should consider use of the guidance document in developing QAPPs on a graded approach for Federal facility hazardous waste sites. Further, it is important to note that the use of the UFP-QAPP provides a high level of confidence that data collected will comply with the Information Quality Guideline, issued by the Office of Management and Budget (Federal Register, Vol., No. 36, Friday, February 22, 2002). These guidelines, issued in response to the Data Quality Act (PL 106-554), are available on the web at: **whitehouse.gov/sites/default/files/omb/fedreg/reproducible2.pdf.**

Benefits of using the UFP-QAPP

Consistent Format

- Establishes appropriate content (all quality elements addressed)
- Reduces boilerplate text
- Reduces time for preparation (after first QAPP generated)
- Reduces time for regulatory review/approval

Cost Effective

- Transparent integration/sharing for common projects across regions
- Defensible data
- Quality criteria are decision-dependent
- Project specific quality assurance requirements
- Based on data use/site characteristics
- Minimizes re-mobilization

This article was contributed by: Kevin Oates, IDQTF Federal Coordinator; Walt Helmick, EPA Region 6; and Mike Carter, MDB, Inc.

Additional information on the IDQTF and its products is available at: http://epa.gov/fedfac/documents/qualityassurance.htm

For more information, please contact Kevin Oates, IDQTF Federal Coordinator at 256-895-1764, or Kevin.J.Oates@usace.army.mil.

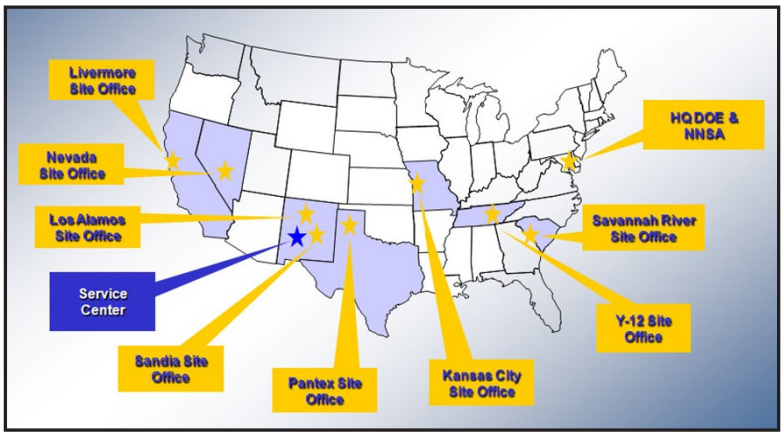
QA Community Corner: *Highlighting organizations within the Department of Energy to better understand the quality assurance work performed within our community.*

The National Nuclear Security Administration

The National Nuclear Security Administration (NNSA) was established by Congress in 2000, as a separately organized agency within the Department of Energy (DOE), responsible for the management and security of the nation's nuclear weapons, nuclear nonproliferation, and naval reactor programs. It also responds to nuclear and radiological emergencies in the United States and abroad. Additionally, NNSA Federal agents provide safe and secure transportation of nuclear weapons and components and special nuclear materials along with other missions supporting the national security.

In 2002, NNSA reorganized and contract and project management oversight responsibility for NNSA's laboratories, plants and special facilities was given to the site offices. NNSA Headquarters (HQ) retained responsibility for strategic and program planning, budgeting and oversight of research, development and nonproliferation activities. There are eight site offices that provide day- to-day oversight of contractors tasked with implementation of the Administration's goals.

DOE NNSA Site Offices



A Service Center, to provide procurement, human resources, and other support services to the site offices, was established in Albuquerque, NM, using expertise from the former operations offices.

NNSA relies on contractors to manage day-to-day site operations and to adhere to DOE policies when operating the laboratories, production plants, and other facilities within the complex. Together, the facilities implement NNSA's all-encompassing Stockpile Stewardship program that includes operations associated with surveillance, assessment, maintenance, refurbishment, manufacture and dismantlement of the nuclear weapons stockpile as well as research and development and certification efforts.

Each site office has an individual assigned the responsibilities to ensure implementation of quality assurance (QA) requirements. Due to the variance in work scope being performed at the sites, there are multiple national consensus standards being utilized. NNSA has also established the American Society of Mechanical Engineers (ASME) Nuclear Quality Assurance (NQA)-1-2008 with 2009 Addenda as the preferred technical standard for implementation of QA within nuclear facilities and during construction of nuclear facilities. NNSA also recently participated in the DOE survey to determine the level of implementation of QA at all sites. The survey revealed that while there is varying maturity of implementation, all sites have implemented QA programs.

The two Senior level NNSA HQ Quality Assurance Managers are Tom Williams and Sam Johnson. NNSA HQ Senior Advisor, Tom Williams, NA 3.6, serves as the QA coordinator for the Office of the NNSA Senior Advisor for Environment, Safety and Health (ES&H). This Office is responsible for evaluating Quality Assurance Program and ES&H management policies and guidance for NNSA HQ, the Service Center, and Site Office Managers, and for providing feedback to NNSA Senior Management.

In addition to his QA responsibilities, Tom is responsible for coordination of Enforcement Actions, Accident Investigations, and Operating Experience Programs at NNSA sites. These tasks, as well as QA, require close coordination with the Office of Health, Safety and Security (HSS) as well as coordination within NNSA.

Tom has over thirty-five years experience in the DOE complex both as a Federal employee and as a contractor employee, including over thirty years field experience. He served as analyst in the HSS Office of Analysis, supporting the operating experience and suspect counterfeit items programs. He served in the Office of Environmental Management as a completion project site manager and a technology development program manager, including serving as a contracting officer's representative in both these capacities. As a Federal employee, he has participated in a variety of assessments including formal follow-up "Progress Assessments" to the 1990s "Tiger Teams," operational readiness reviews, formal program reviews, process feasibility reviews, and accident investigations. His contractor experience includes project management, design and construction, process engineering, and strategic planning positions.

Tom holds a Bachelors of Science degree in Chemical Engineering from Montana State University, a Masters in Engineering degree in Chemical Engineering from the University of Idaho, and is a registered Professional Engineer in California.

NNSA's second senior HQ Quality Assurance Manager, Sam Johnson, works under the NNSA Deputy Administrator for Defense Programs (NA-10). He is responsible for implementing quality assurance requirements for facility operations and line-item construction, including: management and independent assessments, software quality assurance, and suspect/counterfeit parts; implementing Quality Control Programs to ensure weapons product quality; reviewing and approving Site Office Quality Assurance Plans and delegating approval of the contractor Quality Assurance Program to the Site Offices; and periodically reporting to senior NNSA and DOE management on quality assurance implementation.

Prior to his current role, Sam was the Deputy Director and Acting Director of the Office of Environment, Safety and Health and Quality Assurance. He assumed his present duties in January 2008. Sam retired from the U. S. Navy's Submarine Force where he served as Commanding Officer of USS Henry L. Stimson, a nuclear powered, strategic nuclear missile submarine. Sam graduated from Vanderbilt University, with honors in Electrical Engineering, and obtained a Masters Degree in Business Administration from Frostburg University.

This article was contributed by Anita Leivo, Los Alamos Site Office.

For further information, contact Anita Leivo at aleivo@doeal.gov, or 505-667-1021.

Mark Your Calendar

Upcoming Workshops and Conferences

MARCH 2011

2011 DOE Project Management Workshop
Where: Alexandria, VA
When: March 15 - 16

IDQTF Face-to-Face Meeting
Where: Navy Facility in Goose Creek, Charleston, SC
When: March 16 - 17

APRIL 2011

Engineering Practices Working Group 2011 Spring Meeting
Where: Forrestal Building, Washington, DC
When: April 19 - 20

ISM & QA Working Group 2011 Spring Meeting
Where: Argonne National Labs, Chicago, IL
When: April 26 - 28

MAY 2011

Safety Analysis Working Group 2011 Spring Meeting
Where: Santa Fe, NM
When: May 7 - 12

19th International Conference on Nuclear Engineering (ICONE19)
Where: Makuhari, Japan
When: May 16 - 19

JUNE 2011

ASME 2011 Annual Meeting: Conferences, Knowledge and Community
Where: Dallas, Texas
When: June 10 - 15

Office of Quality Assurance Policy & Assistance

Mission:

The Office of Quality Assurance Policy and Assistance establishes and maintains the quality assurance policies, requirements and guidance for the Department of Energy and serves as the Department's corporate resource to ensure that products and services meet or exceed the Department's quality objectives.

The Office provides assistance to Departmental elements and contractors in the interpretation and implementation of the Deparment of Energy quality assurance requirements and in the resolution of quality assurance-related issues.

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