

**NATIONAL NUCLEAR SECURITY ADMINISTRATION  
REVIEW OF PERSONNEL SELECTION, QUALIFICATION AND  
TRAINING REQUIREMENTS FOR DOE NUCLEAR FACILITIES  
AT BWXT PANTEX PLANT**

**Final Report**



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National Nuclear Security Administration  
Department of Energy  
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(Authorized Classifier)

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## **EXECUTIVE SUMMARY**

This training program evaluation was conducted in support of a request from the Manager, Pantex Site Office (PXSO) to meet the DOE O 5480.20A requirement to perform a periodic systematic evaluation of training and qualification programs using DOE-STD-1070-94. The evaluation was to determine whether BWXT Pantex had established a training program that meets the requirements of O 5480.20A and to judge the effectiveness of the Training and Qualification Program. As such, some judgment by the evaluation team is required to draw conclusions as to the effectiveness of the program. Less judgment is required to determine whether the training program meets the administrative requirements of the DOE Order.

At the start of the evaluation, BWXT Pantex presented to the team a summary of issues and a status of the Training and Qualification Program. The status was derived from an analysis of the results of past reviews and several recent internal evaluations in anticipation of this assessment and in response to a series of letters from the Defense Nuclear Facilities Safety Board (DNFSB). The status of the program that was presented to the team is very consistent with the observations by the team. This indicates that BWXT Pantex has the capability to accurately self-assess the program. The concern is that the self-assessment was not the result of the routine management assessment program, but rather focused, responsive assessments in response to an external driver. Due to the recent completion of the program internal assessment, the corrective action plans are incomplete and few actions have been taken. Therefore, the team was unable to judge the adequacy of most corrective action plans and was able to evaluate few corrective actions.

It is the overall conclusion of the training evaluation that BWXT Pantex has defined a satisfactory and compliant training and qualification program that can achieve the expectations of DOE Order 5480.20A. While some program inconsistencies and enhancements were identified, the fundamental program is sound and would provide the desired outcome if effectively implemented. The effectiveness of the program varied among divisions. While some isolated issues were identified in Manufacturing and Applied Technologies training and qualification outcomes, the programs were fundamentally strong and effective. Infrastructure and Engineering Division Training and Qualification Programs were noted to be less robust with systemic weaknesses and issues that are of long standing. In the judgment of the evaluation team, the lack of a robust feedback and improvement program focused on the implementation and effectiveness of the training and qualification Safety Management Program is the most significant issue and the major vulnerability.

Some areas of strength were also identified including the robust weapons training program and the highly effective records management program, Training Records and Certification (TRAC). TRAC is particularly effective due to the many controls and

administrative interlocks that are built into the system to reduce human error in many of the training related decisions and transactions. Plateau, the follow-on system, may not include these features and should be reviewed carefully prior to further development.

The preparations made by BWXT Pantex in support of the evaluation were extensive, effective, and noteworthy. The ability of the evaluation team to complete an effective evaluation was significantly enhanced by these efforts. The efforts were appropriate, appreciated, and were the best preparations in support of an assessment team most members of the team had experienced.

It is the recommendation of the evaluation team that Manager, PXSO forward this report to BWXT Pantex for evaluation and action as appropriate. Many of the needed improvements identified in this report can be integrated into ongoing corrective action plans. It is further recommended that Manager, PXSO determine an effective follow-up approach to validate and incentivise the effectiveness of the corrective actions to the issues with the effective implementation of the BWXT Pantex Training and Qualification Safety Management Program.

The following Issues and Strengths were identified:

**ISSUES:**

**TR2-1** No continuing training is currently available to enhance/update the instructional skills and capabilities of classroom and OJT instructors.

**TR2-2** As currently administered, the annual instructor evaluations required by STD-2777 are of limited value.

**TR6-1** Per Plant Standard STD-2777, employees trained by unqualified instructors must repeat the course with a qualified instructor to receive course credit. In practice this does not always occur.

**TR7-1** The BWXT PANTEX PBT Program does not adequately evaluate the design and development of tests to determine whether learning objectives have been achieved. The use of the test specification methodology as recommended in DOE Handbooks 1204-97, 1205-97, and 1078-94 would satisfy the requirement of DOE Order 5480.20A regarding the evaluation of trainee mastery of the training objectives.

**TR7-2** Tests and answer keys are not formally controlled. Additional specificity in supporting plant standards is required so that all personnel will control tests and answer keys in a consistent, secure manner.

**STRENGTHS:**

**TR1-1** The functionality and embedded engineered controls/interlocks of TRAC is considered to be a strength. The associated accuracy and attention to which TRAC supports assurance that every individual assigned to a job meets the qualification requirements for the job to which assigned is an associated strength made possible by the functionality and engineered controls within TRAC.

**TR4-1** The rigorous reviews and configuration controls required for work with nuclear safety implications combines with the requirement to ensure that training is conducted with the latest approved procedure to ensure that training on such procedures is conducted with the most up-to-date content.

**TR4-2** The core of the procedure for translating job requirements into training is working effectively in a process that runs smoothly without excessive management attention.

**TR5-1** The Safety Training & Audio-Video Support Section of Training & Development Technologies demonstrated a complete and healthy training program. The Manager has worked with divisions to assure appropriate training courses are identified and assigned to job positions through the use of training codes and training matrices. Learning objectives are well written and plans of instruction adequately address the learning objectives. End-of-Course Evaluation Summaries for examinations, courses, and instructors are conducted quarterly and trigger points have been implemented to address potential issues.

**TR5-2** Weapons Training demonstrated the ability and commitment to identify occurrences, address procedural changes and modifications, and assured incorporation into continuing training to help maintain and improve the knowledge and skills of Production Technicians.

**TR8-1** The Infrastructure Controls Department Maintenance Training Group has been doing a consistent and effective job in relation to training effectiveness. Their commitment to provide this critical feedback should be followed by other BWXT training organizations.

## **1.0 INTRODUCTION**

DOE O 5480.20A, Personnel Selection, Qualification and Training Requirements for DOE Nuclear Facilities requires periodic evaluation of training and qualification programs using DOE Standard 1070-94, Guidelines for Evaluation of Nuclear Facility Training Programs. This standard initiates a framework for consistent, systematic evaluation of DOE nuclear facility training programs through the establishment and use of a uniform set of training program evaluation objectives and criteria. The performance objectives and criteria contained in the Appendix to the standard are used by DOE Headquarters and field organizations for the evaluation of nuclear facility training and qualification programs.

The review plan for this evaluation was followed to conduct the review of the training and qualification programs in place to support operations in the nuclear facilities and activities at the BWXT Pantex Plant. This is the report of the evaluation.

### **1.1 Purpose**

The primary purpose in performing the review is to provide credible, objective, value-added information to NNSA line managers related to the status of the contractor training and qualification programs in place at the Pantex Plant.

The evaluation was conducted in response to a request from the Manager, PXSO to meet the triennial evaluation required by DOE-STD-1070-94.

### **1.2 Scope**

The scope of this review included:

- Review of BWXT training and qualification program organization, staffing, and management to facilitate planning, directing, evaluating, and controlling a systematic training process that support facility missions.
- Review of BWXT training staff's technical knowledge, experience, and instructional skills.
- Review of trainees having met minimum requirements (education, experience, etc.) for entry into the training program.
- Review of training program content.
- Review of training program materials (e.g. tools, equipment, facilities, etc).
- Review of the continuing training program for appropriate plant personnel.

- Review of training program consistency and effectiveness.
- Review of the conduct of training program examinations and evaluations.
- Review the training and qualification self-assessment/line management review programs.

### **1.3 Team Composition**

Each NNSA Review Team member had either assessment experience or appropriate training. The team members had no connection with the BWXT Pantex or Personnel Selection, Qualification and Training Requirements for DOE Nuclear Facilities. The Team Leader is the NNSA Office of Operations and Construction (NA-124) Site Lead for Pantex.

The Team Leader certified that each team member was technically competent, had assessment experience, was independent and, through a documented familiarization process, had developed the necessary knowledge to evaluate this facility. Team biographies can be found in the Review Plan.

The Team Leader, in consultation with the applicable team member, had the responsibility for making the determination of an issue.

### **1.4 Conduct of the Review**

The Review Team conducted this review in accordance with the Review Plan. The CRAD provided the defined bases for conducting the Review. The Team Leader reviewed the efforts of the team members to ensure that all objectives in the CRAD were thoroughly assessed.

The CRAD was based on the requirements contained within DOE Orders and the required standard DOE-STD-1070-94. Previous findings and advice of internal and external review groups were considered in development of the review approach. The review approaches included plans for reviewing procedures and programs, interviewing personnel, and observing training and operations.

The team met daily during the on-site review to facilitate coordination of effort and exchange of information. These meetings allowed the technical experts to discuss significant observations of problems identified during the day and permitted the Team Leader to identify any trends or areas of concern where more detailed information was required. They helped to flag potential schedule conflicts and information gaps in time to take corrective action.

Quality assurance of the review process was the responsibility of the Team Leader. That responsibility included oversight of the review, daily onsite peer review of the findings of the technical experts, and specifying the form of reports and retention of records on which the team's conclusions were based. Review Team members were free to issue a dissenting opinion. This independence, coupled with the professional experience of the participants, is intended to assure an objective and comprehensive review.

## **2.0 EVALUATION**

### **2.1 Summary of Results**

This training program evaluation was conducted in support of a request from the Manager, Pantex Site Office (PXSO) to meet the DOE O 5480.20A requirement to perform a periodic systematic evaluation of training and qualification programs using DOE-STD-1070-94. The evaluation was to determine whether BWXT Pantex had established a training program that meets the requirements of O 5480.20A and to judge the effectiveness of the training and qualification program. As such, some judgment by the evaluation team was required to draw conclusions as to the effectiveness of the program. Less judgment was required to determine whether the training program meets the administrative requirements of the DOE Order. BWXT Pantex must develop the actions in response to the results of the evaluation in response to direction provided by the Manager, PXSO.

At the start of the evaluation, BWXT Pantex presented to the team a summary of issues and a status of the training and qualification program. The status was derived from an analysis of the results of past reviews and several recent internal evaluations in anticipation of this assessment and in response to a series of letters from the Defense Nuclear Facilities Safety Board (DNFSB). The status of the program that was presented to the team was consistent with the observations by the team. This indicates that BWXT Pantex has the capability to accurately self-assess the program. The concern is that the self-assessment was not the result of the routine management assessment program, but rather focused, responsive assessments in response to an external driver. Due to the recent completion of the program internal assessment, the corrective action plans are incomplete and few actions have been taken. Therefore, the team was unable to judge the adequacy of most corrective action plans and was able to evaluate few corrective actions.

The most significant concerns were associated with inadequate feedback and improvement processes within training and qualification programs and organizations. Many of the issues derive from programmatic weaknesses that should have been resolved by adequate feedback and improvement mechanisms. Several managers expressed the philosophy that readiness reviews and external reviews such as the DNFSB provided an adequate management assessment program. The central training organization within the Human Resources Division has overall responsibility for the training and qualification Safety Management Program (SMP) but lacks a robust assessment program to ensure the SMP meets the commitments within the nuclear authorization basis. A concern was also

identified with the processes used to develop and control end-of-course and qualification tests, which is another facet of feedback and improvement. Additional concerns were identified with the Infrastructure and Engineering Division Training and Qualification program results. Particular concerns were the unresolved deficiencies in continuing training and robust requalification programs within Infrastructure Division and the lack of a robust training program within Engineering Division, as indicated by the issues with System Engineering Qualification and basic training program management.

Some areas of strength were also identified including the robust Weapons Training Program and the highly effective Records Management Program, TRAC. TRAC was particularly effective due to the many controls and administrative interlocks that are built into the system to reduce human error in many of the training related decisions and transactions. The bid specification for Plateau, the follow-on system, does not include these controls and interlocks. Plateau should be reviewed carefully prior to further development.

The following Area Summaries and the associated Form 1 Assessment Forms discuss the results of the evaluation in more detail. Since training program effectiveness is a key element of the evaluation, it is important that both the Area Summaries and the Form 1s be evaluated for data that can be used to ensure that the corrective action plans are fully comprehensive.

## **2.2 Area Summaries**

### **MANAGEMENT AND ADMINISTRATION OF TRAINING AND QUALIFICATION PROGRAMS, TR-1**

The focus of this area was to evaluate the organization and implementing directives that defined the management and administration of the training and qualification program. The area further evaluated the effectiveness of the defined organization in achieving the desired outcomes of effective training and qualification. The evaluation was conducted through interviews and review of Pantex implementing command media and the resulting training and qualification documentation.

BWXT Pantex is organized, staffed, and managed to facilitate planning, directing, evaluating, and controlling systematic training processes that support the facility missions. Some inconsistencies were noted between DIR-0001 and the implementing standards and internal operating procedures that may contribute to some of the less than desirable results that were observed. In particular, concerns are identified as to the effectiveness of the training and qualification programs within the Engineering and Infrastructure Support Divisions. Additional concerns were identified with the consistency and depth of management involvement in oversight of the training and qualification programs. In particular, the limited management attention to training not directly tied to task qualifications is a concern.

Most of the concerns have been previously identified, either through internal assessments or external reviews. In some cases the inadequacies have existed for an extended period of time without resolution that indicates a need for a new approach to resolution. The ongoing six-sigma Yellow Belt activity may provide the new and successful approach. The management commitment to ensuring that all assigned workers are properly qualified is a noteworthy success that must be maintained as the corrective actions are implemented and the Plateau training and qualification data management system is developed.

A strength was identified in the functionality and embedded engineered controls/interlocks of TRAC. The accuracy with which TRAC supports assurance that every individual assigned to a job meets the qualification requirements for the task to which assigned is an associated strength made possible by the functionality and engineered controls within TRAC. TRAC is particularly effective due to the many controls and administrative interlocks that are built into the system to reduce human error in many of these training related decisions and transactions. An associated concern is that the accuracy, administrative interlocks, and functionality of TRAC not be compromised as TRAC is replaced by an improved software program, Plateau. The bid specification for Plateau did not address these interlocks and other key TRAC features, thereby creating a risk that Plateau will not provide these key functionalities. The functionalities of Plateau, including its ability to interface with other site software, should be reviewed prior to further development.

## **DEVELOPMENT AND QUALIFICATION OF TRAINING STAFF, TR-2**

The focus of this area was to evaluate the programs and processes in-place to ensure that BWXT Pantex training personnel are fully qualified to safely perform the duties assigned to them. The review also verified the academic credentials, years of job-related experience, and years of experience in nuclear programs for key training personnel.

As required by DOE O 5480.20A, BWXT Pantex has implemented training programs based on the Systemic Approach to Training. The review of this area verified that training personnel assigned to execute the training program had the basic instructional design, development, and presentation capabilities necessary to perform as required.

The review indicated two areas of programmatic weaknesses, summarized as Issue TR2-1 and TR2-2. Issue TR2-1 identified the lack of available continuous training in advanced instructional skills for classroom and On-the-Job (OJT) instructors. Issue TR2-2 identified the limited value of annual instructor evaluations as currently administered. Neither of these issues was self-identified.

### **TRAINEE ENTRY-LEVEL REQUIREMENTS, TR-3**

The focus of this area was to evaluate the accuracy and effectiveness of the programs and processes in place to ensure that the minimum training, experience, and education requirements are met. The management directives that define the entry-level requirements for each O 5480.20A position were reviewed. The effectiveness of meeting the requirements was also reviewed.

BWXT Pantex has processes that if fully implemented would have assured that trainees met the minimum requirements for entry into the training program. However, due to lack of understanding at critical points in the process and lack of clarity and necessary details in the procedures and on the forms, the processes were not implemented effectively. The self-identified result is that some individuals entered the 5480.20A training program who did not meet the minimum entry-level requirements. At the time of the assessment, there was no resolution for the condition that had been identified.

### **DETERMINATION OF TRAINING PROGRAM CONTENT, TR-4**

BWXT Pantex identifies, documents and includes program content for competent job performance in training programs through a systems approach to training. Line management conducts Needs Analyses, Task Analyses and training development, with the Training & Development Technology Department (T&DT) providing educational technology assistance and facilitation. BWXT Pantex conducts Analysis and Design reviews within two years of the effective date of the procedure developing the training, and thereafter biennially from the last review/approval date to maintain the requirements current. T&DT is the process-owner of training analysis and design.

Authorization basis documents, procedures, and other references are cited as appropriate and are listed on the PX-15 as drivers of the course if they require the tasks covered in the training. The BWXT Pantex system is particularly robust in this area to the extent that training always uses the current edition of work procedures; hence changes to the procedure are automatically included. The extensive effort expended outside the training area to ensure procedures are current thereby ensures up-to-date training.

Training for Technical Staff is based on an assessment of position duties and responsibilities. Opportunities for improvement exist, including increased utilization of training specialists in development of qualification programs and development of formally stated expectations for demonstration of mastery of skills and knowledge during qualification of Technical Staff, and development of more clearly stated expectations for the Subject Matter Experts (SMEs) in training development and maintenance.

BWXT has not completely implemented its plant standards for training. An earlier review by the DNFSB noted that the analysis and design process was not documented as required by the plant standard. This assessment noted that retention testing of a random sample of graduates of Technical Safety Requirement (TSR) – related training was not

being conducted as required by the plant standard for training effectiveness. The failure to follow local procedures, especially those with quality assurance aspects, is given a greater significance by the new site-wide 10 CFR 830 compliant Documented Safety Analysis (DSA) which credits certain training with reducing the probability of certain accidents. BWXT Pantex has identified the root causes of the state of incomplete implementation and has developed corrective actions for senior management approval.

## **DESIGN AND DEVELOPMENT OF TRAINING PROGRAMS, TR-5**

This area focused on designing and developing training that prepares trainees to perform work for which training is provided. It also focused on provision of continuing training to maintain and improve job performance.

BWXT Pantex has policies and procedures in place governing the design and development of training programs. Learning objectives are based on tasks selected for training, describe the knowledge and skills required for successful job performance, and are specified in observable and measurable terms. Lesson plans effectively utilize appropriate training settings, accurately support the learning objectives, and promote the effective delivery of training. Training materials are reviewed, approved, and controlled. Continuing training programs are defined and reviewed to improve incumbent knowledge and skills.

BWXT Pantex meets the intent of both DOE O 5480.20A and DOE-STD-1070-94 in relation to the design and development of training programs. There are no issues with this objective. There are two strengths associated with this objective: (1) The Safety Training & Audio-Video Support section of Training & Development Technologies demonstrated a complete and healthy training program. The Manager has worked with Divisions to assure appropriate training courses are identified and assigned to job positions through the use of training codes and training matrices. Learning objectives are well written and plans of instruction adequately address the learning objectives. End-of-Course Evaluation Summaries for examinations, courses, and instructors are conducted quarterly and trigger points have been implemented to address potential issues; and (2) Weapons Training demonstrated the ability and commitment to identify occurrences, address procedural changes and modifications, and assured incorporation into continuing training to help maintain and improve the knowledge and skills of Production Technicians.

## **CONDUCT OF TRAINING, TR-6**

The focus of this area was to ensure that training was conducted in the setting most suitable for the particular training content, and that training was consistently and effectively presented using approved lesson plans and other training guides. The evaluation was conducted through interviews with Training Instructors, review of Pantex implementing standards and procedures, and the observation of the conduct of actual classroom and OJT training courses.

Conduct of training, primarily in the weapons and maintenance areas, indicates that BWXT is using approved and current training materials. BWXT effectively utilizes inert weapon trainers to conduct OJT for qualifying/certifying technicians. While the main focus was in the area of weapons training, considerable effort has also been made in the maintenance arena to provide maintenance personnel with simulators and/or mockups to help facilitate their training. BWXT has self-identified issues in the area of maintenance continuing training, including OJT, and are putting plans in place to correct these deficiencies. Both internal and external assessments identified trainer fidelity as an issue. More proactive actions are required on the part of BWXT, the design laboratories, and NNSA to ensure that trainer fidelity is improved, and that the capability to perform nuclear explosive operation training and qualification can continue to be adequately demonstrated.

### **TRAINEE EXAMINATIONS AND EVALUATIONS, TR-7**

The focus of this area was to evaluate the programs and processes within the Systematic Approach to Training used to assess the trainee achievement of course Learning Objectives. Specifically, the detailed work processes and skills utilized to prepare and deliver valid and reliable tests were reviewed. The requirement for test validity and reliability is a cornerstone of confidence in the training process.

A detailed review of the test development processes and interviews with training staff supporting testing indicated some inconsistencies in the understanding of the requirements to create a valid and reliable test. The fundamental test development step of weighting the enabling objectives and ensuring that a sufficient number of test questions are presented based on the weighting is missing from the current process. In place of this step, BWXT Pantex has chosen to implement an alternative rule-based process that requires "...at least one question per enabling objective." Interviews with instructors indicated a lack of understanding of how many questions were appropriate to adequately test for a specific enabling objective. This process weakness is identified as Issue TR7-1.

The review also examined the control and security of tests and answer keys. Control of these items is accomplished ad hoc and tests were found to be stored on floppy disks, network drives, and unsecured computer hard drives. This informal control is identified as Issue TR7-2.

Neither of these issues were self-identified.

The Assessor noted that both of these issues were adequately addressed in the applicable, superseded plant standard. The migration of the standard to a streamlined, function-based format resulted in a loss of requirements specificity that diminished confidence in the training program.

## **TRAINING PROGRAM EVALUATION, TR-8**

This area focused on the systematic evaluation of training programs.

BWXT Pantex has administrative controls in place that govern the effective evaluation of training programs. BWXT Pantex has not consistently and effectively implemented these across all organizations at Pantex Plant. In October 2002, BWXT Pantex management recognized training effectiveness as a programmatic weakness for its training and qualification programs. Management chartered a Yellow Belt Team to address training effectiveness in November 2002. The team has defined training effectiveness issues and is close to briefing senior management on programmatic improvements that should bring BWXT Pantex into full implementation of its defined and revised training effectiveness strategies.

Overall, BWXT Pantex demonstrated that it meets criteria 8.1, 8.2, 8.4, and 8.5. These criteria tie to the comprehensive evaluation of training programs. BWXT Pantex does not meet criteria 8.3, 8.6, and 8.7. These criteria refer to specific elements within the evaluation of training programs (end of course evaluations, training materials, and training facilities), all of which should be met when the Yellow Belt Team recommendations are adopted and implemented by December 31, 2003, as planned.

All issues were pre-identified to the team and will not be repeated or used in this report. Specific issues are discussed under individual criteria on the Form 1s. In summary, accountability is not well defined and there is poor coordination of training program evaluation. Training responsibility is fragmented throughout the organization. Most training groups have demonstrated strong and consistent training programs. Again, these issues should be resolved by the controls and corrective actions planned by the Training Effectiveness Program Yellow Belt Team.

One strength was identified. The Infrastructure Controls Department Maintenance Training Group has been doing a consistent and effective job in relation to training effectiveness. Their commitment to provide this critical feedback should be followed by other BWXT training organizations.

## **3.0 CONCLUSIONS AND RECOMMENDATIONS**

### **3.1 Conclusions**

It is the overall conclusion of the training evaluation that BWXT Pantex has defined a satisfactory and compliant training and qualification program that can achieve the expectations of DOE Order 5480.20A. While some program inconsistencies were identified, the fundamental program is sound and would provide the desired outcome if effectively implemented. The effectiveness of the program varied among divisions. While some isolated issues were identified in Manufacturing and Applied Technologies

training and qualification outcomes, the programs were fundamentally strong and effective. Infrastructure and Engineering Division training and qualification programs were noted to be less robust with systemic weaknesses and issues that are of long standing. In the judgment of the evaluation team, the lack of a robust feedback and improvement program focused on the training and qualification Safety Management Program is the most significant issue and the major vulnerability.

At the start of the evaluation, BWXT Pantex provided the team with an accurate status of the training and qualification program. However, that status was the result of external assessments and ad hoc internal assessments, not a result of the routine training and qualification management assessment processes. Corrective Action Plans were being formulated or finalized for most of the areas of weakness. Few actual corrective actions were in place. Since the BWXT Pantex corrective action planning was so immature, the team was not able to effectively evaluate its adequacy or draw conclusions as to the effectiveness in resolving the issues with the performance of the training and qualification program.

### **3.2 Recommendations**

It is the recommendation of the Evaluation Team that Manager, PXSO take the following actions:

Forward this report to BWXT Pantex for evaluation and action. Encourage the evaluation of **ALL** of the information in this report. In light of the ongoing six-sigma training related assessments and where possible, incorporate the information and issues from this report into the ongoing training and qualification programmatic improvements. In those cases where issues or effectiveness deficiencies are noted that are not within the scope of the ongoing corrective action planning, additional corrective actions should be considered.

Require a response from BWXT Pantex as to the results of their evaluation of the information in the report and their proposed resolution for the issues and the less than fully effective examples in the report and the underlying documentation provided to the evaluation team. Compensatory measures for performance deficiencies should be identified.

Require the PXSO Staff to use the assessment criteria from DOE-STD-1070-94 within the ongoing oversight of BWXT.

Monitor closely the development and implementation of the Plateau Training Records program to ensure that the functionality and nuclear safety related controls currently embedded within TRAC are not lost or compromised.

Elevate BWXT Pantex efforts to improve weapons trainer fidelity to prevent further degradation of the capability to provide effective Nuclear Explosive Training and Qualification.

In light of the longstanding status of some of the issues identified in this report, consider making resolution of the issues and performance effectiveness conditions a subject of the contractor evaluation and award fee process.

Incorporate resolution of the issues and performance effectiveness into the contractor evaluation and award fee process, with emphasis to correctional long standing issue.

## **4.0 LESSONS LEARNED**

### **4.1 Lessons Learned for Future Assessments**

The preparations made by BWXT Pantex in support of the evaluation were extensive, effective, and noteworthy. The ability of the evaluation team to complete an effective evaluation was significantly enhanced by these efforts. The efforts were appropriate, appreciated, and were the best preparations in support of an assessment team most members of the team had experienced.

The support provided to the team to schedule interviews, provide documents, and keep the team members on schedule and at the appropriate location was noteworthy and appreciated.

The CRADs used for the review were enhanced from the standard in that several specific requirements from the order were included. Future reviews should consider the CRADs from this review as a tailored version of the standard.

It is noteworthy that the use of the standard to conduct the periodic assessment of the 5480.20A training program is a requirement from the order (section 6.b) and thus the criteria are requirements as a flow down from inclusion of the order in the contract. No further justification is required to evaluate the program against the criteria.

As with all assessments, it is important that the evaluation team have adequate spaces in which to work, adequate equipment and supplies, and access to documents through the intranet. All of those expectations were met for this evaluation and were contributors to the success of the evaluation.

### **4.2 Lessons Learned for Other Sites**

#### **Application of Six Sigma to Training Process**

In October 2002, BWXT Pantex management realized that it could not efficiently measure training effectiveness at Pantex Plant. T&DT management, tasked with

identifying issues that could be resolved through the EPIC Yellow Belt process, chartered a Yellow Belt Team to review training effectiveness practices and recommend improvements. Members included representatives from Human Resources, Infrastructure, Engineering, and Manufacturing Divisions.

The Training Effectiveness Yellow Belt Team was chartered in October 2002 and received training as a group in November 2002. The team began working its six-sigma toolbox to identify those six sigma tools most applicable to issues with the training effectiveness process. By looking at each area of the DMAIC process (Define, Measure, Analyze, Implement, and Control), tools were chosen to meet the requirements of each DMAIC area. These included:

1. Defining the pain/measure for the problem.
2. Measuring the process through a training process block diagram, training effectiveness process map, identification of customer requirements, Failure Modes and Effects Analysis (FMEA), employee and instructor surveys, training-related assessment findings, and a review of past practices, successes and failures.
3. Analysis included the FMEA failure modes, fishbone/root cause analysis, analysis of survey results, analysis of training-related findings, and identification of business system deficiencies.
4. Improvements identified included, enhancing related PX forms, assigning roles and responsibilities, appointing training effectiveness personnel, providing training effectiveness training, implementing training program evaluation process, tracking training effectiveness activities and performance metrics, improving communication with managers, enhancing the business process to modify training based on feedback, applying a graded approach, and evaluating briefing/formal training decision process.

BWXT plans to implement these reforms by December 31, 2003 to allow validation of effective implementation through the balance of 2004.

### **Teaming with Local Educational Institutions to Establish a Potential Applicant Pool**

Amarillo College offers classes, at the students expense which validate/remediate job skills for potential employees. Applicants are guaranteed a job interview at Pantex.

## **APPENDIX I ASSESSMENT FORMS**

**OBJECTIVE: TR 1**

**DATE: August 7, 2003**

**OBJECTIVE MET: Yes**

### **OBJECTIVE:**

The facility is organized, staffed, and managed to facilitate planning, directing, evaluating, and controlling a systematic training process that supports the facility mission(s). (5480.20A, Att. 2, Chap 1, pg I-1, pp 2)

### **CRITERIA:**

- 1.1 Facility line management has overall responsibility and authority for the content and effective conduct of the training and qualification program(s).**
- 1.2 An organization/person within line management is responsible for the implementation of the training and qualification program(s).**
- 1.3 Goals, objectives, and plans are in place to describe the implementation of the training and qualification programs.**
- 1.4 Training records are maintained to support management information needs and to provide required historical data. (Pg I-19, pp 15)**
- 1.5 Training developed and/or implemented by personnel or organizations other than the operating contractor's staff is monitored and controlled to ensure that it meets applicable facility requirements.**
- 1.6 Training facilities, equipment, and materials effectively support training activities.**
- 1.7 Formal programs are in place to grant exceptions to training requirements, and to control/document qualification and certification requirements. (5480.20A, Att. 2, pg I-16, pp 11. & pg I-17, pp12.)**

### **APPROACH:**

**Record Review:** Review approved BWXT policies, records and procedures to 1) understand roles, responsibilities, and authorities; 2) organization; and, 3) the defined interfaces for the Pantex training and qualification program. Review published training

goals, objectives, and plans for the training and qualification of training staff and facility personnel. Review BWXT training records, and employment records per 5480.20A requirements. Verify that training records support management information needs. Review approved BWXT policies, records and procedures that control and document the programs for granting exceptions and extensions.

Interviews: Interview the PXSO and BWXT Training Managers to understand 1) their roles, responsibilities, and the interfaces; and, 2) the formal control of the granting of exceptions and extensions. Interview BWXT training staff as necessary.

Observations: Observe training evolutions as necessary to measure adequacy of training facilities, tool, equipment, and materials.

**RECORDS REVIEWED:**

- DOE Order 5480.20A, Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities, Change 1, 7-12-01
- DOE-STD-1074-94, June 1994, Guidelines for evaluation of nuclear facility training programs
- A-03-67, Nuclear Facility Training Program Assessment Report, July 9-17, 2003
- Pantex Training Implementation Matrix for DOE O 5480.20A, Revision 7, March 20, 2003
- AB-SAR-314353, Chapter 12, Sitewide SAR, Procedures and Training, Rev 8, April 30, 2003
- DIR-0001, Issue 14, Roles and Responsibilities for the Management and Operation of Pantex Plant, undated
- STD-2001, Issue 17, Employment Hiring Procedures, undated
- STD-2533, Issue 5, 5480.20A Position Classification Process, undated
- STD-2770, Issue 12, Training, undated
- STD-2777, Issue 11, Personnel Selection, training, and Qualification, undated
- STD-2777, Issue 10, Signature Page including signature of DOE/OASO Contracting Officer, dated 12/14/01
- STD-2785, Issue 5, Training Evaluations
- STD-2786, Issue 5, Training Development
- STD-2787, Issue 5, Training Implementation
- STD-2788, Issue 6, Training Analysis and Design
- STD-7020, Issue 6, Drills at Pantex
- IOP-AT80027, Issue 9, Applied Technology Division Guidelines for Personnel Qualification
- IOP-B-0019, Issue 29, Manufacturing Guidelines for Personnel Selection, Qualification, and Certification
- IOP B-3072, Issue 6, June 13, 2001, Weapon Production Stores Dept. Training and Qualification of Personnel
- IOP B-3106, Issue 2, Recertification and Requalification Document Test Procedure

- IOP-00872, Issue 2, Weapons Training and Qualification
- IOP-00879, Issue 2, Maintenance and Utilities Training and Qualification Program including required reading and lessons learned
- MNL-00078, Issue 9, signed 10/25/02, Manufacturing Administrative Manual
- MNL-293072, Issue 1, Process Engineering Department Manual
- MNL-293056, issue 2, Engineering Division Manual
- DOE Order 5480.20A Personnel List dated 06/25/03
- BWXT Pantex plant training findings trend matrix from sample assessment reports January 2000 through 23 July 2003, dated 28 July 2003
- BWXT Pantex Comparison Matrix for 5480.20A entry level requirements (TIM Revision 7) dated 22 July 2003
- STD 1875, Issue 8, Software Quality Life Cycle
- STD 1875, Issue 9 DRAFT, Software Quality Life Cycle
- DOE Letter Beckner to Conway dated May 23, 2003, with enclosures regarding software Quality assurance deficiencies at the Pantex Plant.
- DOE Letter Beckner to Conway dated June 5, 2003 with enclosures regarding training deficiencies at the Pantex Plant.
- Amarillo Area Office Procedure 110.1.4, revision 1, dated 11/17/97, Oversight of Contractor Training Program
- Amarillo Area Office Procedure 102.1.0, revision 1, dated 6/08/99, Training and Qualification Program
- NNSA DOE 5480.20A Audit Status Matrix, revision 1 dated 28 July 2003
- Training Program Description (TPD) and Qualification Package for Engineering Division System Engineers, dated May 30, 2003
- PX 3864 Qualification Training Completion Report for Qualification of System Engineers, identified as course 517.46
- TPD and Qualification Package for Operations Division Nuclear Safety Officer, dated December 12, 2001
- PX-3864 Qualification Training Completion Report for Qualification of Nuclear Safety Officer identified as course 552.05
- Summary Report of Initial and Continuing Training Program 12-5b Infrastructure Maintenance Training for Carpenters (09B)
- Training Code Assignment and Training Requirements lists of all required courses needed or completed for 6 ES&H Division Personnel; 5 Applied Technology Division personnel; 5 Engineering Division Personnel; 5 Infrastructure Division Personnel; and 2 Manufacturing Division Personnel
- Job Descriptions for six different positions
- PX-2726A, Infrastructure Division Employee Qualification Program, Issue 2 (two versions) and Issue 3
- PX100-11, Issue 16, Employee Transfer Data Form
- PX-2658, Issue 7, Salary/Personnel Action Worksheet
- PX-2657, Issue 7, New Hire Salary Offer Worksheet
- PX-4090, Generic First Line Supervisor Employee Training Plan
- Monthly Personnel Qualification Reports for Manufacturing and Maintenance (3)

- Aggregate Report for all not completed required or overdue training and qualification for Dept 801-860, Dept 501-550, Dept 333, Dept 850, Dept 148, Dept 670, Dept 920, Dept 970, Dept. 775
- NNSA Training Assessment Inbrief Presentation Material
- Matrix of Training Program Status; NNSA DOE O 5480.20A Audit—July/August 2003, Rev 1, 28 July 2003

**INTERVIEWS CONDUCTED:**

- Manufacturing Production Manager (2)
- Manufacturing Division Manager
- Manufacturing Production Section Manager
- Manufacturing Weapons Training Manager
- Manufacturing Business Support Manager
- Weapons Training Specialist
- Manufacturing Business Support Representative
- Engineering Division Training Coordinator (DTC)
- Engineering System Engineering Manager
- Applied Technology Division Manager
- Applied Technology, Technology Development Department Manager
- Applied Technology DTC
- ES&H Division Manager
- ES&H DTC
- Radiation Safety Instructor, DTC
- Waste Management DTC
- Infrastructure DTC
- Infrastructure Training Group Leader
- Infrastructure Division Manager
- Infrastructure Controls Department Manager
- IT Applications Develop Dept Manager
- SQA Team Lead
- Training TIM Coordinator
- Manager Compensation and HRIS
- HR Specialist
- HR Admin Specialist

**OBSERVATIONS:**

- Site Training
- NNSA Training Assessment Inbrief
- Tour of Weapons and Maintenance training facilities

## **DISCUSSION OF RESULTS:**

### **1.1 Facility line management has overall responsibility and authority for the content and effective conduct of the training and qualification program(s).**

BWXT Pantex organizational directives are clear in assigning responsibility and authority for the content and the effective conduct of training and qualification to line management with the direct flowdown to facility management. This flowdown starts with DIR-0001, Pantex Roles and responsibilities directive through Plant Standard 2770, Training, into individual division Internal Operating Procedures (IOP). Some inconsistency is noted within DIR-0001 in that the specific training and qualification expectations are not consistent. For example, Section 3.1.10 (c) tasks Human Resources Manager with *“Administer a comprehensive, coordinated, centralized training program for qualification and certification of operations personnel...”* While it is true that the central training organization provides some overall direction for training and qualification and maintains a records system (TRAC) for tracking training and qualification status, that is far from the task to *“Administer a comprehensive, coordinated, centralized training program for qualification and certification of operations personnel.....”* Plant Standard STD-2770, section 3.1.2 Specifies: *“Managers and supervisors within directorate organization (a) Take ownership of training programs and verify that proper training is provided for each job position including the following subjects:”* This requirement seems in conflict with the direction from DIR-0001, both as it tasks central training discussed above and as it tasks individual directorates as discussed below.

DIR-0001 also tasks Manager of Manufacturing with *“Establishes, maintains, and conducts training for the weapons training, qualification, and certification program.”* Interviews and records review indicate that the Manufacturing Training and Qualification Program is effective in ensuring only appropriately trained, qualified, and proficient operators and technicians are assigned to conduct work within Manufacturing. It was noted that several key managers were functioning in roles for which they had not completed the required qualification. The Division Manager was aware of these situations, but was not monitoring progress, nor had any compensatory measures been specified. One consequence of the situation is that no professional, qualification associated continuing training is being tracked for the individuals since they have not completed initial qualification.

DIR-0001 also requires that Manager of Engineering *“Identifies the engineering training, qualification and certification program requirements to the Director of Human Resources and supports accomplishment of the Program.”* This statement implies a lesser overall responsibility on Manager of Engineering and an increased role in the Engineering Division training and qualification programs from Human Resources (Central Training). The Engineering Division Manual, section 2.2.9.1 seems to confirm the expectations from DIR-0001 rather than the role defined in STD-2770. The results of the interviews and record reviews noted that Engineering Training and Qualification

Status is much less robust than manufacturing. A specific issue is the System Engineer Qualification Program development and execution. A TPD and Qualification card were recently produced with limited direct involvement from central training as would be expected if it were a “..comprehensive, coordinated, centralized training program for qualification..”. The conclusion of the assessor from a review of the TPD and resulting qualification card and discussions with the cognizant manager is that the appropriate tasks were identified, but that the method of ensuring that the trainee obtains the competence commensurate with these tasks in the qualification process is seriously flawed and will not result in the effective system engineers to which the plant has committed. It was also noted that while the System Engineer Qualification requirement had been included in the training matrix for designated System Engineering Department personnel, the System Engineer designation had not been included in the training matrix for the designated Process Engineer Department Personnel. The review also noted that the DTC was much less experienced and much less capable of manipulating TRAC to gain the requested reports and data. In addition, the DTC indicated little involvement in training development or presentation and worked solely to schedule classes and input information into TRAC. The DTC indicated that no reports were produced for or requested by management to monitor the status of training and qualification within the division beyond those reports and emails automatically developed in TRAC.

DIR-0001 Tasks the Manager of Applied Technology (AT) with “*establish and maintain a business support infrastructure, including the selection and training of personnel for research...*” Record reviews and interviews indicated that this requirement was being met in an effective manner. Management was engaged and responsible for training. The DTC was fulfilling all of the applicable requirements of the DTC Job Description. It was noted that the process defined in IOP-AT80027 for designation of positions under 5480.20A would not always achieve the desired outcome since no mention is made of work with radioactive materials or work in a non-reactor nuclear facility (NRNF). A review of the list of personnel within AT requiring 5480.20A qualification indicated that the correct individuals had been selected. However, the selection could not have been achieved if the criteria in the IOP were followed.

DIR-0001 contains no expectations for training and qualification programs within the ES&H directorate. Record reviews and interviews reveal that ES&H has no divisional training and qualification program. The DTC is an individual in Training and Development Technologies Department (T&DT). ES&H “owns” no training. Radiation safety training for both ES&H Radiation Safety Staff and the remainder of the plant are conducted within T&DT. Interviews and review of Professional Staff Training Matrices indicates that there is no Professional Development Training required for Safety Professionals that would be ES&H Division specific training. All management involvement with training and qualification within ES&H Division was on an exception basis. No routine reports or metrics were provided or monitored. ES&H Management stated that they got excellent support from T&DT and that few training and qualification issues ever rose to management’s attention.

DIR-0001 contains no expectations for training and qualification programs within the Infrastructure Division. Infrastructure Division has a training group that plans, coordinate, present, and develop training and qualification program elements. The Infrastructure Training and Qualification Program focuses on ensuring that qualification is current and documented for every individual who is assigned a task for which qualification is required. There are approximately 300 qualified individuals within the Infrastructure Division. This assessment and past assessments have identified many issues and opportunities for improvement with the Infrastructure Division Training and Qualification Program. Most significant is the lack of required continuing training and drill program to validate and enhance the technical or professional skills of the individuals who work on systems, structures, and components (SSC) within the Pantex plant NRNFs. This issue is an acknowledged need that is being addressed in the development of a plan. It appears that the existing training group may lack the resources and technical competence to “flesh out” the plan and then implement it. Little evidence was noted that T&DT has been requested, taken, or plans an active, technical role in the planning and execution of the corrective actions. It was also noted that the report of overdue or not completed training within the Infrastructure Division was large, calling into question whether appropriate management oversight and responsibility for training is present within the division. Management did clearly articulate the commitment to ensuring each individual was qualified, but agrees that there is inadequate continuing training required to maintain the qualification. With a known inadequacy in continuing training tied directly to requalification, it would be more important to ensure that all required training outside of requalification requirements is completed. Management does not monitor the status of this non-qualification related training.

**This criterion was met**, although some inconsistencies and opportunities for improvement were identified and are discussed above. Some of the issues have been identified by BWXT Pantex and will not be repeated. The observation concerning training support for engineering and the inadequacy of the System Engineering Program has not been directly identified, but should be considered as the overall corrective action plan for the system engineering issues is brought to completion. The inconsistencies between the DIR-0001 requirements and the actual implementation processes should be evaluated.

## **1.2 An organization/person within line management is responsible for the implementation of the training and qualification program(s).**

As discussed above, BWXT Pantex directives generally define the expectations that an organization or a person within line management is responsible for implementation of the training and qualification programs. As discussed above, the effectiveness of the organizations and the outcomes of those organizations vary across the divisions. Also, it is noted above that there is some inconsistency within the overall plant roles and responsibilities directive, DIR-0001, as to the expectations for an organization or person within line management to be responsible to implement the training and qualification program. Central training is clearly tasked with a responsibility that it appears has been

passed off to the divisions through STD-2770. Manufacturing and Applied Technologies Divisions are clearly tasked by DIR-0001 with achieving the outcome of an effective training and qualification program within their organizations and have done so. DIR-0001 is less specific with tasking for other divisions, which may contribute to the issues and problems that are identified within Engineering and Infrastructure Divisions Training and Qualification Program results.

The success of the expectation that an organization or person within line management is responsible for the implementation of the training and qualification program is judged from the effectiveness of the training and qualification programs. Based on the results of this assessment and the results of previous assessments and outside reviews, the effectiveness of the Engineering Division and Infrastructure Division Training and Qualification Programs require programmatic improvements. Most of the areas of improvement have been previously identified and only verified by this assessment. However, it is noteworthy that the areas in which improvements are required have been previously identified over the years and the corrective actions taken in response to previous identifications have apparently not been effective or at least sustained. Although training and qualification issues were not the sole cause for the performance issues, it was a significant contribution in most cases.

**This criterion was met.** To meet this criterion, an administrative organization must be identified and that has been done. As discussed, the organizations are not all achieving the desired outcome or the necessary effectiveness.

### **1.3 Goals, objectives, and plans are in place to describe the implementation of the training and qualification programs.**

As discussed in the BWXT Pantex Nuclear Facility Training Program Assessment and validated during this assessment, goals, objectives, and plans are in place to describe the implementation of the training and qualification programs. They are stated in the Training Implementation Matrix (TIM), plant directives, Plant Standards and internal operating procedures. See the discussion in Criteria 1.1 for a more detailed discussion. For example, the TIM in part V.A states: “The qualification program is designed to ensure that personnel who are required to be qualified meet and/or demonstrate the minimum education, experience, training, and special requirements necessary to perform the basics functions of a job area as identified through job analysis. The mission statement for the T&DT Department states: “provide quality training programs, products, service, and support to the Pantex Plant to meet or exceed DOE and federal training requirements and to ensure a qualified, safe work force.”

DIR-0001 provides the goals and objectives for implementation of the training and qualification programs. T&DT as well as divisional IOPs amplify the details and provide the plans for the implementation of the training and qualification programs. Additional discussion of these implementing documents and programs are provided above.

At the individual worker or function level, through the performance based training (PBT) processes and procedures, the specific training and qualification plans are defined for each task. Training Program Descriptions (TPD) are developed to relate the tasks to specific skills and to the mechanism to use to attain the necessary competence commensurate with the responsibilities. Individual qualification cards are developed to define the process for achieving the competence commensurate with the qualification or certification. The process is robust and the outcome is usually adequate. A couple exceptions were noted with continuing training associated with maintenance craft requalification and the training methods specified in the System Engineering qualification process.

In addition, each worker has a training matrix that defines the aggregate of training that she or he must take to meet the goals and objectives for the individual's training and qualification program. Some of the training is specified as one-time training while other training is repeated at a specified periodicity. The employee and the supervisor review the training matrix for each employee annually. (Discussions and review of the individual training matrix indicates the review is annual, although it is specified as biennially in STD 2770) The items on the training matrix are in the TRAC database through which they are managed and tracked. The effectiveness of the process to ensure the implementation of the training and qualification program is not clear. If the completion of the items on the training matrix is important to the ability of the individual to safely and accurately accomplish the assigned job, tracking of completion of the items is also important. When a required training item is not completed within the specified periodicity, the readiness of the individual is not assured without further evaluation of the affect of the missed training on the capability to conduct the assigned tasks. Based on the size of the overdue training reports and the apparent lack of management evaluation of the significance of individual items for individuals, it appears that timely completion of training that is not part of a specific qualification is not a priority.

**This criterion was met.** The administrative aspect of this criterion is met. Due to the amount of training that is overdue and the lack of management awareness of the individual situations, it is less clear that the desired or appropriate outcome from the objectives and plans is being achieved.

**1.4 Training records are maintained to support management information needs and to provide required historical data. (Pg I-19, pp 15)**

The plant standards and IOPs specify the documentation that is required to show completion of training and qualification. In general, various Pantex Forms (PX-) are specified to document training events or training or qualification status. Pantex has a robust computerized training records system known as Training Records and Certification (TRAC) System. The information from the various PX forms is entered into TRAC. The system provides reports and status of training and qualification in a manner to meet management information needs and to provide required historical data. The system is a mainframe computer system that is not user friendly. However, the system is

extremely effective and when manipulated by an experienced DTC, provides all records and reports that are necessary for management to oversee and manage the training and qualification program and processes. The system has automatic input to some security systems to ensure access is not permitted when minimum access training and qualification is not current. The system provides reports for individuals, departments or groups, divisions, or selected subsets. Qualification lists are a key tool used to ensure that only qualified individuals are assigned to specific tasks for which qualification is required. The TRAC functionality includes automated checks such as verification that an individual who signs a PX form is qualified or authorized. An instructor whose proficiency has lapsed would have any documents he signed rejected. (TR.1-1) It was noted that TRAC is only as good as the individuals who are using it. Some challenges were identified in conversation over manipulation of the data, tailoring of reports, and updating system data. In some cases, difficulty was experienced in obtaining the requested tailored report. This difficulty may contribute to the limited use that management makes of the report capability within TRAC.

As discussed above, most managers do not take advantage of the capability of TRAC to provide reports and metrics of the status of training and qualification within the organization. Instead, the automatic functions of TRAC and the diligence of the DTC are relied upon to manage training and qualification.

TRAC is being replaced by a windows, server based replacement know as Plateau. As a software system which has nuclear safety implications Plateau must be developed, documented and managed as a critical software system with robust Software Quality Assurance (SQA). STD-1875, Software Quality Lifecycle Revision 9 has just been issued and is a significant upgrade from the previous version. Plateau will require SQA Level 1 in accordance with STD-1875, Issue 9. It is important that plateau development documentation, testing, and verification and validation and overall quality control meet the requirements for a quality Level 1 system as defined in STD-1875. In addition to the concerns for SQA associated with Plateau, functionality is also a concern. TRAC has demonstrated multiple functionality, in both the engineered control interlock features and the reports and tracking functions that are available. No individual knows or uses all of the features of TRAC. It is not know whether all of the interlocks and functions are adequately documented or whether they have been transitioned to Plateau. It is important to ensure that the transition to Plateau does not create unexpected lapses in the controls of nuclear safety that are embedded as engineered controls into TRAC. The compensatory measures put into place as Plateau is brought on line must be robust and thorough.

Additional records associated with training and qualification and implementation of the requirements of DOE O 5480.20A were reviewed during the assessment. For example, a record of all personnel who are in 5480.20A positions was provided. This record was a report from the Human Resources Information Management (HRIS) Data Management System, Peoplesoft. STD-2533 specifies a semi-annual audit of the accuracy of the information. Discussions also indicated an annual review in conjunction with the development and submittal of the TIM. Some errors were noted in the 5480.20A

designations in the HRIS Report. The DTCs were generally able to point out the errors when required to consider a particular position. In some cases, they indicated that they had attempted to have the error corrected without success. It was not clear that the individual DTCs or division training personnel used the information in the HRIS, so they had little concern when errors were noted. However, it appears that the HR compensation section does use the information in conjunction with assuring that entry training, experience, and qualification status is adequate to hire or transfer a specific individual. As noted in TR.3, many errors were noted in the process to ensure entry-level qualification requirements are met. The errors in the HRIS may contribute to this situation.

Other training records are maintained by either the divisional training organizations or T&DT. Examples include Plans of Instruction (POI), TPDs, qualification records, etc. T&DT also maintains records of completed courses, examinations, and other related materials associated with completed training. Records containing information on education, experience, and employment history are maintained by Human Resources. Medical records required for prerequisite training documentation are maintained by medical.

**This criterion was met.** The use of the records to monitor the effectiveness of the training program is not as effective as would be possible if the functionality of TRAC were fully exploited.

**1.5 Training developed and/or implemented by personnel or organizations other than the operating contractor's staff is monitored and controlled to ensure that it meets applicable facility requirements.**

T&DT has identified that this requirement is not met and is not included as a requirement in the training program requirements documentation. The failure to ensure that subcontractor staff is monitored and controlled to ensure that it meets applicable facility requirements was recently identified as an issue. No corrective action has yet been identified. No compensatory measures have been specified. Discussions during the assessment indicated that no particular effort was made to monitor contractor training for content or quality of delivery as might be appropriate in recognition of the lack of a programmatic resolution. It was identified that frequently subcontracted training is from the equipment manufacturer. However it was also discussed that the manufacture's trainers are not always competent. Anecdotal discussions also indicated difficulty obtaining training from a vendor that meet all the 5480.20A requirements at a price the buyer was willing to pay.

**This criterion was not met.** The issue is self-identified and corrective action is being evaluated.

**1.6 Training facilities, equipment, and materials effectively support training activities.**

Facilities in which manufacturing weapons training and infrastructure maintenance training occurred were toured. While the facilities could be improved, particularly to improve the physical conditions and to make the surroundings more accurately reflect the location where the activities will actually occur, they seem adequate to the needs of the training organization. Issues were identified, however. The maintenance training facility is noisy and many simulators are in the same space. The facility is a partially converted warehouse. Training spaces look like they are in a warehouse. A request has been submitted to upgrade the facility. Weapons training facilities lack fidelity with the actual bays and cells where the work will occur. Some cosmetic stagecraft has been undertaken to more closely simulate the bays and cells. More could be done. Another concern is the disruption of the training facilities to support weapons program process and tooling development. Program development is inherently informal and can result in negative training if not carefully managed. In addition, program development utilizes spaces that are in demand for training. Issues have also been identified with the physical condition as well as the technical fidelity of the weapons training devices. That aspect of the training support will be discussed in TR 6.5.

**This criterion was met.** As discussed above, while the criterion is met, many opportunities for improvement exist to improve the facilities, equipment and materials.

**1.7 Formal programs are in place to grant exceptions to training requirements, and to control/document qualification and certification requirements.**  
(5480.20A, Att. 2, pg I-16, pp 11. & pg I-17, pp12.)

Plant Standard STD-2777, Personnel selection, training, and qualification contain a provision and appropriate process to grant exemptions to training requirements and to control and document qualification and certification requirements. The procedure includes a provision that the Manager, PXSO, must approve all requests for extensions for certifications.

In accordance with DOE 5480.20A, Manager, Pantex Site Office (PXSO) shall: (7) *approve contractor procedures which are established to grant exceptions to specific training or qualification requirements for an individual;* (8) *Approve on a case-by-case basis, contractor requests for certification extensions.*

STD-2777, Issue 11 is currently effective. The last approval by PXSO was for Issue 10, approved by the Contracting Officer vice the manager as specified in the Order. BWXT Pantex states that due to the non-intent nature of the changes, PXSO approval of Issue 11 was not required. In that the Manager, PXSO approves the TIM and the Order requires the Manager PXSO to approve the contractor procedure, it is not clear that the contracting officer is the correct approval official for the procedure. In addition, since the change bars in Issue 11 indicate a change in the portion of the procedure that requires PXSO approval of extensions of certification, it would be appropriate that PXSO concur in the change.

**This criterion was met.**

**ISSUES:**

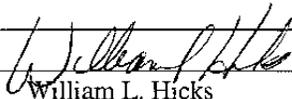
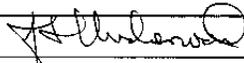
All issues identified in this CRAD are previously identified and were communicated to the assessment team prior to the start of the assessment. In addition, it was stated that corrective action planning is in progress. Therefore they will not be repeated. They are discussed in the write-ups of the individual criteria.

**STRENGTH:**

**TR1-1** The functionality and embedded engineered controls/interlocks of TRAC is considered to be a strength. The associated accuracy and attention to which TRAC supports assurance that every individual assigned to a job meets the qualification requirements for the job to which assigned is an associated strength made possible by the functionality and engineered controls within TRAC.

**CONCLUSION:**

BWXT Pantex is organized, staffed, and managed to facilitate planning, directing, evaluating, and controlling systematic training processes that support the facility missions. Some inconsistencies were noted between DIR-0001 and the implementing standards and internal operating procedures that may contribute to some of the less than desirable results that were observed. In particular, concerns are identified as to the effectiveness of the training and qualification programs within the Engineering and Infrastructure Support Divisions. Most of the concerns have been previously identified, either through internal assessments or external reviews. In some cases the inadequacies have existed for an extended period of time without resolution that indicates a need for a new approach to resolution. The ongoing six-sigma yellow belt activity may provide the new and successful approach. The management commitment to ensuring that all assigned workers are properly qualified is a noteworthy success that must be maintained as the corrective actions are implemented and the Plateau training and qualification data management system is implemented.

Inspector:  William L. Hicks	Team Leader:  Jeff G. Underwood Team Leader
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**OBJECTIVE: TR 2**

**DATE: August 7, 2003**

**OBJECTIVE MET: Yes**

**OBJECTIVE:**

**Training staff (contractor and subcontractor) possess the technical knowledge, experience, and the developmental and instructional skills required to fulfill their assigned duties. (5480.20A, Att. 2, Pg I-1, pp 2 & pg IV-3, pp 2)**

**CRITERIA:**

- 2.1 The training staff have and maintain the education, experience, and technical qualifications for their respective positions.**
- 2.2 A training program is implemented to ensure that training staff gains the knowledge and skills required for their position.**
- 2.3 A continuing instructional skills training program is implemented to maintain, improve, and update the knowledge and skills of incumbent training staff based, in part, on the results of instructor evaluations.**

**APPROACH:**

**Record Review:** Review several training/employment records of BWXT training staff to measure appropriate education, experience, and technical qualification for assigned positions. Review approved training program policies, procedures, and records for the implementation of a training staff-training program, and a continuing training program. Review instructor evaluations for evidence of an effective feedback mechanism.

**Interviews:** Interview training managers and staff to measure adequacy of education/technical knowledge, experience, and instructional skills.

**Observations:** Observe training evolutions (as available).

No Instructor Training was observed during the review. An On-the-Job refresher class (Course No. 125.02) for instructors was scheduled for 7/30/03 – 8/01/03, but cancelled due to having an insufficient number of trainees registered to justify holding the class (per the T&DT course instructor).

**RECORDS REVIEWED:**

- DOE O 5480.20A, Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities, Change 1, 7/12/2001

- DOE-STD-1070-94, DOE Standard, Guidelines for Evaluation of Nuclear Facility Training Programs, June 1994
- BWXT Pantex Training Implementation Matrix, Revision 7, 3/20/2003
- DOE-HDBK-1001-96, DOE Handbook - Guide to Good Practices for Training and Qualification of Instructors, March 1996
- 125.19, BWXT Pantex Student Workbook – Classroom Instructor Training – Initial, no Revision or Date identified
- 125.02, BWXT Pantex Student Workbook – On the Job Training, no Revision or Date identified
- STD-1001, BWXT Pantex Standard – Employee Hiring Procedure (U), Issue 17
- STD-2770, BWXT Pantex Standard – Training, Issue 12
- STD-2777, BWXT Pantex Standard – Personnel Selection, Training, and Qualification, Issue 11
- STD-2785, BWXT Pantex Standard – Training Evaluation (U), Issue 5
- STD-2786, BWXT Pantex Standard – Training Development, Issue 5
- STD-2787, BWXT Pantex Standard – Training Implementation, Issue 5
- STD-2788, BWXT Pantex Standard – Training Analysis & Design, Issue 6
- IOP-00872, BWXT Pantex Internal Operating Procedure – Weapons Training & Qualification, Issue 2
- BWXT PANTEX Training Schedule for 7/28/03 through 8/8/03
- Job Description, Mfg. Business Support Representative, Job Code F47, Issue 4
- Job Description, Division Training Coordinator, Job Code V63, Issue 4
- Organizational Chart – Infrastructure Division, Revision 7/8/2003
- Organizational Chart – Engineering Division, Revision 7/30/03
- MNL-293056, Engineering Division Manual, Issue 2
- MNL-293072, Process Engineering Department Manual, Training (Excerpts), Issue 1
- P01-500.06, Process Engineering Department Mentorship Program Workbook, Issue 8, 3/7/2003
- Training Program Description & Qualification Package for Engineering Division System Engineer (SE), 5/30/2003
- Training Program Description & Qualifications Package for Operations Directorate Operations Training Coordinator (E104), 11/27/2000
- Training Records and Certification System (TRAC) Report – Training History of Weapons Training Personnel (4 instructors), 8/1/03
- Training Records and Certification System (TRAC) Report – Qualified Personnel Report – Weapons Trainer Qualification (WTQ), 8/1/03
- Qualification Cards, Mfg Div. Weapons Trainers (2 instructors), 5/22/00, 8/5/02
- Qualification Cards, Mfg Div. Operations Coordinator, 8/7/98
- Qualification Cards, Mfg Div. Operations Manager, 2/2/98
- Training Records and Certification System (TRAC) Report – Equivalent Course Information Report – Operations Manager/Weapons Trainer Equivalence, 7/31/03
- PX-21, Requisition for Personnel, Weapons Training Specialist, 6/25/02 –

- PX-15, Course Creation Worksheet, Course 69.13, Hoist Practical Evaluation for Manufacturing, 6/25/03
- PX-15D, Training Effectiveness Plan, Course 69.13, Hoist Practical Evaluation for Manufacturing, submitted with PX-15 dated 6/25/03
- Plan of Instruction (POI) – Course 69.13, Hoist Practical Evaluation for Manufacturing, submitted with PX-15 dated 6/25/03
- PX-4267, Performance Evaluation Completion Report, Course 69.13, Hoist Practical Evaluation for Manufacturing, Issue 3
- Plan of Instruction (POI) – Course 283.02 – B83 Mechanical Mod 0/1, Issue 1, 01/03
- PX4267, Performance Evaluation Completion Report, Course 283.02 – B83 Mechanical Mod 0/1, Issue 3
- Training Records and Certification System (TRAC) Report – Qualified Personnel Report – Basic Training Instructor (TI), Infrastructure Division, 07/30/03
- Training Records and Certification System (TRAC) Report – Qualified Personnel Report – On-the-Job Training Instructor (OTI), Infrastructure Division, 07/30/03
- PX-3122, Instructor Skills Competency for Classroom Training, Infrastructure Course 88.15, 07/30/03
- PX-3122A, Instructor Skills Competency for OJT Training, Infrastructure Course 88.15, 07/30/03
- Infrastructure Qualified Instructor Classroom Evaluation Report, Summary of Class Critiques, 07/30/03
- Contract 27987, Statement of Work – Overhead Crane Inspection (Vendor) Training, 06/17/03
- Contract 27987, Certificate of Vendor Instructor Qualification, 11/15/2001
- Statement of Work, Certification (Vendor) Training for NDT-PT-LL2, 04/23/03, Vendor Course Syllabus and instructor resume attached
- Academic credential check evidence for key T&DT personnel
- PX-2039, Instructor Technical Qualification Evaluation Form, for 3 T&DT instructors, dated July 2003
- Training Records and Certification System (TRAC) Report – T&DT Course Listing, 08/04/2003
- Course Development Support Documents, Course No. 125.20, Basic Instructor Training Refresher
- Course Development Support Documents, Course No. 125.07, Basic On-the-Job Training Refresher
- PX-15D, Training Effectiveness Plan, Course No. 125.20, not dated
- BWXT Pantex training staff education and experience summary table, 08/04/03
- Academic credential checks for T&DT Key Personnel
- Individual Training Matrix for 3 T&DT personnel, dated 08/04/03
- PX-3122 “Instructor Skills Competency for Classroom Training” forms (5) for active classroom instructors, dated July 2003 (various dates)
- PX-3122A “Instructor Skills Competency for OJT Training” forms for (5) active OJT instructors, dated July 2003 (various dates)

- The ASTD Training & Development Handbook, 4<sup>th</sup> Ed., Craig, R.L. Editor in Chief, 1996, McGraw-Hill, New York

**INTERVIEWS CONDUCTED:**

- Division Manager, Engineering Division
- Division Manager, Human Resources Division
- Division Manager, Infrastructure Division
- Manager, Infrastructure Controls
- Training Team Leader – Infrastructure Division
- Instructor, Infrastructure Division
- Contracting Officer’s Technical Representative (Vendor Training Purchases) – Infrastructure Division
- Division Training Coordinator – Infrastructure Division
- Division Training Coordinator – Engineering Division
- Supervisor, System Engineering
- Supervisor, Process Engineering
- Manager, Weapons Training
- Instructors (4) – Weapons Training Department
- Administrative Assistant – Weapons Training Department
- Division Training Coordinator – Manufacturing Division
- Manager, Manufacturing Business Support
- Manager, Training & Development Technologies (T&DT)
- Instructor - T&DT
- Test Development Specialist – T&DT
- Procurement Buyer/Contracting Officer – Vendor Training Services

**OBSERVATIONS:**

None

**DISCUSSION OF RESULTS:**

**2.1 The training staff have and maintain the education, experience, and technical qualifications for their respective positions**

The minimum (entry-level) requirements for education and experience of the training organization personnel for the 5480.20A positions of Training Manager, Training Instructor, and Training Coordinator were met. This criterion was satisfied by a review of records of each staff member’s highest educational credential attained, years of job-related experience, and years of experience in a nuclear facility. At Pantex, this includes training personnel working in organizational divisions other than in the Training & Development Technologies department within the Human Resources Division. In addition to the basic instructional skills needed, the training staff has the basic

technical/subject matter knowledge appropriate to successfully execute their training responsibilities.

The qualification status of the training staff personnel is maintained in the Training Records and Certification System (TRAC). The system aids Division Training Coordinators and training management in maintaining the active qualification status of the staff by providing timely management reports on upcoming qualification renewal requirements and by maintaining a complete list of training required to satisfy the appropriate training and job codes for each training staff member. BWXT Pantex Standard STD-2777 governs the qualification of training staff personnel. Weapons training staff qualification requirements are further identified in Manufacturing Division Internal Operating Procedure IOP-B-0019.

Additionally, prior to teaching a course, STD-2777 requires that an instructor be reviewed and approved by training management to deliver the specific training as documented on a completed PX-2039 form (Instructor Technical Qualification Evaluation). Completion of this form is also recorded in the TRAC system.

DOE Order 5480.20A also requires that “Subcontractor personnel shall meet the qualifications for the job function to be performed” (Chapter 1, Paragraph 3). Criteria 1.5 of DOE Standard 1074-94 states “Training developed and or implemented by personnel or organizations other than the operating contractor’s staff is monitored and controlled to ensure that it meets applicable facility requirements.” In the case of vendor training services, the trainers shall possess, as a minimum, the same level of technical and instructional skills as BWXT Pantex qualified instructors for the given subject matter. Procurement records from two vendor training purchases were reviewed. In both cases, there were no specific requirements within the Statement of Work to provide trainer qualification documentation prior to order acceptance. The procurement department buyer for the contracted services was unaware of any special requirements or impacts on the procurement process for items within the purview of DOE Order 5480.20A. The division training team leader did request, and did receive, trainer qualifications in the form of resumes and a qualification certificate. This request was done on an ad hoc basis based on the experience of the technical representative, and there is no current procedural requirement to include the document submittal requirements in the training purchase documents. This situation is discussed further in Criteria TR1-5 of this report.

Based on the evidence reviewed, **this criterion was met.**

## **2.2 A training program is implemented to ensure that training staff gains the knowledge and skills required for their position.**

BWXT Pantex, via the Training & Development Technologies Department (T&DT), provides Basic Instructor Training (BIT) (Course No. 125.19) and On-the-Job Instructor Training (OJT) (Course No. 125.02) to all potential training instructors in all organization divisions for the purpose of meeting this Criterion. Per STD-2777, personnel assigned a

Training Code of “TP” or “OTP” (instructor codes) are required to successfully complete this basic training, prior to conducting a class. Completion of the training is recorded in the TRAC System.

Instructional theory and skills indoctrination training and refresher training (BIT/OJT) for staff personnel designated as Training Coordinators (training code TC) are not currently required per the TRAC system. This is in opposition to the position duties, responsibilities, and requirements listed in the Human Resources job description document (position code V63) and to the aggregated functional responsibilities for Division Training Coordinators (DTC) identified in Plant Standards STD-2770, STD-2777, and STD-2788. Further, most DTCs are designated with a job code unrelated to the duties of DTC. In practice, however, the DTC role and duties are primarily administrative and the lack of instructional skills has a minimal impact on training functions. Per a review of current training classes available, there is no class offered that would serve as an indoctrination for staff assigned to the position of DTC. Based on the records reviewed, there is only one person currently assigned as a Division Training Coordinator that is assigned to position code V63, out of a total of 13 persons listed as Training Coordinators.

Based on the evidence reviewed, **this criterion was met.** However, the job roles and responsibilities of the Division Training Coordinators should be reviewed and revised as appropriate.

**2.3 A continuing instructional skills training program is implemented to maintain, improve, and update the knowledge and skills of incumbent training staff based, in part, on the results of instructor evaluations.**

Biennial refresher training for Basic Instructor Training and On-the-Job Training as required by STD-2777 reinforces the instructional concepts and skills taught in the associated baseline courses discussed in Criteria 2-2. This program does satisfy the requirement to maintain the incumbent’s knowledge and skills. However, a review of current active training classes from T&DT indicates there are no other classes available that provide advanced instructional development skills and concepts. Supplemental courses were offered in the past, but discontinued. One example was course 125.09, Advanced Instructor Training. (TR2-1)

STD-2777 also requires an instructor to receive an annual instructor evaluation and to attain a rating of Satisfactory by another qualified instructor. A review of 10 sample Instructor Evaluations from T&DT, Infrastructure, and Weapons Training, reported on forms PX-3122 (Basic Instructor Training) or PX-3122A (On-the-Job Training), revealed a lack of uniformity in scoring and in the level of details provided by the evaluators. Examples were observed where the scoring was split (e.g. 4.5 vs. 4 or 5) or some other notation (5+ or N/A) was used. Some observers added detailed notes to the forms discussing the evaluation in additional depth. There was no uniformity or direction regarding whether a low score in any particular area should trigger additional discussions

or documentation. There was also evidence of scoring inflation with two records indicating the highest scores in all observed areas (average score 4.95 – 5). This lack of uniformity limits the usefulness of the data in analysis of overall training staff performance and hampers management’s ability to objectively assess training effectiveness for instructors.

Based on the evidence reviewed, **this criterion was not met.** (TR2-2)

**ISSUES:**

**TR2-1** No continuing training is currently available to enhance/update the instructional skills and capabilities of classroom and OJT instructors.

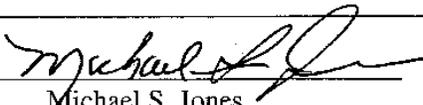
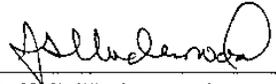
**TR2-2** As currently administered, the annual instructor evaluations required by STD-2777 are of limited value.

**STRENGTH:**

None

**CONCLUSION:**

**The overall objective was met,** with notation of the continued training and instructor evaluation weaknesses described above.

Inspector:  Michael S. Jones	Team Leader:  Jeff G. Underwood Team Leader
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**OBJECTIVE: TR 3**

**DATE: August 7, 2003**

**OBJECTIVE MET: No**

**OBJECTIVE:**

**Trainees meet the minimum requirements for entry into the training program.**

(5480.20A, Att. 2, pg IV-1, pp 2)

**CRITERIA:**

- 3.1 Entry-level requirements are established for each position and include as applicable the minimum education, experience, technical, and medical requirements.**
- 3.2 Personnel selected for and/or assigned to the operating organization meet the prescribed entry-level requirements prior to being assigned to a position.**
- 3.3 Training program entry-level requirements are reviewed and revised as necessary on the basis of evaluation of trainee performance.**

**APPROACH:**

**Record Review:** Review approved BWXT policies and procedures detailing entry-level requirements for minimum education, experience, technical, and medical requirements. Review the current, approved Training Implementation Matrix. Review several employment, training, and medical records to measure compliance with requirements. Review training course materials/records to measure adherence to course prerequisites.

**Interviews:** Interview training managers and staff as necessary.

**Observations:** None required.

**RECORDS REVIEWED:**

- DOE Order 5480.20A, Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities, Change 1, 7-12-01
- DOE-STD-1074-94, June 1994, Guidelines for evaluation of nuclear facility training programs
- A-03-67, Nuclear Facility Training Program Assessment Report, July 9-17, 2003

- Pantex Training Implementation Matrix (TIM) for DOE O 5480.20A, Revision 7, March 20, 2003
- AB-SAR-314353, Chapter 12, Sitewide SAR, Procedures and Training, Rev 8, April 30, 2003
- DIR-0001, Issue 14, Roles and Responsibilities for the Management and Operation of Pantex Plant, undated
- STD-2001, Issue 17, Employment Hiring Procedures, undated
- STD-2533, Issue 5, 5480.20A Position Classification Process, undated
- STD-2770, Issue 12, Training, undated
- STD-2777, Issue 11, Personnel Selection, Training, and Qualification, undated
- STD-2777, Issue 10, Signature Page including signature of DOE/OASO Contracting Officer, dated 12/14/01
- BWXT Pantex Plant Training Findings Trend Matrix from sample assessment reports January 2000 through 23 July 2003, dated 28 July 2003
- BWXT Pantex Comparison Matrix for 5480.20A entry level requirements (TIM Revision 7) dated 22 July 2003
- Training Code Assignment and Training Requirements lists of all required courses needed or completed for 6 ES&H Division Personnel; 5 Applied Technology Division personnel; 5 Engineering Division Personnel; 5 Infrastructure Division Personnel; and 2 Manufacturing Division Personnel
- Job Descriptions for six different positions
- PX-2726A, Infrastructure Division Employee Qualification Program, Issue 2 (two versions) and Issue 3
- PX100-11, Issue 16, Employee Transfer Data Form
- PX-2658, Issue 7, Salary/Personnel Action Worksheet
- PX-2657, Issue 7, New Hire Salary Offer Worksheet
- PX-4090, Generic First Line Supervisor Employee Training Plan
- NNSA Training Assessment Inbrief Presentation Material
- IOP-AT80027, Issue 9, Applied Technology Division guidelines for Personnel Qualification
- IOP-B-0019, Issue 29, Manufacturing Guidelines for Personnel Selection, Qualification, and Certification
- IOP B-3072, Issue 6, June 13, 2001, Weapon Production Stores Dept Training and Qualification of Personnel
- IOP B-3106, Issue 2, Recertification and Requalification Document Test Procedure
- IOP-00872, Issue 2, Weapons Training and Qualification
- IOP-00879, Issue 2, Maintenance and Utilities Training and Qualification Program
- Matrix of Training Program Status; NNSA DOE O 5480.20A Audit—July/August 2003, Rev 1, 28 July 2003

**INTERVIEWS CONDUCTED:**

- Manufacturing Production Manager (2)
- Manager Compensation and HRIS
- HR Specialist
- HR Admin specialist
- Manufacturing Weapons Training Manager
- Manufacturing Business Support Manager
- Training TIM Coordinator

**OBSERVATIONS:**

None

**DISCUSSION OF RESULTS:**

**3.1 Entry-level requirements are established for each position and include as applicable the minimum education, experience, technical, and medical requirements.**

Entry-level requirements have been expressly specified in the TIM that commits to implementation of the requirements from 5480.20A. STD-2533 and STD-2001 establish the expectation that entry-level requirements will be met. There is also discussion of a matrix that relates the entry requirements to the individual positions. The Nuclear facility Training Assessment Report indicates that the matrix was not available. Several versions were provided during this assessment but none appeared to be an official or controlled document. Several PX forms associated with employee transfers and new hires were reviewed. These included PX100-11, Employee Transfer Data Form, PX-2657, New Hire Salary Offer Worksheet, PX-2658, Salary/Personnel Action Worksheet, and three versions of PX-2726A, Infrastructure Employee Qualification Assessment. In each case, the form contained a question concerning compliance with the 5480.20A employment requirements or whether the position to which the employee was being hired was a 5480.20A position. In only one of the six forms reviewed did the form provide the 5480.20A requirements that the individual must meet. In some cases that is appropriate since the requirements are based on the position and must be evaluated for each position.

The individual Division IOPs also discuss the requirement to meet specific entry prerequisite education requirements. In most cases, the specific requirements for 5480.20A positions have not been repeated on the forms or in the IOPs. As a result, errors occur due to the lack of understanding of the specific requirements by the individual who conducts the initial screen of a prospective new hire or a transferring individual. Interviews with selected hiring managers indicated that they did not question

whether the prospective new hire met the entry requirements, assuming the candidate would not have been presented for an interview if he or she did not meet minimum entry requirements.

**This criterion was met.** However, as discussed below, the desired outcome was not achieved in that a number of individuals have been identified who did not meet the specified entry requirements due to the lack of understanding of those requirements by the individuals who conducted the initial screens. Contributing to the screening errors was the situation in which the specific requirements were not readily available to the screener who had not been adequately trained as to the meaning of the requirement and the action expected of the screener.

### **3.2 Personnel selected for and/or assigned to the operating organization meet the prescribed entry-level requirements prior to being assigned to a position.**

The failure to meet this criterion was pre-identified to the assessment team as follows:

*“Process for verifying entry-level qualifications is adequate but not fully implemented/enforced. Corrective actions are under consideration.”* The report of the nuclear facility Training Program Assessment conducted in July 2003, report A-03-67 discussed the results of the review of this criterion as follows:

*“The position descriptions for several operator positions failed to reflect the requirement for a high school diploma as required by 5480.20A.*

*A review of PX-2658 which would identify exempt positions falling under 5480.20A and whether candidate met entry-level minimum entry-level requirements revealed:*

- *Only 6 of 17 were answered correctly that 5480.20A applied. However only one of those answered the second and third question correctly. “Is candidate qualified? How qualified?”*
- *There were 6 of 17 answered in the negative for all questions related to 5480.20A.*
- *The others were simply left blank on one or all of these questions.”*

Discussions with the HR Manager and the individuals who work with the relevant forms confirmed that they agreed that the proper checks and evaluations had not been made previously to ensure personnel met the applicable 5480.20A initial training prerequisites. They were struggling with a corrective action path forward. The initial approach was to update the individual Job Description Forms. This effort was using a matrix (BWXT Pantex Comparison Matrix for 5480.20A Entry-level Requirements) provided by the TIM Coordinator. The matrix listed each job title in each division that was a 5480.20A position and provided the 5480.20A entry-level requirements. The plan was for the HR Specialist to add the 5480.20A entry-level requirements to the Job Description. Unfortunately, this approach is flawed since the same job title and HR Position Code applies to both 5480.20A positions and non-5480.20A positions. Therefore the path HR was on would require unnecessary or inappropriate entry-level requirements when the

position was not a 5480.20A position. Following the interview, the HR Manager agreed that the approach was flawed and a new plan was required.

The second necessary action to resolve this problem is to evaluate the entry-level qualifications of incumbents to 5480.20A positions to determine whether they met the prerequisite entry-level requirements. For those in positions for which the entry-level requirements were not met, management decisions to grant a waiver, remove the individual from the position, or take remedial actions will be required. From the discussions with HR, it was apparent they recognized additional action was required, but did not have a plan as to what action would be taken. It was not apparent that the managers of the individuals in 5480.20A positions were aware of the potential issue nor had thought about how to deal with the questions when they arise. If the issue is not managed in an appropriate and thoughtful manner, the impact could be significant.

**This criterion was not met.** The issue was identified at the start of the assessment. However, the corrective action plan was not appropriate and no plan was in place to deal with the legacy of failing to verify entry-level requirements to incumbent qualified individuals.

### **3.3 Training program entry-level requirements are reviewed and revised as necessary on the basis of evaluation of trainee performance.**

The report of the Nuclear Facility Training Program Assessment indicated that during interviews it was noted that Manufacturing did review the adequacy of the entry-level requirements and as an example was changing the entry-level requirements for Production Technicians, Job Code 675. This situation was briefed to the Assessment Team during the inbrief. However, a review of the relevant IOPs and STD provides no requirement that the review of the adequacy of the entry-level requirements occur. In fact, the manufacturing and maintenance IOPs are essentially silent on entry-level requirements; instead passing the subject to STD-2001, Employment Hiring Procedures that is also essentially silent on entry-level requirements. No procedure discusses a requirement to review and revise entry-level requirements as necessary based on an evaluation of trainee performance.

The status matrix provided to the team at the start of the assessment has the following note/comment regarding the status of this criterion: *“While revision of TPDs and required training matrices is done annually/biennially for most 5480.20A training and qualification programs, the administrative control does not specify the periodicity of this review and ensure that it occurs. This control is written into the new draft of one of the PBT standards (2770, 2785, 2786, 2787, or 2788).”*

**This criterion was not met.** However, the corrective actions identified above will resolve the deficiency.

**ISSUES:**

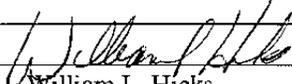
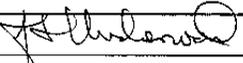
All issues identified in this CRAD are previously identified and were communicated to the assessment team prior to the start of the assessment. In addition, it was stated that corrective action planning is in progress. Therefore they will not be repeated. They are discussed in the write-ups of the individual criteria.

**STRENGTH:**

None

**CONCLUSION:**

BWXT Pantex has processes that if fully implemented would have assured that trainees met the minimum requirements for entry into the training program. However, due to lack of understanding at critical points in the process and lack of clarity and necessary details in the procedures and on the forms, the processes were not implemented effectively. The self-identified result is that some individuals entered the 5480.20A training program who did not meet the minimum entry-level requirements. At the time of the assessment, there was no resolution for the condition that had been identified.

Inspector:  William L. Hicks	Team Leader:  Jeff G. Underwood Team Leader
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**OBJECTIVE: TR 4**

**DATE: August 7, 2003**

**OBJECTIVE MET: Yes**

**OBJECTIVE:**

**Program content for competent job performance is identified, documented, and included in the training programs, as appropriate. (5480.20A, Att. 2, pg I-6, pp b.)**

**CRITERIA:**

- 4.1 The tasks required for competent job performance are identified and documented through a systematic analysis of job requirements. The training program is based on the results of this analysis. (5480.20A, Att. 2, pg I-6, pp b.)**
- 4.2 Current facility safety analysis report, procedures, technical and professional references, DOE Guidelines and Orders, and industry operating experience are referenced as applicable to establish both initial and continuing training. (5480.20A, Att. 2, pg I-5, pp (3))**
- 4.3 Training for Technical Staff personnel is based on an assessment of position duties and responsibilities. (5480.20A, Att. 2, pg I-13, pp h.)**

**APPROACH:**

**Record Review:** Review approved BWXT policies, procedure, and records for evidence of a program of systematic analysis of job requirements for appropriate tasks performed in the facility. Review training program technical staff training requirements, and records as necessary to measure conformance to specified requirements. Review the facility-specific list of tasks, and job task analysis program documentation.

**Interviews:** Interview BWXT training program managers and staff as necessary to understand the systematic analysis of job requirements and how it supports determination of training program content.

**Observations:** None required.

**RECORDS REVIEWED:**

- DOE Order 5480.20A, Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities, Change 1, (7/12/01)
- DOE-STD-1070-94, June 1994, Guidelines for evaluation of nuclear facility training programs

- Training Implementation Matrix, DOE O 5480.20A, Revision 7, March 20,2003
- EPIC Yellow Belt Project Evaluation of Training Effectiveness, Spring 2003
- MNL00079, Pantex Plant Quality Assurance Program Description (9/02)
- BWXT Pantex Nuclear Facility Training Program Assessment Report A-03-67 of July 23, 2003, Subject, Nuclear Facility Training Program
- Infrastructure Training and Qualification Program Assessment Report, SA-500-03-05, (3/14/03)
- BWXT Pantex Plant Training Findings Trend Matrix from Sample Assessment Reports, January 2000 through July 2003.
- DIR-0001, Roles and Responsibilities for the Management and Operation of Pantex Plant, Issue 14
- MC-1000, MIC S/RID, Management Integration and Controls Standards/Requirements Identification Document, Issue 10
- MS-3300, MS S/RID, Mission Support Standards/Requirements Identification Document, Maintenance Section, Issue 03
- STD-0147, Change Initiation, Review, and Approval, Issue 5
- STD-2533, 5480.20A Position Classification Process, Issue 5
- STD-2770, Training, Issue 12
- STD-2777, Personnel Selection, Training, and Qualification, Issue 11
- STD-2785, Training Evaluation, Issue 5
- STD-2786, Training Development, Issue 5
- STD-2787, Training Implementation, Issue 5
- STD-2788, Training Analysis & Design, Issue 6
- STD-3140, Event Investigation, Critique Process and Occurrence Reporting, Issue 35
- STD-6161, Issue Reporting, Issue 14
- Draft STD-277X, Technical Safety Requirements Training
- Training Completion Report (PX-3864) for Course 523.02, Individual Training Matrix Review
- Engineering Division Manual MNL-293056
- IOP-AT80027, Applied Technology Division Guidelines for Personnel Qualification, Issue 9
- IOP-B-0019, Guidelines for Personnel Selection, Qualification and Training, Issue 029
- IOP-B3072, Weapon Production Stores Department Training and Qualification of Personnel, Issue 6
- IOP-00872, Weapons Training and Qualification, Issue 2
- IOP-00879, Maintenance and Utilities Training Program, Issue 002
- Quality Assurance Program Description, Infrastructure Division
- Assurance Plan, Manufacturing Division
- Quality Plan, Technology Development & Deployment Department
- Human Resources Division Quality Plan
- Infrastructure Division Training & Qualification Program Assessment Report, March 14, 2003

- Training Program Description & Qualification Package for Maintenance Division (PX-2496A) Manufacturing Production Technician (12/20/02)
- Training Program Description & Qualification Package for Manufacturing Division (PX-2496A) Production Planner (4/8/03)
- Training Records and Certification Quality/Training Code/Course Relationships MAP Training Code: PT (12/18/02)
- Training Program Description & Qualification Package for Engineering Division, System Engineer (5/30/03)
- Training Program Description & Qualification Package for Applied Technology Division, Engineering Technician Reuse (4/11/03)
- Training Program & Qualification Record for Planning, Scheduling & Integration Division, Tooling Material Handler TW2 & TW4 (4/03)
- Training Program Description & Qualification Package for Quality Division, Product Acceptance Technician (PAT) (5/24/01)
- Training Program Description & Qualification Package for Manufacturing Division, W62 D&I Mechanical (1/8/03)
- Training Program Description & Qualification Package for Applied Technology Division, Technology Development and Deployment Department, Development Engineer/Scientist (3/24/03)
- Training Program Description, & Qualification Package for Planning, Scheduling & Integration Division, Production Stores Operations Manager, SWWO (7/15/03)
- Training Program Description & Qualification Package for Planning, Scheduling & Integration Division, Production Stores – Department Manager, SWOD (2/7/03)
- Training Program Description & Qualification Package for Planning, Scheduling & Integration Division, Production Stores – Operations Manager, SWWO Training Program Description & Qualification Package for Planning, Scheduling & Integration Division, Production Stores – Department Manager, SWOD (2/7/03)
- (2/7/03)
- Training Records and Certification Quality/Training Code/Course Relationships MAP Training Code: PAT (5/24/01)
- POI 103.11 Waste Management and Component Issues for Manufacturing Personnel- Level 1
- POI 176.58 Surface Porosimetry by ASAP-2405
- POI 69.13-Hoisting Practical Examination for Manufacturing Division
- POI 125.19 Basic Instructor Training
- POI 500.06 Process Engineering Mentoring Program
- Training Records and Certification Quality/Training Code/Course Relationships MAP Training Code: TW2 & TW4 (4/03)
- Course Creation/Review Worksheet PX-15, Surface Area Analysis – ASAP-2405 (1/22/03)
- Course Creation/Review Worksheet PX-15, Product Acceptance Qualification Card 142.06
- Course Creation/Review Worksheet PC-15, Interactive Electronic Procedures 302.79
- Course Creation/Review Worksheet PX-15, Production Planner Qualification Card

- Flexible Continuing Training, PX-15B, (draft) for Transportation TSRs, Group 2, Module 2
- Needs Analysis, PX-15C, POI 80.58
- Training Completion Report, Course Number 523.02, Individual Training Matrix Review
- Work Order Package 29159316 01, 12-60 Hoist Brake Inspection
- Job Description, Division Training Coordinator, Position Code V63
- Organization charts for divisions and departments evaluated
- Infrastructure Division Training Effectiveness Course Log
- Manufacturing Division List of Eligible SME's for Technical Support, May 9, 2003
- FY 2003 BWXT Pantex Mid-Year Self-Assessment
- BWXT Mid-Year Assessment by the NNSA Site Office

**INTERVIEWS CONDUCTED:**

- Training & Development Technologies Department (T&DT) Manager
- Training TIM Coordinator
- Engineering Division Manager and training staff
- Infrastructure Division Manager and training staff
- Manufacturing Division Manager and training staff
- Applied Technology Division Manager and training staff.
- Planning, Scheduling and Integration Division and training staff
- Project Manager, Site-wide Safety Analysis Report Integrated Implementation Plan
- Instructor, POI 125.19, Basis Instructor Training
- Weapons Training Manager
- Infrastructure Training and Qualification Team Leader
- Project Manager (IT Division), Plateau Project
- T&DT Project Manager, Plateau Project
- Training Specialists (5)

**OBSERVATIONS:**

- NNSA Training Assessment Inbrief
- Tour of T&DT Facilities
- Tour of Maintenance Training Facilities

**DISCUSSION OF RESULTS:**

- 4.1.1 The tasks required for competent job performance are identified and documented through a systematic analysis of job requirements. The training program is based on the results of this analysis. (5480.20A, Att. 2, pg I-6, pp b.)**

BWXT Pantex addresses this criterion through a systems approach to training. A line management led team conducts a Needs Analysis per DOE-HDBK 1103-96. If the Needs Analysis indicates additional training a line management led team conducts a Table Top Job Analysis (TTJA) per DOE-HDBK-1076-94. The team translates the tasks emerging from the TTJA into terminal learning objectives and compares the objectives to existing training. If nothing suitable exists BWXT develops the necessary training. The training is then incorporated into either an existing or new Qualification Standard. BWXT uses a comparable procedure to determine the need for changes to existing training and Qualification Standards.

BWXT conducts Analysis and Design reviews within two years of the effective date of the procedure developing the training, and thereafter biennially from the last review/approval date to maintain the requirements current. T&DT initiates these reviews and works with the line management formed team that reviews the current job requirements and available Analysis and Design Documents.

The T&DT Department provides a facilitator to guide this process, while the line organization responsible for the job provides an instructional developer, team leader, Subject Matter Experts (SMEs) and other members of the various teams. T&DT is the process-owner and promulgates it via Plant Standard 2788. This program is not working effectively in all cases. See TR1.1 for a discussion of observations of the System Engineer Qualification.

The Defense Nuclear Facilities Safety Board (DNFSB) staff noted that this process meets requirements, but added that BWXT Pantex was not documenting the process in the manner called for in the Plant Standard. BWXT Pantex is revising the Plant Standard to reflect the current documentation practices.

The analysis and design process relies on the SME to ensure that all relevant training content is included. BWXT Pantex has no formally stated expectations for SME qualifications to participate in training analysis and design other than designation by their line management. There is no requirement for SMEs to have training in instructional development. Where training content is based on configuration controlled procedures subject to rigorous review the lack of formally stated expectations for SME qualifications is overcome by the quality control practices for development of work procedures, however a residual risk remains unaddressed in that portion of training content not based on a formal procedure subject to rigorous review. Various divisions use different methods for designating SMEs and none designate them in a way that assigns specific POIs, Qualification Cards, or other training activities to a specific SME for oversight. There are also no formal expectations for the SME's role in training development and training evaluation.

The Divisional Training Coordinators also play a large role in the analysis and design process. Some concerns were noted with their qualifications. (See TR 2.2)

BWXT was unable to produce evidence of retention testing of a random sample of graduates of Technical Safety Requirement (TSR) – related training three to six months after completion of the training as required by Plant Standard 2785, paragraph 3.6.1. Although the current version of Pantex Form 15B requires identification of a course as TSR-related, there has been no effective system set up to compile a list of such training or to identify TSR-related training developed prior to use of the current PX-15B. This observation, plus the DNFSB’s observation of BWXT’s failure to document the analysis and design process per the directions of the Plant Standard suggest the Plant Standards for training are not completely implemented, and lower confidence that the innovations anticipated from the Yellow Belt effort nearing completion will be effectively implemented. The failure to follow local procedures, especially those with quality assurance aspects, is given a greater significance by the new site-wide 10 CFR 830 compliant Documented Safety Analysis (DSA) which credits certain training with reducing the probability of certain accidents. BWXT Pantex has identified the root cause of implementation problems; plans to address them are nearing readiness for submission to senior management for approval.

The EPIC Yellow Belt Project has evaluated the failure modes of this process and developed a set of recommended self-assurance actions to address the failure modes. These actions are being prepared for presentation to senior management for approval.

**This criterion was met.** Opportunities exist for improvement in the qualification of SMEs and Training Coordinators and in compliance with the Plant Standards for training evaluation.

**4.2 Current facility safety analysis report, procedures, technical and professional references, DOE Guidelines and Orders, and industry operating experience are referenced as applicable to establish both initial and continuing training. (5480.20A, Att. 2, pg I-5, pp (3))**

Authorization basis documents, procedures, other references are cited as appropriate and are listed on the PX-15 as drivers of the course if they require the tasks covered in the training. The BWXT Pantex system is particularly robust in this area to the extent that training always uses the current edition of work procedures; hence changes to the procedure are automatically included. The extensive effort expended outside the training area to ensure procedures are current thereby ensures up-to-date training in those areas where work is controlled through procedures. (Strength TR 4.2)

A residual risk remains for courses other than those that teach procedure-oriented work. In these BWXT Pantex relies on the SME to ensure proper and complete content. Review of various courses indicated general compliance, however in one case the references were not current. T&DT was able to produce only two of nine references selected from two modules of one Plan of Instruction. The missing references dated to the late 1980s. (See comment in TR4.1 concerning SMEs).

Plant Standard 2785, Training Evaluation, Paragraph 3.2 requires reviews of Plans of Instruction (POIs) biennially and prior to teaching the course. The expectations for the depth and extent of these reviews are not specified in the plant standard or covered in instructor training. Development of formal expectations for these reviews would tighten the quality controls and provide greater assurance that course content is current.

**This criterion was met.** Opportunities for improvement exist in SME qualification and training evaluation that would enhance compliance.

**4.3 Training for Technical Staff personnel is based on an assessment of position duties and responsibilities.** (5480.20A, Att. 2, pg I-13, pp h.)

Job tasks for Technical Staff tend not to be based on tightly controlled procedures such as those for operators and technicians. Tasks for Technical Staff are also more broadly stated and do not breakdown as easily into specific technical steps for which detailed targeted training can be developed. Training for Technical Staff, therefore, is based on assessment of position duties and responsibilities rather than on a detailed breakdown of the specific steps required to perform those duties and responsibilities.

Analysis and design of qualification programs for Technical Staff address these differences by heavy reliance on entry requirements such as education and experience supplemented by self-study, mentoring, and other less structured training activities. Formal course work is generally used to provide information necessary to perform tasks and methodologies rather than to develop targeted skills. Mastery of generally complicated tasks (such as accident analysis or development of maintenance requirements) is usually best demonstrated through oral examinations or through performance of actual tasks under appropriate supervision and review than by performance testing. (Other concerns about the System Engineer Qualification are presented under TR 1.1.)

BWXT's training analysis and design processes respect these differences and comply with the DOE Standard. In practice, however, some variability was noted. The Training Program Description for the System Engineer, for instance, was developed without extensive facilitation from T&DT and did not include documentation of a robust demonstration of mastery of the skills and knowledge by the trainee. This qualification would be strengthened by incorporation of a structured mentoring program such as POI 500.06 for process engineers, currently in use by another department in the same division.

**This criterion was met.** Opportunities to improve exist, including increase utilization of training specialists as called for in Plant Standard 2785, development of formally stated expectations for demonstration of mastery of skills and knowledge by Technical Staff during their qualification, and by sharing of training techniques for Technical Staff across department and division lines.

**ISSUES:**

None

**RECOMMENDATIONS:**

None

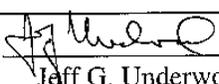
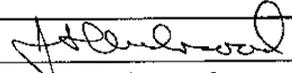
**STRENGTH:**

**TR4-1.** The rigorous reviews and configuration controls required for work with nuclear safety implications combines with the requirement to ensure that training is conducted with the latest approved procedure to ensure that training on such procedures is conducted with the most up-to-date content.

**TR4-2.** The core of the procedure for translating job requirements into training is working effectively in a process that runs smoothly without excessive management attention.

**CONCLUSION:**

**The objective is met.** Opportunities exist for improvement in the qualification of SMEs and Training Coordinators, in compliance with the Plant Standards for training evaluation, in utilization of training specialists as called for in Plant Standard 2785, in development of formally stated expectations for demonstration of mastery of skills and knowledge by Technical Staff during their qualification, and in sharing of training techniques for Technical Staff across department and division lines.

Inspector:  Jeff G. Underwood	Team Leader:  Jeff G. Underwood Team Leader
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**OBJECTIVE: TR 5**

**DATE: August 7, 2003**

**OBJECTIVE MET: Yes**

**OBJECTIVE:**

**Training program materials identify and support the knowledge and skills needed by trainees to perform tasks associated with the position for which training is being conducted. The content of initial training prepares the trainee to perform the job for which the candidate is being trained. The content of continuing training maintains and improves incumbent job performance. (5480.20A, Att. 2, pg I-6, pp b. & pg I-9, pp d.)**

**CRITERIA:**

- 5.1 Learning objectives are derived from tasks selected for training. Learning objectives describe knowledge and skills required for successful job performance and are specified in observable and measurable terms.**
- 5.2 Lesson plans and other training materials used in the selected training setting (e.g., classroom, laboratory, simulator, individualized instruction, on-the-job training, etc.) are accurate, support the learning objectives, and promote effective delivery of training.**
- 5.3 Review, approval, and control requirements are established and utilized for all training materials.**
- 5.4 A continuing training program is in place and maintains and improves the knowledge and skills of job incumbents.**

**APPROACH:**

**Record Review:** Review a representative sample of BWXT lesson plans and training materials to measure derivation of learning objectives from tasks selected for training. Review approved BWXT policy, records, and procedures for 1) lesson plan/training material review, approval, and control requirements; and 2) continuing training program implementation and accomplishment.

**Interviews:** Interview training managers and staff as necessary to understand 1) lesson plan/training material generation, and utilization; and, 2) continuing training program implementation and accomplishment. Interview training managers and staff to understand issues regarding weapons trainer fidelity/usage as a training and qualification tool.

**Observations:** Observe several training evolutions (e.g. classroom, laboratory, or on-the-job) and verify that lesson plans and other training materials are accurate, support learning objectives, and promote effective delivery of training.

**RECORDS REVIEWED:**

- DOE O 5480.20A, Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities, Change 1, 7-12-01
- DOE-STD-1070-94, Guidelines for Evaluation of Nuclear Facility Training Programs
- Letter from Defense Nuclear Facilities Safety Board to Ambassador Brookes, 4/4/2003
- Memorandum from Everet H. Beckner to Chairman John T. Conway, Defense Nuclear Facilities Safety Board, 6/5/2003
- Letter from Chairman John T. Conway to Everet H. Beckner, Deputy Administrator for Defense Programs, National Nuclear Security Administration, 7/9/2003
- BWXT Plant Standard STD-2777, Personnel Selection, Training and Qualification
- BWXT Plant Standard STD-2785, Training Evaluation
- BWXT Plant Standard STD-2786, Training Development
- BWXT Plant Standard STD-2787, Training Implementation
- BWXT Plant Standard STD-2788, Training Analysis & Design
- A-03-67, Nuclear Facility Training Program Assessment Report, July 9-17, 2003
- Division Training Coordinator Job Description, Issue No. 4, 09/17/01
- End-of-Course Evaluation Forms for Classroom and OJT Training Report for FY02, 01/06/03
- End-of-Course Evaluation Summary for 01/01/2003 through 03/31/2003, April 8, 2003
- End-of-Course Evaluation Summary for 01/01/2003 through 03/31/2003 for Safety Training & Audio Video Support, April 8, 2003
- End-of-Course Instructor Evaluation Summary for 01/01/2003 through 03/31/2003 for Safety Training & Audio Video Support, April 8, 2003
- PX-2331, End-of-Course Evaluation form
- PX-15, Course/Creation Modification Worksheet
- PX-15T, Test Analysis
- PX-15NT, New/Revised Test
- PX-15S, Training Survey Form
- PX-15O, Post-Training Job Observation
- PX-3111, Training Program Design Outline
- PX-3864, Training Completion Report-Issue 9, 10/15/01
- Training Course File Report, Course numbers 00001.01 through 00557.00
- Training Course File 00125.19, Basic Instructor Training
  - 00125.01, Basic Instructor Training
  - 00125.02, On-The-Job Instructor Training
  - 00125.12, Instructor Continuing Training

- Training Course File 00005.03, Explosive Safety Refresher
- Training Course File 00005.04, DOE Explosive Safety
- Training Course File 00007.20, Tritium Safety
- Training Course File 00007.34, Tritium Safety Refresher
- Training Course File 00009.04, Nuclear Criticality Initial
- Training Course File 00009.05, Nuclear Criticality Refresher
- Training Course File 00069.13, Hoist/Rigging Practical (Weapons Training)
- Training Course File 00176.05, Freeze Drying of Explosives & Inert Material
- Training Course File 00183.12, Beryllium Awareness Training
- Training Course File 00256.04, W56 HE Disassembly
- Training Course File 00407.82, Conduct Fire Modeling/Intro to Fire Dynamics Vendor Training

**INTERVIEWS CONDUCTED:**

- Manager-Training & Development Technologies Department
- Manager, Production-Manufacturing Division
- Training Specialist-Training Implementation Manual Custodian, Central Training Assessment & Coordinator
- Training Specialist-Classroom Instructor
- Training Specialist-OJT Instructor
- Division Training Coordinator-Gen, Mgr. Staff, Deputy Gen. Mgr., Product Assurance & Certification, Prime Contract Mgr., Quality Assurance, Human Resources, ES&H
- Division Training Coordinator-Applied Technologies
- Training Specialist-Computer-Based Training
- Training Specialist-Safety Training Section
- Training Specialist-Safety Training Section
- Manager-Safety Training & Audio-Video Support
- Manager-Manufacturing Weapons Training
- Manager-Manufacturing Business Support

**OBSERVATIONS:**

- Toured Weapons Training Bays and observed procedure validation and testing
- Observed Weapons Training Bay preparation for training
- W-78 Cable Repair OJT

**DISCUSSION OF RESULTS:**

- 5.1 Learning objectives are derived from tasks selected for training. Learning objectives describe knowledge and skills required for successful job performance and are specified in observable and measurable terms.**

BWXT Plant Standard, STD-2786 establishes the process for developing training materials in accordance with performance-based training methodology. BWXT Plant Standard, STD-2788, Training Analysis & Design, establishes the process for analyzing job performance, determining when training is needed, what topics to include in training, and how to design training, based on job-related information collected during the analysis process. Section 3.5.7 establishes the criteria for terminal and enabling objectives and further references guidance from DOE-HDBK-1200-97. Terminal and Enabling objectives are documented on PX-3111, Training Program Design Outline.

During Lesson Plan (Plan of Instruction or POI) development, learning objectives are written to reflect task performance and consider associated knowledge and skills. A review of 14 BWXT POIs has revealed that the learning objectives describe the knowledge and skills required and are specified in observable and measurable terms.

The Safety Training & Audio-Video Support section of Training & Development Technologies demonstrated a complete and healthy training program. The Manager has worked with Divisions to assure appropriate training courses are identified and assigned to job positions through the use of training codes and training matrices. Learning objectives are well written and plans of instruction adequately address the learning objectives.

Weapons Training demonstrated the ability and commitment to identify occurrences, address procedural changes and modifications, and assured incorporation into continuing training to help maintain and improve the knowledge and skills of Production Technicians.

**This criterion was met.** However, there was one POI, 407.82, Conduct Fire Modeling/Intro to Fire Dynamics, which appeared to be a one-time vendor training course on computer fire modeling and the objectives did not appear to be formulated to the same level as the BWXT produced POIs.

**5.2 Lesson plans and other training materials used in the selected training setting (e.g., classroom, laboratory, simulator, individualized instruction, on-the-job training, etc.) are accurate, support the learning objectives, and promote effective delivery of training.**

BWXT Plant Standard, STD-2786 establishes the process for developing training materials in accordance with performance-based training methodology. Section 3.3 establishes the criteria for POI development. The instructional developer researches course references to determine what supporting information the trainee requires to achieve each course objective. Upon POI completion, the instructional developer schedules and conducts a pilot of the course for designated SMEs, T&DT representative, and if appropriate, sample representatives of the target audience and the Training Coordinator. A review of selected BWXT POIs packages (PX-2039) revealed that the

POIs and associated materials were accurate, supported the learning objectives, and that training could be delivered in an effective manner.

**This criterion was met.**

**5.3 Review, approval, and control requirements are established and utilized for all training materials.**

BWXT Plant Standard, STD-2770 establishes the procedures for providing standardized administrative controls for all of Pantex Plant training. It provides specific administrative requirements for on-site training, General Employee Training, On-the-Job training, continuing training, and external training. This Standard applies to all job positions within the division organization that are identified in the Training Implementation Matrix.

The Training & Development Technologies Manager establishes procedures for the site-wide training program. The Division Training Coordinator (DTC) serves as the point of contact for the directorate on all training-related matters. The DTC ensures full compliance to DOE O 5480.20A for affected personnel and tracks the status of personnel qualifications to ensure that personnel are scheduled to attend required training and monitors adherence to the schedule. The DTC assists in defining the scope of new training needs and continuing training needs, creates the matrix for subcontractors, creates and maintains training codes and training matrices, enrolls personnel in Training Records and Certification (TRAC), monitors and facilitates personnel qualifications, and notifies employees and supervisors of deficiencies in training requirements.

**This criterion was met.** However, if it were not for TRAC's significant functionality, adherence to this criterion would be challenged.

**5.4 A continuing training program is in place and maintains and improves the knowledge and skills of job incumbents.**

The Readiness & Assessment Department of BWXT Pantex conducted an independent assessment of the Pantex Nuclear Facility Training Program during the period of July 9 through July 17, 2003. The purpose of this assessment was to examine the implementation, compliance, and conduct of the training and qualification programs against the criteria of DOE O 5480.20A. Their conclusion was that a continuing training program was in place. However, this criterion was pre-identified to the NNSA Assessment team during the In-Briefing that DNFSB issues with continuing training for maintenance personnel are being addressed and brought into line with order requirements. BWXT Plant Standard STD-2770, Training, clearly states in Section 3.7-Continuing Training, "Continuing Training is broken down in Fixed and Flexible categories." Qualified Basic Instructor Training or OJT instructors conduct Fixed Continuing Training to provide updates to initial courses presented on a predefined

periodic basis. Flexible Continuing training is designed to allow for the rapid dissemination of information to the Plant population.

The Maintenance Internal Operating Procedure IOP-00879, Maintenance and Utilities Training & Qualification Program Including Required Reading and Lessons Learned, also states in Section 3.1.1 (6) that continuing training is conducted on an on-going basis and that continuing training is broken down into two categories.

**This criterion was met.** There is not a failure to have a program, but there is a need to fully implement the program because fixed continuing training elements are still being determined. Maintenance Training has demonstrated improvement in documenting its Flexible Continuing Program but the required Fixed Continuing Training has not been fully implemented. However, updated training program descriptions are in draft and will be finalized by the end of the year.

**ISSUES:**

None

**STRENGTH:**

The Safety Training & Audio-Video Support section of Training & Development Technologies demonstrated a complete and healthy training program. The Manager has worked with Divisions to assure appropriate training courses are identified and assigned to job positions through the use of training codes and training matrices. Learning objectives are well written and plans of instruction adequately address the learning objectives. End-of-Course Evaluation Summaries for examinations, courses, and instructors are conducted quarterly and trigger points have been implemented to address potential issues.

Weapons Training demonstrated the ability and commitment to identify occurrences, address procedural changes and modifications, and assured incorporation into continuing training to help maintain and improve the knowledge and skills of Production Technicians.

**CONCLUSION:**

**This objective is met.** However, additional observations follow:

The TRAC system has permitted training to operate with insufficient participation or ownership of management. Their involvement occurs when training program problems have already occurred. This is reactive management instead of proactive management.

Accountability is not well defined and there is poor coordination of training program evaluation. Training responsibility is fragmented throughout the Organization. However, most training groups demonstrated strong and consistent training programs.

Inspector: <u>J. Patrick Rhone</u> J. Patrick Rhone	Team Leader: <u>Jefferson G. Underwood</u> Jefferson G. Underwood Team Leader
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**OBJECTIVE: TR 6**

**DATE: August 7, 2003**

**OBJECTIVE MET: Yes**

**OBJECTIVE:**

**Training is conducted in the setting most suitable for the particular training content. Training is consistently and effectively presented using approved lesson plans and other training guides. (5480.20A, Att. 2, pg I-7, pp (3) & pg I-8, pp (4))**

**CRITERIA:**

- 6.1 Training is conducted using approved and current training materials.**
- 6.2 Training replicates actual job conditions to the extent practical, and allows for direct participation by the trainees.**
- 6.3 On-the-job training is conducted and evaluated by designated personnel who have been instructed in program standards and methods.**
- 6.4 Laboratory training is effectively and consistently presented.**  
  
**This Criterion is not applicable to Pantex and was not evaluated.**
- 6.5 Simulator training is effectively and consistently presented, where appropriate.**

**APPROACH:**

**Record Review:** Review appropriate lesson plans and training materials.

**Interviews:** None required

**Observations:** Observe several training evolutions (at least one each of classroom, individualized, and on-the-job, if possible) given the time constraints of the review.

**RECORDS REVIEWED:**

- DOE Order 5480.20A, Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities, Change 1, 7-12-01
- BWXT Pantex A-03-67, Nuclear Facility Training Program Assessment Report, July 9-17, 2003
- Letter from Defense Nuclear Facilities Safety Board to Ambassador Brooks, April 4, 2003

- Defense Nuclear Facilities Safety Board Staff Issue Report, from J. Deplitch to J.K. Fortenberry, March 24, 2003
- Memorandum from Everet H. Beckner to Chairman John T. Conway, Defense Nuclear Facilities Safety Board, June 5, 2003
- Memorandum to Daniel E. Glenn, Pantex Site Operations Manager, from Michael B. Mallory, General Manager BWXT Pantex, re: Response to Defense Nuclear Facilities Safety Board Letter and Staff Report on Conduct of Operations at Pantex Plant, May 7, 2003
- BWXT Pantex DIR-0001, Roles and Responsibilities for the Management and Operation of Pantex Plant, Issue 14
- MIC-1000, BWXT Pantex Management Integration & Controls S/RID, Issue 10, 9/30/02
- MS-3300, Maintenance Section of the Mission Support S/RID, Issue 03, 8/8/01
- BWXT Plant Standard STD-2533, 5480.20A Position Classification Process, Issue 5
- BWXT Plant Standard STD-2770, Training, Issue 12
- BWXT Plant Standard STD-2777, Personnel Selection, Training, and Qualification, Issue 11.
- BWXT Plant Standard STD-2785, Training Evaluation, Issue 5
- BWXT Plant Standard STD-2786, Training Development, Issue 5
- BWXT Plant Standard STD-2787, Training Implementation, Issue 5
- BWXT Plant Standard STD-2788, Training Analysis & Design, Issue 6
- BWXT Plant Standard STD-3354, Personnel Assurance Program, Issue 7
- BWXT Plant Standard STD-7020, Drills at Pantex, Issue 6
- BWXT Internal Operating Procedure IOP-AT80027, Applied Technology Division Guidelines for Personnel Qualification, Issue 9
- BWXT Internal Operating Procedure IOP B-0019, Manufacturing Division Guidelines for Personnel Selection, Qualification & Certification, Issue 029
- BWXT Internal Operating Procedure IOP B-3072, Operations Division Weapon Production Stores Department Training and Qualification of Personnel, Issue 6, June 13, 2001
- BWXT Internal Operating Procedure IOP B-3016, Operations Division Recertification and Requalification Document Test Procedure, Issue 2
- BWXT Internal Operating Procedure IOP-00872, Weapons Training & Qualification, Issue 2
- BWXT Internal Operating Procedure IOP-00879, Maintenance and Utilities Training & Qualification Program Including Required Reading and Lessons Learned, Issue 002
- BWXT MNL-00078, Manufacturing Administration Manual, Issue 9, 10/25/02
- BWXT Plan of Instruction POI No. 541.77, Authorization Basis Practical
- BWXT Plan of Instruction POI No. 278.69, W78 Cable Repair, 7/23/98
- BWXT Plan of Instruction POI No. 276.10, W76 NELA
- BWXT Training Folder for Course #133.15, SNM Vault Doors
- BWXT Training Folder for Course #133.20, Maintenance of Cell Personnel Doors

- BWXT Training Folder for Course #133.18, Maintain Blast Door Latching Mechanism
- BWXT Training Folder for Course #133.17, Troubleshoot & Maintain Blast Doors 11-50
- E-mail, M. Earls to F. George, Subject: Trainer Fidelity
- E-mail, S. Holden to F. George, Subject: W62 Broken Trainer Parts List
- List of B61 Trainer problems, corrective actions, and status
- List of W56 Trainer parts needed
- PX-2039, Instructor Technical Qualification Evaluation, Issue 9, for Authorization Basis Practical Course Instructor
- PX-15, Course Creation/Review Worksheet for Authorization Basis Practical Course, Issue 000
- PX-3864, Training Completion Report (written examination) for Authorization Basis Practical Course, 3 versions
- PX-15C, Needs Analysis for Authorization Basis Practical Course, 4/23/03
- Courses 157.02 and 541.74, Authorization Basis (AB) and Safety Basis (SB) Documentation Handout
- DOE O 5480.20A Position Definitions per BWXT Pantex DOE O 5480.20A Training Implementation Matrix, Revision 7
- DOE Standard DOE-STD-1070-94, Guidelines for Evaluation of Nuclear Facility Training Programs, June 1994
- DOE Handbook DOE-HDBK-1114-98, Guide to Good Practices for Line and Training Manager Activities, June 1998
- DOE Handbook DOE-HDBK-1204-97, Guide to Good Practices for the Development of Test Items, January 1997
- DOE Handbook DOE-HDBK-1205-97, Guide to Good Practices for the Design, Development, and Implementation of Examinations, June 1997
- DOE Handbook DOE-HDBK-1206-98, Guide to Good Practices for On-The-Job Training, April 1998
- Procedure Number 102.1.0, U.S. Department of Energy, Amarillo Area Office, Training and Qualification Program, Revision 1, 6/8/99
- Procedure Number 110.1.4, U.S. Department of Energy, Amarillo Area Office, Oversight of Contractor Training Program, 11/17/97

**INTERVIEWS CONDUCTED:**

- Program/Project Manager, Weapon Training Department
- Weapons Training Specialists, Weapon Training Department (7)
- Production Technicians, Weapon Training Department (4)
- Training Specialist, Training & Development Technology Department (3)
- Authorization Basis Analyst, Authorization Basis Department
- Program Engineer/Scientist, Nuclear Explosive Safety Department
- Weapons Engineering Section Manager, Nuclear Explosive Safety Department

- Departmental Engineer, Readiness & Assessment Department
- Department Manager, Infrastructure Controls

**OBSERVATIONS:**

- Course No. 541.77, Authorization Basis Practical.
- W78 Cable Repair OJT Training

**DISCUSSION OF RESULTS:**

**6.1 Training is conducted using approved and current training materials.**

BWXT Plant Standard STD-2786 establishes the process for developing training materials in accordance with Performance Based Training methodology. STD-2788 requires the Table Top Design Team to determine appropriate training settings for proposed courses based on the nature of the subject, such as theory or practical skills training, and types of equipment available. The sponsoring organization reviews and approves all on-the-job training (OJT) materials, checklists, or lessons.

Instructors, prior to presenting designated courses, are charged to use only approved training materials, verify that the Plan of Instruction (POI) reflects current approved procedures before teaching a class, and follow the directives of the POI while conducting training. A Training Instruction form (PX-2389) is used to identify situations that do not permit the performance or simulation of operations in the training environment and identify alternatives to allow the training activity to continue. For training requirements that cannot be complied with, the Training Instruction is used to identify and either waive the requirements or provide an alternative method of instruction. The Training Instruction information is normally incorporated into the course POI before conducting the next class; however, in the case of continuing training, the POI update must be completed within one year.

An individual designated as the course contact for an approved POI is responsible for verifying that all related training materials accurately reflect current plant policies and procedures. They are required to conduct planned course reviews on a biennial basis, review revisions of related procedures to determine if the revision has any impact on the POI, and evaluate results from the training effectiveness surveys or input from Subject Matter Experts (SMEs) and revise courses, as needed. Individuals designated as SMEs or Subject Matter Specialists (SMSs) by the Division Manager or designee are to provide independent reviews of training materials for technical accuracy and applicability to the designated target audience, and work with instructors to update existing courses, as needed. Should a revision be required, the course contact documents a major change (a change to course material that impacts the intent of the course enabling objectives) on a PX-15 (Course Creation/Review Worksheet). The course contact revises the POI and associated training materials and submits the revised materials with the PX-15 through the normal approval process. It was observed that three of four maintenance training

course folders reviewed required biennial updates of the POIs but these had not been accomplished. One was due in January 2000, one in April 2001, and one in June 2003. TRAC was queried and these courses are in a “pending” status, meaning that no courses can be scheduled and no rosters developed until these courses are updated. TRAC also revealed that there are no waiting lists for these courses, which is the most likely reason why they were not updated.

Course No. 541.77, Authorization Basis Practical, was observed. This course was developed primarily for Production Section Managers as a result of a Readiness Assessment finding, but the course was open to anyone desiring to attend. During the course of the instruction, the instructor noted that there was some wrong information in the POI and that an update would be required prior to teaching the course again. Three different versions of the written examination were handed out to the students. Each examination contained ten questions and covered all of the enabling objectives. Multiple-choice, true/false, and fill in the blank questions were utilized.

A review of four maintenance training folders (OJT) was conducted. Two of these courses were designated as safety-related but only had a one-time training requirement. One course, Course #133.20, was updated to incorporate a Technical Procedure (TP) for cell cargo door gap measurement. This TP contains a box in the upper right corner of each page designating that it has ties to the Authorization Basis (AB) (box has the letters “AB” inside). Another TP tied to this course has [SR] and [ISI] markings in the left margin for certain steps, indicating that these steps are either satisfying surveillance or in-service inspection requirements. This course has not been designated as having ties to the AB or to Technical Safety Requirements (other than safety-related as noted above). Since this course is currently designated as a one-time training course, it is not clear how changes to this TP would drive additional training. This issue has already been identified by both the DNFSB and BWXT. In their response to the DNFSB, BWXT established a schedule for re-evaluation of craft Job Task Analyses affecting nuclear facility maintenance.

**This criterion was met.** Conduct of training, primarily in the weapons and maintenance areas, indicates that BWXT is using approved and current training materials. For the most part, required biennial reviews of training courses are being conducted. In instances where required biennial reviews were not conducted, the system in place to ensure that these courses are not taught until updates are completed was functioning properly.

## **6.2 Training replicates actual job conditions to the extent practical, and allows for direct participation by the trainees.**

POIs specify the trainee prerequisites, references, required facility/equipment conditions, instructional aids, and the trainee and instructor preparation required for a particular training course. Typical POIs for weapons OJT require that a trainer unit, special tooling and test/monitoring equipment, 35-account material, support material, and the procedures be available to conduct the training. The course of instruction for weapons OJT is

performed by following the approved Nuclear Explosive Operating Procedures which are required to be checked during the performance of the pre-operational check. If it is discovered that a procedure is not up-to-date, training is not allowed to start until the correct version of the procedure is delivered to the facility. It is desirable to perform training in an actual bay or cell, but typically the training is performed in one of the training bays in Building 12-15 or 12-15A because of unavailability of bays and cells for training.

OJT for Weapons Training and Qualification is conducted by the Weapons Training Specialist (WTS) who divides the subject matter into three blocks: demonstration, coaching, and evaluation. During the demonstration phase, the WTS discusses and explains the task and demonstrates how to perform the process by using the appropriate procedures and tooling. In addition, the WTS explains critical steps and why they are important. Throughout the OJT process, the WTS also ensures the trainees comply with other facets of the operation, such as safety precautions, bonding requirements, two-person concept, and personnel protective equipment. The trainees observe the demonstration of the process and ask or answer questions about the process being demonstrated.

For the coaching phase of the OJT, the WTS observes the trainee perform the operations and assists the trainee in performing the operations by giving explanations of the process, asking questions about the process, and providing information requested by the trainee. The trainee practices the process by using the appropriate procedures and tooling and asks questions as needed. The trainee is allowed to practice the skill until mastery of the skill is achieved. This phase of the OJT process was observed during POI No. 278.69, W78 Cable Repair.

For the evaluation phase of the OJT, the WTS independently evaluates (without coaching) each trainee or evaluates as a team on operations that require more than one trainee to perform the operation. Preferably, the evaluator is a qualified instructor other than the instructor who conducted the training. If there is no other instructor available to conduct the evaluation, the initial instructor evaluates the trainee. The WTS identifies processes that require teamwork in the POI and on the Training Progress Record. If oral questions are part of the evaluation, the WTS documents the questions asked and the trainee's answers. The WTS administers a comprehensive written examination and documents the results using a PX-3864, Training Completion Report.

No Maintenance/Utilities training was scheduled during the timeframe for this review so no assessment of the effective implementation of training in these areas could be performed. Discussions with BWXT personnel indicate that Maintenance has recognized the need to provide some training aids, such as mockups or simulators, to assist in teaching the Maintenance crafts personnel, and that some progress has been made in acquiring these. An evaluation of some maintenance training course folders, including the POIs, written examinations, and performance evaluations, would indicate that the training is adequate and meets the enabling objectives for these courses.

Buildings 12-15 and 12-15A each contain four bays to be used for weapons training. These bays are not exclusively used by the Weapons Training Department. Some of the bays are used for other purposes such as tooling tryout. While BWXT has made some progress in trying to replicate the Zone 12 South facilities in the training bays, the bays, especially those in 12-15, still require more work. The bays in Building 12-15A are much more realistic to the Zone 12 facilities than are the Building 12-15 bays. The W78 Cable Repair OJT was conducted in one of the Building 12-15A training bays using a W78 inert trainer. All required tooling, testers, and other equipment were in the bay. One significant advantage that the 12-15A bays have over the 12-15 bays are that alarm systems to support immediate action drills such as radiation alarms, fire alarms, etc., are functional in the 12-15A bays but not the 12-15 bays.

**This criterion was met.** BWXT effectively utilizes inert weapon trainers to conduct OJT for qualifying/certifying technicians. While trainer fidelity remains an issue, BWXT has been able to make do with what they have, but if trainer fidelity continues to degrade the effectiveness with which to train technicians for nuclear explosive work could be in jeopardy (see criterion 6.5). While the main focus of this criterion was in the area of weapons training, considerable effort has also been made in the maintenance arena to provide maintenance personnel with simulators and/or mockups to help facilitate their training.

**6.3 On-the-job training is conducted and evaluated by designated personnel who have been instructed in program standards and methods.**

**BWXT Plant Standard STD-2770, Training, identifies criteria to be used when selecting OJT as a training method. These include: using actual equipment and processes is an integral part of task training; hands-on practice is necessary to improve or attain skill(s) required for task performance; task performance involves observation or inspection; task performance requires acclimation to a particular physical location or environment; task training involves health or safety hazards which are emphasized during training; training is offered to small groups or individuals; and the OJT process is the only practical training method available.**

BWXT's Training Standard charges individuals who develop and deliver training to meet the criteria set forth for qualified instructors in Plant Standard STD-2777. Individuals who will teach OJT are required to complete initial training for OJT. OJT instructors submit a PX-2039, Instructor Technical Qualification Evaluation, for each course they are assigned to teach. For first-time instructors of a course, evaluation observations must be made during a pilot class or during the first class taught (not applicable for weapon training courses). For weapons training, the Weapons Training Manager provides a WTS for a class and assures that the training specialist is qualified. The WTS identifies alternatives to operations that are not performed or simulated. Should a WTS not be available, a qualified OJT instructor and an SME may conduct the training. Personnel who do not meet instructor qualifications for OJT are allowed to present stand-up

meetings, briefings, orientations, flexible continuing training, vendor instruction, computer-based training, and proctoring.

Qualified instructors are required to attend refresher training biennially and demonstrate adequate instructional skills expertise by undergoing one annual instructor evaluation by another qualified instructor and attaining a rating of satisfactory. An instructor's qualification is revoked should the evaluator determine that the instructor's instructional skills are unsatisfactory. In addition, instructors who do not meet requalification requirements lose their instructor qualification. In the event employees are trained by an unqualified instructor, Plant Standard STD-2777 requires employees to repeat the course with a qualified instructor in order to receive course credit. In practice this does not always occur. Discussions with BWXT personnel indicated that TRAC would catch an unqualified instructor when the course completion sheets are submitted by the trainees. Issue 9 of STD-2777 allowed a provision that if an instructor delivered training but did not meet all teaching qualification requirements at the time, students would not receive credit for any training received from that instructor until the instructor's teaching qualifications were evaluated and restored. If during evaluation the instructor's skills were found to be substandard, the training would be considered invalid and the students retrained by a qualified instructor. In revision 10 of STD-2777 approved in December of 2001, this provision was removed. During this review, it was discovered that there were instances of unqualified instructors being used and actions taken were under the old revision of the standard. When pointed out to BWXT, they took immediate action by sending an email to all training coordinators, instructors, and TRAC notifying them of the current requirement. In addition, TRAC will not post course completions for courses taught by unqualified instructors. BWXT also plans to re-emphasize this requirement during all initial and refresher training for instructor qualification courses. (Issue TR6-1).

Procedures allow a provision to grant an interim on-the-job experience (OJE) qualification to allow a trainee to gain experience. Receiving the OJE qualification allows the trainee to perform hands-on work provided this work is under the observation of a qualified technician, supervisor, SME or instructor. An individual that has achieved the OJE qualification has received an initial overview of the POI and an initial demonstration of the process. For Weapon Production and Satellite processes, no training is allowed on a nuclear explosive unless all OJE qualification requirements are met.

A Performance Demonstration/Operational Evaluation is used for personnel pursuing initial qualification. It is used to measure and validate the employee's performance following successful completion of a technical training course. After satisfactory completion of classroom, OJT or hands-on training, another qualified individual using the performance demonstration form specific to the OJT course observes the employee. The observer is normally a certified Production Section Manager or SME. The observer is not required to maintain an OJT Instructor qualification to proctor the performance demonstration or written exam. If a task is not (or cannot be) performed, the evaluator

may have the trainee simulate, walk-through, or discuss performance of the task if allowed by the performance checklist. In this case, the evaluator is responsible for assuring conditions of task performance, references, tools, and equipment reflect the actual task to the extent possible.

During the review of several Internal Operating Procedures (IOPs), it was observed that IOP B-3072, Weapon Production Stores Department Training and Qualification of Personnel, contained a reference to Plant Standard STD-0225, On-The-Job Training. It was discovered that STD-0225 was archived in February of 1999. Although this IOP was updated in June of 2001, it still referenced the archived Plant Standard. It was also noted that STD-2777, Personnel Selection, Training, and Qualification, discusses hands-on initial and requalification requirements for nuclear explosives. These requirements apply to the Production Technicians and Operation Managers (OMs). The OM position was replaced by the Production Section Manager position over a year ago. Although STD-2777 is not up to date, it is currently undergoing revision and BWXT should ensure that all references to the OM position are deleted.

Procedures governing Maintenance Craft Personnel and General Services Operations Group (Utilities) state that OJT is normally conducted in the facility as part of their day-to-day work activities. Craft shop and utility supervisors identify and define specific job tasks for OJT, identify training objectives, and observe the training process. After successful completion of field administered OJT, documentation of completed OJT training is submitted to the Training and Qualification Section. Qualifications are then awarded to the individual at the direction of their supervisor. During the course of this review, no OJT for maintenance or utilities was scheduled, so no evaluation of OJT was made in this area. As noted by the Defense Nuclear Facilities Safety Board (DNFSB) and BWXT's self-assessment, the OJT at the shop floor lacks formality. To resolve this issue, Infrastructure updated their IOP to formalize the OJT requirements. At the time of this review it was not possible to evaluate the effectiveness these changes have imparted on Maintenance and Utilities OJT.

**This criterion was met.** Weapons Training OJT, although limited to one training course observation, appears to be a very robust program. The method of instruction used by the WTS was in accordance with BWXT standards. Completion of the task observed was by actual task performance, which is always the preferred method. Since the training schedule did not have OJT training courses for other BWXT organizations, an assessment of these organizations' OJT training effectiveness could not be performed. However, BWXT has self-identified issues in the OJT area and are putting plans in place to correct these deficiencies. Once these plans are in place and implemented, a follow-up should be conducted to evaluate the effectiveness of these corrective actions.

#### **6.4 Laboratory training is effectively and consistently presented.**

This Criterion is not applicable to Pantex and was not evaluated.

#### **6.5 Simulator training is effectively and consistently presented, where appropriate.**

As noted in the DNFSB Staff Issue Report, the fidelity of the mock-up units of nuclear weapons used for training is not being maintained and is degrading with time. Discussions with the WTSs validated the DNFSB's concern regarding trainer fidelity. Across the board, all WTSs identified the need for spare parts, of which the critical ones are mock HE, detonator cables, and stress cushions. The W78 program has only one JTA trainer, and it is in poor shape. The WTSs also stated that they are still confident that their trainers are adequate to demonstrate their training process, but if trainers continue to degrade, as they will over time, the ability to effectively train the technicians also degrades, and eventually that confidence will be lost. While some programs are better off than others, every program expressed the need to upgrade and/or replace worn or broken parts. Some programs have had to resort to reusing parts that have become so worn that they do not perform like War Reserve (WR) components. In addition, some replacement parts do not replicate WR parts effectively. This significantly degrades Production Technician training effectiveness. It is also difficult for a Project Team to present a process to be studied by the Nuclear Explosive Safety Study Group (NESSG). Past NESSGs have assigned post-start findings to programs concerning trainer fidelity. The most recent NESSG for the W62 program had significant issues with the trainer fidelity and the W62 Project Team had difficulty demonstrating portions of the W62 D&I process. These portions of the W62 D&I process (some with important nuclear explosive safety implications) could not be demonstrated (or demonstrated properly) because of the condition of the trainer. This places the capability to perform nuclear explosive operations training and qualification in jeopardy. Should the NESSG determine that they cannot assess the safety of a nuclear explosive operation because of poor trainer fidelity, most likely a pre-start finding will be assigned and operations will not be authorized until the trainer is upgraded and the NESSG reconvened.

BWXT is in the process of evaluating all trainer units currently on hand. They are identifying the number and condition of trainer units across all programs, and needs for unit upgrades and/or additional trainer units. When completed, they will submit these needs and estimated costs to the BWXT Pantex Directed Stockpile Work program managers to be included in the individual program provisioning process.

The issue of trainer fidelity has been around for several years. At one time DOE had a joint standing committee that addressed trainer fidelity issues for the weapons programs, but this committee was phased out in the mid-1990s. The fact that trainer fidelity

continues to be an issue is indicative of the low priority and importance management has placed on maintaining trainer fidelity. If proactive, rather than reactive actions, are not taken, NNSA runs a high risk of not being able to certify the safety of a nuclear explosive operation.

See Criteria 1.6 and 6.2 for a discussion on the fidelity of training facilities.

**This criterion was met.** Although Weapon Training Specialists still feel that they can adequately demonstrate their processes, as trainer unit fidelity degrades over time, the effectiveness of technician training will also degrade. To maximize training effectiveness and quality, training should be conducted in actual production facilities; if training bays are the only option, the 12-15A bays are a better replication of actual facilities and should be utilized to the maximum extent possible over the 12-15 bays.

**ISSUES:**

**TR6-1** Per Plant Standard STD-2777, employees trained by unqualified instructors must repeat the course with a qualified instructor to receive course credit. In practice this does not always occur.

**STRENGTH:**

None

**CONCLUSION:**

Conduct of training, primarily in the weapons and maintenance areas, indicates that BWXT is using approved and current training materials. To increase training effectiveness and quality, production facilities should be used to the maximum extent possible for weapons training. If training cannot be performed in actual production facilities, training should be conducted in the 12-15A bays rather than 12-15 bays. Additional improvements in the training facilities are still required. As a result, training is not conducted in the setting most suitable for the particular training content.

Weapons training OJT utilizes an effective three-phase approach to OJT to allow as much direct participation by the trainee as possible. While the main focus was in the area of weapons training, considerable effort has also been made in the maintenance arena to provide maintenance personnel with simulators and/or mockups to help facilitate their training. Both internal and external assessments have identified issues in the continuing training and OJT area of maintenance and BWXT is putting plans in place to correct these deficiencies.

Trainer fidelity, although identified as an issue many years ago, still continues to be an issue. As trainer fidelity continues to degrade over time, the effectiveness of technician training will also be affected. More proactive actions are required on the part of BWXT, the design laboratories, and NNSA to ensure that trainer fidelity is improved, and that the safety of a nuclear explosive operation can continue to be adequately demonstrated.

Inspector: <u>Daniel R. Bruns</u> Daniel R. Bruns	Team Leader: <u>Jeff G. Underwood</u> Jeff G. Underwood Team Leader
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**OBJECTIVE: TR 7**

**DATE: August 7, 2003**

**OBJECTIVE MET: Yes**

**OBJECTIVE:**

**Individual trainees are examined and/or evaluated on a consistent and regular basis to ensure that learning is taking place and that trainees are acquiring the knowledge and skills required to work efficiently and safely at their jobs.**

(5480.20A, Att. 2, pg I-8, pp (5))

**CRITERIA:**

- 7.1 Trainees are evaluated regularly using written, oral, and/or performance examinations and quizzes.** (5480.20A, Att. 2, pg I-8, pp 4 & pg I-9, pp d. (2))
- 7.2 Examinations (both written and oral) and OJT, laboratory, or simulator performance evaluations are based on learning objectives, administered consistently, controlled, and documented.** (5480.20A, Att. 2, pg I-8, pp (4) & pg I-15, pp 8.)
- 7.3 The content of written and oral examinations is changed at intervals sufficient to prevent compromise.** (5480.20A, Att. 2, pg I-15, pp 8.)
- 7.4 Development, approval, security, administration, and maintenance of written and oral examinations, and performance evaluations are formally controlled.** (5480.20A, Att. 2, pg I-15, pp 8.)
- 7.5 Remedial training and reevaluation are provided when examination or performance standards are not met.** (5480.20A, Att. 2, pg I-16, pp 10.)
- 7.6 Requalification and recertification programs are in place for appropriate personnel.**  
(5480.20A, Att. 2, pg I-3, pp d. & pg I-16, pp 10.)

**APPROACH:**

**Record Review:** Review approved BWXT policy, records, and procedures associated with the training programs conduct of written examinations, oral examinations, and/or performance examination and quizzes. Review evidence of a remedial training and reevaluation program for required training. Review approved BWXT policy, records, and procedures with regard to the requalification and recertification processes.

**Interviews:** Interview BWXT managers and training staff with regard to 1) testing and examination programs; and, 2) requalification and recertification processes.

**Observations:** None required.

**RECORDS REVIEWED:**

- DOE O 5480.20A, Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities, Change 1, 7/12/2001
- DOE-STD-1070-94, DOE Standard, Guidelines for Evaluation of Nuclear Facility Training Programs, June 1994
- DOE-HDBK-1078-94, DOE Handbook – Training Program Handbook: A Systematic Approach to Training, August 1994
- DOE-HDBK-1204-97, DOE Handbook - Guide to Good Practices for the Development of Test Items, January 1997
- DOE-HDBK-1205-97, DOE Handbook - Guide to Good Practices for the Design, Development, and Implementation of Examinations, June 1997
- 125.19, Pantex Student Workbook – Classroom Instructor Training – Initial, no Revision or Date identified
- 125.02, Pantex Student Workbook and Examination – On the Job Training, no Revision or Date identified
- STD-2770, Pantex Standard – Training, Issue 12
- STD-2777, Pantex Standard – Personnel Selection, Training, and Qualification, Issue 11
- STD-2785, Pantex Standard – Training Evaluation (U), Issue 5
- STD-2786, Pantex Standard – Training Development, Issue 5
- STD-2787, Pantex Standard – Training Implementation, Issue 5
- STD-2788, Pantex Standard – Training Analysis & Design, Issue 6
- IOP-00872, Pantex Internal Operating Procedure –Weapons Training & Qualification, Issue 2
- Training Program Description & Qualification Package for Engineering Division System Engineer (SE), 5/30/2003
- Training Program Description & Qualifications Package for Operations Directorate Operations Training Coordinator (E104), 11/27/2000
- PX-15, Course Creation Worksheet, Course 69.13, Hoist Practical Evaluation for Manufacturing, 6/25/03
- PX-15D, Training Effectiveness Plan, Course 69.13, Hoist Practical Evaluation for Manufacturing, submitted with PX-15 dated 6/25/03
- Plan of Instruction (POI) – Course 69.13, Hoist Practical Evaluation for Manufacturing, submitted with PX-15 dated 6/25/03
- PX-4267, Performance Evaluation Completion Report, Course 69.13, Hoist Practical Evaluation for Manufacturing, Issue 3
- Plan of Instruction (POI) – Course 283.02 – B83 Mechanical Mod 0/1, Issue 1, 01/03

- PX4267, Performance Evaluation Completion Report, Course 283.02 – B83 Mechanical Mod 0/1, Issue 3
- PX-3122, Instructor Skills Competency for Classroom Training, Infrastructure Course 88.15, 07/30/03
- PX-3122A, Instructor Skills Competency for OJT Training, Infrastructure Course 88.15, 07/30/03
- Infrastructure Qualified Instructor Classroom Evaluation Report, Summary of Class Critiques, 07/30/03
- Contract 27987, Statement of Work – Overhead Crane Inspection (Vendor) Training, 06/17/03
- Contract 27987, Certificate of Vendor Instructor Qualification, 11/15/2001
- Statement of Work, Certification (Vendor) Training for NDT-PT-LL2, 04/23/03, Vendor Course Syllabus and instructor resume attached
- PX-2039, Instructor Technical Qualification Evaluation Form, for 3 T&DT instructors, dated July 2003.
- Training Records and Certification System (TRAC) Report – T&DT Course Listing, 08/04/2003
- POI and Test Development Guides, PANTEX “K” Network Drive, dated 05/09/02
- PX-15D, Training Effectiveness Plan, Course No. 125.20, not dated
- Course Examination, Course No. 61.01 (NM/SNM Custodian), 3 versions, 03071, 03072, 03073
- Course Examination, Course No. 112.02 (Back Injury Prevention), version 01073
- Course Examination, Course No. 169.86 (NE and Weapons Safety Theory), version 03051

**INTERVIEWS CONDUCTED:**

- Division Manager, Engineering Division
- Division Manager, Human Resources Division
- Division Manager, Infrastructure Division
- Manager, Infrastructure Controls
- Training Team Leader – Infrastructure Division
- Instructor, Infrastructure Division
- Contracting Officer’s Technical Representative (Vendor Training Purchases) – Infrastructure Division
- Division Training Coordinator – Infrastructure Division
- Division Training Coordinator – Engineering Division
- Supervisor, System Engineering
- Supervisor, Process Engineering
- Manager, Weapons Training
- Instructors (4) – Weapons Training Department
- Administrative Assistant – Weapons Training Department
- Division Training Coordinator – Manufacturing Division
- Manager, Manufacturing Business Support

- Manager, Training & Development Technologies (T&DT)
- Instructor - T&DT
- Test Development Specialist – T&DT

**OBSERVATIONS:**

None

**DISCUSSION OF RESULTS:**

**7.1 Trainees are evaluated regularly using written, oral, and/or performance examinations and quizzes.** (5480.20A, Att. 2, pg I-8, pp 4 & pg I-9, pp d. (2))

The use of examinations is governed by STD-2788. Trainees are tested using written, oral, and/or performance examinations and quizzes as required by the course design documents, attached to the course PX-15 form submitted for approval, including the course Plan of Instruction (POI). Courses 125.02 (Initial OJT Training) and 69.13 (Hoist Practical Evaluation for Manufacturing) were reviewed to verify that a mix of test types were used and that the exam questions were appropriate to the particular training format in use (classroom or OJT).

Based on the evidence reviewed, **this criterion was met.**

**7.2 Examinations (both written and oral) and OJT, laboratory, or simulator performance evaluations are based on learning objectives, administered consistently, controlled, and documented.** (5480.20A, Att. 2, pg I-8, pp (4) & pg I-15, pp 8.)

Test design is governed by STD-2788 and the administration and control of examinations is governed by STD-2770. Five written examinations and two oral examinations were reviewed. Each of the examination test questions reviewed was mapped to a specific learning objective in the associated course. This mapping is inherent in the examination design process, when completed correctly, as documented in the process artifacts submitted and approved with the PX-15 form (Course Creation Worksheet). Course 125.02 (Initial OJT Training) and Course 69.13 (Hoist Practical Evaluation for Manufacturing) were reviewed specifically to see whether all of the enabling elements in the course were tested, and they were. Two of the tests reviewed included true/false questions, which are to be avoided per STD-2788.

During interviews of instructors from T&DT, infrastructure, and Weapons Training, a weakness related to test development regarding the number of questions to be included in a test was noted. The following discussion provides background information for a recommendation.

## **Use of Test Specifications**

DOE Handbooks DOE-HDBK-1204-97, “Guide to Good Practices for the Development of Test Items” and supporting DOE Handbook DOE-HDBK-1205-97, “Guide to Good Practices for the Design, Development, and Implementation of Examinations,” discuss the design and administration of tests. Handbook 1205 presents the following preface for discussions of testing:

“Nuclear facilities spend a significant amount of training resources testing trainees. Tests are used for employee selection, qualification, requalification, certification and recertification, and promotion. Ineffective testing procedures, or inappropriate interpretation of test results, can have significant effects on both human performance and facility operations. Test development requires unique skills, and as with any skill, training and experience are needed to develop the skills. Test development, test use, test result interpretation, and test refinement, like all other aspects of the systematic approach to training, should be part of an ongoing, systematic process.”

Within the BWXT Pantex Performance Based Training (PBT) model, test design is accomplished in the design phase of course development. Testing is a key tool used to determine whether the course Learning Objectives have been successfully transferred to the trainees. For a test to accomplish its purpose, the test must be valid and reliable. A valid test must measure exactly what it was intended to measure. A reliable test is one that gives the same results each time it is used under the same circumstances. In the PBT process, as described in DOE Handbook 1078-94 (Training Program Handbook: A Systematic Approach to Training) a test specification is used to guide the construction of a valid and reliable test.

Again per DOE Handbook 1205, “The development of test specification is a vital step in the testing process. Test specifications provide two important checks on the entire test mechanism. They are:

- An explicit, documented link between each test item and a learning objective that is verified to be relevant, important, and based on the task
- Consistency in the way tests are developed at a facility”

The development of a test specification allows the design team or course developer to assess each learning objective in terms of its impact or importance (weighting factor), and guides the decision of how many questions are required per each supporting enabling objective to clearly indicate that the transfer of the learning objective was achieved. In some cases, one test question for an enabling objective may be sufficient. In other cases, five questions for an enabling objective may be insufficient. A thoughtful, consistent process, including subject matter expertise and instructional development expertise, is needed to guide the test design. The development of the test specification should occur prior to actual construction of the test questions and answer keys.

The Pantex PBT model, as described in Basic Instructor (BIT) Course 125.19 (section on “Introduction to Test Administration”) briefly mentions the use of a test specification, but the concept is not further discussed, reinforced, or required by implementing procedures. Per one qualified course instructor interviewed for the audit, the students are told that the use of a test specification is optional.

The Assessor noted that superseded Pantex Standard STD-0223, Development, Administration, and Banking of Training Evaluation (Testing) Materials, Paragraph 3.3.5, required the use of test specifications. Additionally, STD-0223, Paragraph 3.4.2, required the use of pilot tests to evaluate test quality prior to rollout.

Instead of requiring the use of a test specification, Pantex has chosen to use a rule-based practice regarding the number of test questions to be prepared for each enabling objective. The BIT course states that at least one test question per enabling objective is required.

At the level of procedural implementation, there is confusion regarding the construction of tests. STD-2786 (Training Development) reinforces the “at least one” rule per enabling objective, complicated by the requirement to develop a minimum of two different tests, with no more than 30% of the questions on one test being repeated on any subsequent test for a given Plan of Instruction (POI). STD-2788 (Training Analysis and Design) requires the development of three test questions per enabling objective. Form PX-15, the Course Creation/Review Worksheet, does not require a test specification to be submitted.

This confusion on test construction requirements was apparent when interviewing instructors and course developers. No instructors mentioned the use of a test specification when creating tests and the most common answer during the interview when asked how many test questions were required was “one per enabling objective.”

The Assessor also noted that a “Test Development and Review Checklist” for development of course tests is available on the network “K” drive. The checklist addresses some of the concerns discussed here, but many answers to checklist items are subjective.

As a result of implementing a rule-based approach to test development, combined with the lack of procedural consistency and clarity, it is likely that few if any course developers, especially outside of T&DT, understand the underlying concepts used to create a test that is valid and reliable. Given the importance of testing, this result undermines the credibility of the BWXT Pantex performance-based training program, and T&DT should review this aspect of PBT at Pantex. (TR7-1)

Control of examinations is discussed under Criterion 7.4 below.

Based on a review of the evidence and the fact that the use of test specifications is a recommended practice, but not a requirement, **this criterion was met**. However, the Assessor recommends that the T&DT organization reassess the alternate approach currently used for test design. (TR7-1)

**7.3 The content of written and oral examinations is changed at intervals sufficient to prevent compromise.** (5480.20A, Att. 2, pg I-15, pp 8.)

BWXT Pantex addresses this criterion by developing a sufficient number of test questions for a given course to ensure that trainees won't see the same questions from test to test. Additionally, test versions are tracked by the TRAC system for each trainee so that the course instructor can verify that the student won't receive the same test as in the previous class. Trainees are given different subsequent tests. The test design process is described in STD-2788 and the requirements for control of tests are given in STD-2770. Per these procedures, a sufficient number of test questions are to be created to allow at least two test versions for a particular course, and to prevent more than 30 percent of the test questions from being reused in subsequent tests. At the time of course creation, a test bank of questions is developed that is sufficient to meet these requirements. Three versions of the test for Course 61.01 were reviewed to determine if these requirements had been met. The test versions met the requirements shown above.

Additionally, courses must be reviewed biennially per STD-2785 to ensure that the course design and materials are still valid. This review includes tests.

Based on the evidence reviewed, **this criterion was met**.

**7.4 Development, approval, security, administration, and maintenance of written and oral examinations, and performance evaluations are formally controlled.** (5480.20A, Att. 2, pg I-15, pp 8.)

Training development and approval are governed by STD-2786. Test security requirements are shown in STD-2770. Maintenance of oral and written exams is governed by STD-2785. Test administration is governed by STD-2770. There is no formal, specific guidance provided on maintaining the security of tests and answer keys, beyond the requirement for instructors to control access to the test key and any additional copies of the test (STD-2770, Paragraph 3.2.5(4)). The Assessor noted that superseded standard STD-0223 (described above) contained a high level of specificity regarding responsibilities for test control. This level of specificity is no longer provided in the current procedure.

During interviews with four weapons training instructors, the instructors identified different personal test and answer key storage practices. Two instructors kept working

copies on their computer hard drives, one kept the tests on a password-protected network drive, and one kept no local tests whatsoever, relying on the copies maintained in T&DT.

Based on this instructor feedback and the fact that the security of tests and answer keys is not procedurally addressed in more detail, examination security is determined to be uncontrolled, and **this criterion is not met. (TR7-2)**

**7.5 Remedial training and reevaluation are provided when examination or performance standards are not met. (5480.20A, Att. 2, pg I-16, pp 10.)**

Interviews with five instructors indicated that all students that missed written test questions were immediately provided feedback on the correct answer, either individually or as part of a class discussion. Plant Standard STD-2770 defines the steps required for training remediation and re-testing. Some qualified instructors indicated that they believed students achieving a score of less than 70 percent on a written test could be remediated and immediately re-tested, although none of the instructors interviewed had ever experienced this situation personally. Plant Standard STD-2770 indicates that only those students scoring between 70 to 79 percent can be retested without being re-trained. Students scoring less than 70 percent on a written test must retake the full training course.

Based on the results of the instructor interviews, **this criterion was met.** However, the Assessor recommends that all instructors re-familiarize themselves with the steps to be taken per STD-2770 when a failing test score is posted for an examination.

**7.6 Requalification and recertification programs are in place for appropriate personnel. (5480.20A, Att. 2, pg I-3, pp d. & pg I-16, pp 10.)**

Plant Standard STD-2777, Internal Operating Procedures IOP-AT80027 (Applied Technology Division) and IOP-B0019 (Manufacturing) provide the requirements for qualification and requalification programs. The TRAC system tracks the current qualification status of personnel under the purview of the qualification/re-qualification program and Division Training Coordinators provide management reports from the system to advise managements and employees of upcoming training requirements needed to maintain the appropriate qualifications for a given position. TRAC reports for weapons training group personnel and for T&DT personnel were reviewed to check current qualification status and no discrepancies were noted.

The TRAC system also provides input to the ARGUS security access system such that qualified personnel who have their qualification expire for any reason are blocked from accessing secure plant areas, including the MAA.

Based on the evidence reviewed, **this criterion was met.**

**ISSUES:**

**TR7-1** The BWXT PANTEX PBT program does not adequately evaluate the design and development of tests to determine whether learning objectives have been achieved. The use of the test specification methodology as recommended in DOE Handbooks 1204-97, 1205-97, and 1078-94 would satisfy the requirement of DOE Order 5480.20A regarding the evaluation of trainee mastery of the training objectives.

**TR7-2** Tests and answer keys are not formally controlled. Additional specificity in supporting plant standards is required so that all personnel will control tests and answer keys in a consistent, secure manner.

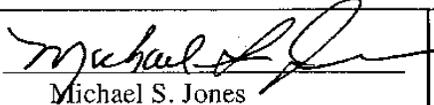
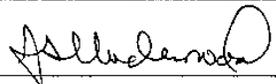
**STRENGTH:**

None

**CONCLUSION:**

**The overall objective was met**, with notation of the test quality and test security measures described above. Full compliance across all divisions with the existing plant standards and work processes will mitigate the effects of these weaknesses somewhat, but will not provide optimum effectiveness. Furthermore, the migration of test development activities beyond the T&DT organization, coupled with weakened subject matter expertise in test design and administration within T&DT, is expected to further reduce confidence in the training program test function, unless addressed.

The Assessor noted that previous plant standards and work processes, if fully implemented and complied with, would have fully satisfied Objective 7. The migration to a more function-based standards layout as currently implemented has diminished the effectiveness and security of the test functions within training.

Inspector:  Michael S. Jones	Team Leader:  Jeff G. Underwood Team Leader
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**OBJECTIVE TR 8**

**DATE: August 7, 2003**

**OBJECTIVE MET: Yes**

**OBJECTIVE:**

**A systematic evaluation of training effectiveness and its relation to on-the-job performance is used to ensure that the training program conveys all required skills and knowledge. (5480.20A, Att. 2, pg I-8, pp 5.)**

**CRITERIA:**

- 8.1 A comprehensive evaluation of individual training programs is conducted by qualified individuals on a periodic basis to identify program strengths and weaknesses. (5480.20A, pg 4, pp C. (2) & CRD, pg 1, pp 6)**
- 8.2 Instructional skills and technical competencies of instructors are evaluated regularly. (5480.20A, Att. 2, pg IV-3, pp g. (2) (c) 1-2)**
- 8.3 Feedback from trainee performance during training is used to evaluate and refine the training program. Feedback from former trainees and their supervisors is used to evaluate and refine the training program. (5480.20A, Att. 2, pg I-8, pp (5))**
- 8.4 Change actions (e.g., procedure changes, equipment changes, facility-specific and operating experience) are monitored and evaluated for their applicability to initial and continuing training programs and are incorporated in a timely manner. Changes in job scope are evaluated to determine the need for revision of initial and continuing training programs. (5480.20A, Att. 2, pg I-8, pp (5))**
- 8.5 Improvements and changes to initial and continuing training are systematically initiated, evaluated, tracked, and incorporated to correct training deficiencies and performance problems. (5480.20A, Att. 2, pg I-8, pp (5))**
- 8.6 Training materials are maintained current, based upon the results of training program evaluations. (5480.20A, Att. 2, pg I-8, pp (5))**
- 8.7 Training facilities are evaluated to determine their effect on the training process. (5480.20A, Att. 2, pg I-8, pp (5))**

**APPROACH:**

**Record Review:** Review the BWXT program of self-assessment as it pertains to periodic review of training programs, and the documentation of any recently accomplished training program reviews. Review approved BWXT policy, records, and procedures for 1) instructor evaluation; 2) trainee/supervisor feedback on training; 3) formal change control with specified action initiators or triggers; 4) system for initiating, evaluating and tracking improvements and changes; and 5) program for the periodic evaluation of training facilities.

**Interviews:** Interview BWXT managers and training staff as necessary to evaluate the criteria.

**Observations:** None required.

**RECORDS REVIEWED:**

- DOE O 5480.20A, Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities, Change 1, 7-12-01
- DOE-STD-1070-94, Guidelines for Evaluation of Nuclear Facility Training Programs
- Letter from Defense Nuclear Facilities Safety Board to Ambassador Brookes, 4/4/2003
- Memorandum from Everet H. Beckner to Chairman John T Conway, Defense Nuclear Facilities Safety Board, 6/5/2003
- Letter from Chairman John T. Conway to Everet H. Beckner, Deputy Administrator for Defense Programs, National Nuclear Security Administration, 7/9/2003
- BWXT Plant Standard STD-2777, Personnel Selection, Training and Qualification
- BWXT Plant Standard STD-2785, Training Evaluation
- BWXT Plant Standard STD-2786, Training Development
- BWXT Plant Standard STD-2787, Training Implementation
- BWXT Plant Standard STD-2788, Training Analysis & Design
- A-03-67, Nuclear Facilities Training Program Assessment Report, July 9–17, 2003
- Division Training Coordinator Job Description, Issue No. 4, 09/17/2001
- End-of-Course Evaluation Forms for Classroom and OJT Training Report for FY03, 01/06/2003
- End-of-Course Evaluation Summary for 01/01/2003 through 03/31/2003, April 8, 2003
- End-of-Course Evaluation Summary for 01/01/2003 through 03/31/2003 for Safety Training & Audio Video Support, April 8, 2003
- PX-2331, End-of-Course Evaluation form
- PX-15, Course/Creation Modification Worksheet
- PX-15T, Test Analysis
- PX-15NT, New/Revised Test
- PX-158, Training Survey Form

- PX-150, Post-Training Job Observation
- PX-3111, Training Program Design Outline
- PX-3864, Training Completion Report – Issue 9, 10/15/2001
- Training Course File Report, Course numbers 00001.01 through 00557.00
- Training Course File 00125.19, Basic Instructor Training
  - 00125.01, Basic Instructor Training
  - 00125.02, On-The-Job Instructor Training
  - 00125.12, Instructor Continuing Training
- Training Course File 00005.01, DOE Explosive Safety
- Training Course File 00005.03, DOE Explosive Safety Refresher
- Training Course File 00007.20, Tritium Safety
- Training Course File 00007.34, Tritium Safety Refresher
- Training Course File 00009.04, Nuclear Criticality Initial
- Training Course File 00069.13, Hoist/Rigging Practical (Weapons Training)
- Training Course File 00176.05, Freeze Drying of Explosives & Inert Material
- Training Course File 00183.12, Beryllium Awareness Training
- Training Course File 00256.04, W56 HE Disassembly
- Training Course File 00407.82, Conduct Fire Modeling/Intro to Fire Dynamics (Vendor Training)

**INTERVIEWS CONDUCTED:**

- Manager-Training & Development Technologies Department
- Manager-Production-Manufacturing Division
- Training Specialist – Training Implementation Manual Custodian, Central Training Assessment & Coordinator
- Training Specialist – Classroom Instructor
- Training Specialist – OJT Instructor
- Division Training Coordinator, General Mgr Staff, Deputy General Mgr, Product Assurance & Certification, Prime Contract Mgr, Quality Assurance, Human Resources, ES&H
- Division Training Coordinator – Applied Technologies
- Training Specialist – Computer-Based-Training
- Training Specialist – Safety Training Section
- Training Specialist – Safety Training Section
- Manager – Safety Training & Audio-Video Support
- Manager – Manufacturing Weapons Training
- Manager – Manufacturing Business Support

**OBSERVATIONS:**

None

## **DISCUSSION OF RESULTS:**

### **8.1 A comprehensive evaluation of individual training programs is conducted by qualified individuals on a periodic basis to identify program strengths and weaknesses. (5480.20A, pg 4, pp C. (2) & CRD, pg 1, pp 6)**

BWXT Plant Standard STD-2785, Training Evaluation, establishes the process for evaluating training according to performance based training methodology. The Standard states that instructors, course contacts, or designees monitor indicators to improve training system performance through a formal training evaluation system. Evaluation activities include monitoring indicators, analyzing information, initiating corrective actions as needed. Biennial reviews are conducted to determine if the training content is current and accurate and if the training is based in its impacts on job content is current and accurate and if the training is based in its impacts on job performance of the target audience. Instructors are to conduct unscheduled reviews of POIs before teaching a classroom or on-the-job training course to verify the training material is current with related procedures. Course evaluations are to be disseminated to trainees and Instructors are to encourage them to participate in the continuous improvement of training. For training effectiveness, additional evaluation options include post-training evaluations by conducting trainee and supervisor post-training surveys; job observations of filed operations by course contacts, instructors, SMEs, or managers and by obtaining feedback from trainees and supervisors; and retention training that is to be administered three to six months after training. Retention testing is also required for technical safety requirement related courses.

BWXT Pantex Plant standards STD 2770, Training, STD-2777, Personnel Selection and Qualification, and STD-2785, Training Evaluation, describe processes for qualified/specified individuals to evaluate training programs and training program elements. Elements of training program/course evaluation include end of course evaluations, evaluations of instructor presentation skills, evaluations of instructor technical skills, biennial reviews of course content, training program evaluations, and retention testing.

While these elements in part satisfy the requirement from DOE O 5480.20A for the contractor to perform “periodic systematic evaluations of training and qualification program,” the elements do not cover all 19 areas called out in the examples given in DOE O 5480.20A, Ch.I.7.b(5):

Evaluation and revision of the training based on the performance of trained personnel in the job setting.

Evaluation provides the critical feedback loop to ensure the training is up to date and reflects the requirements of the job. Specifically, training programs are evaluated for program and lesson content adequacy, test adequacy, presentation adequacy, documentation adequacy, and post-training job performance. In addition, the operating

performance of job incumbents should be monitored to determine individual strengths and weaknesses. The feedback received from the evaluation process is used to modify and improve program content and delivery. Program content should be periodically monitored and revisions should be made (as appropriate) to include changes in areas such as policies and/or procedures, system or component design, job requirements, regulatory requirements, and industry guidelines or commitments. Adjustments should also be made as a result of reviews of operating experience information such as Occurrence Reports, inspection reports, information notices, and bulletins. Feedback obtained from instructors, students, and supervisors is also reviewed for its potential impact on future training programs. The results are translated into action items or recommendations that are factored into program content.

While the majority of these 19 elements are covered by BWXT Pantex administrative controls listed in the three standards noted above those administrative controls have not been uniformly and systematically implemented and enforce.

**This criterion was met.** Although this criterion has ineffective administrative controls, BWXT Pantex both self-identified this issue at the beginning of the assessment and recognized the weaknesses and began working in October 2002 to correct issues with its training effectiveness program. A training effectiveness Yellow Belt Team was chartered in October 2002, the team received Yellow Belt training in November 2002, and the team has been working to complete the Yellow Belt process since November. The team is strengthening its final presentation and will brief senior management on the results within the next few weeks.

The team performed a Failure Modes and Effects Analysis (FMEA) and determined root causes. The team is recommending changes to the overall training effectiveness program that will address the root causes and provide a program where one person has accountability for ensuring that it either works or that senior management is fully aware of it not working in order to take corrective actions.

BWXT Pantex has committed to the implementation of the new training effectiveness program by December 31, 2003. Implementation will require program endorsement by senior BWXT Pantex management, revision of STD-2785 to include new processes, issue tracking, issues closure, and long-term trending to determine effectiveness of corrective actions. The proposed program will correct programmatic deficiencies within the training effectiveness program.

## **8.2 Instructional skills and technical competencies of instructors are evaluated regularly.** (5480.20A, Att. 2, pg IV-3, pp g. (2) (c) 1-2)

BWXT Plant STD-2777, Personnel Selection, Training and Qualification, establishes the process for selecting, qualifying, requalifying, certifying, recertifying, and reinstating employees, and for granting extensions and exceptions to process requirements. Section 3.8 specifically addresses instructor qualification and requalification requirements.

Classroom instructors attend basic instructor training and on-the-job instructors attend OJT training. On a biennial basis, instructors attend refresher training. The instructor qualification is the same as the instructional setting being conducted. Instructors who do not meet qualification requirements lose their instructional qualification. Instructors wanting to regain qualification complete activities causing qualification to lapse (evaluations or continuing training) and/or complete remedial activities related to instructional or technical difficulties.

Instructional skills and technical competencies of instructors are evaluated regularly. STD-2777, Personnel Selection and Qualification, 3.8.2(a)(2) requires that instructors receive an annual instructional skills evaluation in order to maintain their qualification as instructors. Another qualified instructor must perform instructional skills evaluations and the instructor being evaluated must be rated satisfactory for instructional skills or their instructional qualification will be pulled. Instructors who do not receive this annual instructional skills evaluation lose their instructor qualification and the TRAC system will reject all training completions submitted under that instructor's badge number.

Additionally, instructor technical competency is documented on a PX-2039, "Instructor Technical Qualification Evaluation," for each course that an instructor teaches. The PX-2039 documents the technical qualifications for an instructor to teach a course and is approved by the instructor's supervisor, the system SME, or the program engineer as applicable. The PX-2039 requires that the evaluator/approver watch the first presentation of a new course or, for established courses, have observed the course or day-to-day work relating to the course as performed by the instructor. The PX-2039s must be renewed annually. Should the instructor not have a valid PX-2039 for each course taught, the TRAC system will reject all training completions submitted under that instructor's badge number.

**This criterion was met.**

**8.3 Feedback from trainee performance during training is used to evaluate and refine the training program. Feedback from former trainees and their supervisors is used to evaluate and refine the training program. (5480.20A, Att. 2, pg I-8, pp (5))**

Plant Standard STD-2785, Training Evaluation, states that the instructor provides trainees with a PX-2331 for evaluation and encourages trainees to participate in the continuous improvement of training through evaluations of on-site, non-vendor training. The instructor reviews completed evaluations and determines if proposed changes by trainees are valid based on technical merit and principles of learning issues. The instructor then forwards the PX-2331 to Training & Development Technologies.

Summary of End-Of-Course Evaluation Forms (PX-2331) for Classroom and OJT Training received by T&DT for the fiscal year 2002 was reviewed. T&DT Plant Support shows a figure of 112,744 training instances which includes all Classroom, OJT, CBT,

read and sign, drug screen tracking, etc. and T&DT received 4,848 evaluation forms. A return rate ranging from 8 – 9 percent will not provide sufficient feedback to aid in the evaluation and refinement of the training program.

**This criterion was not met.** However, controls planned by the Training Effectiveness Program Yellow Belt as part of the new training effectiveness program should resolve this issue. These controls are scheduled to be in place by December 31, 2003. Additionally, the Infrastructure Controls Department Training Group effectively controls and implements training effectiveness measures for the Infrastructure Division and their example should be followed by the balance of Pantex Plant.

**8.4 Change actions (e.g., procedure changes, equipment changes, facility-specific and operating experience) are monitored and evaluated for their applicability to initial and continuing training programs and are incorporated in a timely manner. Changes in job scope are evaluated to determine the need for revision of initial and continuing training programs.**  
(5480.20A, Att. 2, pg I-8, pp (5))

BWXT Plant Standard STD-2770 establishes the procedures for providing standardized administrative controls for all of Pantex Plant training. It provides specific administrative requirements for on-site training, General Employee Training, On-the-Job training, continuing training, and external training. This Standard applies to all job positions within the directorate organization that are identified in the Training Implementation Matrix.

The T&DT Manager establishes procedures for the site-wide training program. The Division Training Coordinator (DTC) serves as the point-of-contact (POC) for the division on all training-related matters. The DTC assists in defining the scope of the new training needs and continuing training needs, creates the matrix for subcontractors, creates and maintains training codes and training matrices, enrolls personnel in courses through the Training Records and Certification (TRAC) database, monitors and facilitates personnel qualifications, and notifies employees and supervisors of deficiencies in training requirements. The SME or Course Contact develops Flexible Continuing Training from site or industry occurrences, performance deficiency, lessons learned from facility or industry operations, changes to facility procedures and equipment, drills conducted at Pantex and information derived from post drills, occurrence reports, and updates or changes in the Personnel Assurance Program (PAP) or other initial training topics.

BWXT Plant Standard STD-2785, states in Section 3.4, Operating Experience Analysis, the course contact incorporates relevant operational experience in the training program. Sources of this experience include: feedback on experience gained through discussions with SMEs and supervisors, periodic reviews of changes to related plant procedures, and industry events identified through the Lessons Learned Program. However, this process is not consistently implemented across the Plant. The corrective action for this pre-

identified issue has been addressed the Yellow Belt Team review and assessment. Implementation of the corrective action is scheduled to be in place by December 31, 2003.

**This criterion was met.** BWXT Pantex both self-identified this issue at the beginning of the assessment and is working to correct performance issues in these areas. However, BWXT Pantex administrative controls in PX-2785 rely heavily on SMEs to provide information impacting training courses and programs to training instructors. This may occur within a window of up to two years, being caught by the biennial course review called out under STD-2785. BWXT Pantex does not have a site-level policy for determining and administering the designation of SMEs for training courses. Given that there is no “official” list of SMEs for training courses/programs, the potential exists for changes to procedures, equipment, facilities, and operating experience to not be incorporated into training courses and programs since there is no one designated person responsible for communicating this with the instructor.

Additionally, there is no current administrative control dictating that training program descriptions (TPD) be updated to include changes in job scope requiring the revision of initial and continuing training. BWXT Pantex has placed this requirement into the current draft of STD-2788, Training Analysis & Design, which requires the biennial review of the TPD to include changes to job scope. This standard is in the final approval process. While it is the practice of most divisions to review and revise TPDs biennially, the lack of an administrative control made it difficult to track this activity and to ensure that it occurs. The new training effectiveness program, discussed under Criterion 8.1, above, will help ensure that this requirement is implemented and evaluated.

**8.5 Improvements and changes to initial and continuing training are systematically initiated, evaluated, tracked, and incorporated to correct training deficiencies and performance problems.** (5480.20A, Att. 2, pg I-8, pp (5))

Plant Standard STD-2785, *Training Evaluation*, establishes the process for evaluating training according to performance based training methodology. Instructors, course contacts, or designees monitor indicators to improve training system performance through a formal training evaluation system for phases of PBT. The T&DT Department initiates a PX-4310 to notify the designated course contact of the need to conduct a biennial review of the POI and associated training material. The course contact conducts a biennial review to determine if training content is current and accurate and that training is based on its impact on job performance of the target audience. A PX-4310 is submitted to the Division Training Coordinator and the PBT Representative for approval. If the review reveals changes to the training material are needed, the course contact updates the POI and tests, completes a new PX-15, and submits the package to the T&DT PBT representative. The package is submitted to Records for course information update.

STD-2785 requires that course contacts incorporate the results of operating experience analysis into training programs. This does not always occur as expected and is not clearly documented within the training records system.

Prior to the DNFSB visit in January 2003, improvements and changes to initial and continuing training were initiated through flexible continuing training occurred through identification of performance issues via occurrence reports, ad hoc self-assessments, findings in readiness verifications and readiness assessments, and other internal self-assessments occurring in response to performance issues. Performance problems were addressed either through flexible continuing training, new courses, and/or revisions to existing course materials.

Flexible continuing training was not tracked to ensure that it was incorporated into initial and fixed continuing training courses/programs. Flexible continuing training, designed to meet emergent organizational needs has been incorporated into the Issues Tracking System to ensure that training done to meet emergent needs are incorporated into regular lesson plans through a means visible to senior managers.

**This criterion was met.** BWXT Pantex both self-identified this issue at the beginning of the assessment and is working to correct performance issues in these areas. Changes to the training effectiveness program as discussed under Criterion 8.1, above, will strengthen this assessment area.

**8.6 Training materials are maintained current, based upon the results of training program evaluations.** (5480.20A, Att. 2, pg I-8, pp (5))

As stated in Criterion 8.3, Plant Standard STD-2785, Training Evaluation, states that the instructor provides trainees with a PX-2331 for evaluation and encourages trainees to participate in the continuous improvement of training through evaluations of on-site, non-vendor training. The instructor reviews completed evaluations and determines if proposed changes by trainees are valid based on technical merit and principles of learning issues. The instructor then forwards the PX-2331 to T&DT.

The Summary for End-of-Course Evaluation Forms (PX-2331) for Classroom and OJT Training Received by T&DT for the fiscal year 2002 was reviewed. T&DT Plant Support shows a figure of 112,744 training instances which includes all Classroom, OJT, CBT, read and sign, drug screen tracking, etc. and T&DT received 4,848 evaluation forms. A return rate ranging from 8 – 9 percent will not provide sufficient feedback to aid in the evaluation and refinement of the training program.

**This criterion was not met.** BWXT Pantex both self-identified this issue at the beginning of the assessment and is working to correct performance issues in these areas. Changes to the training effectiveness program as discussed under Criterion 8.1, above, will strengthen this assessment area.

**8.7 Training facilities are evaluated to determine their effect on the training process.** (5480.20A, Att. 2, pg I-8, pp (5))

End of course evaluations contain a block for rating/commenting upon training facilities. This is the only area where training facility adequacy is currently evaluated by the BWXT Pantex training effectiveness program. Issues concerning training facilities have been documented on prior external assessments, but these have not been fully corrected due to funding issues pre-identified by BWXT Pantex.

BWXT Pantex both self-identified this issue at the beginning of the assessment and is working to correct performance issues in these areas. Changes to the training effectiveness program as discussed under Criterion 8.1, above, will strengthen this assessment area. There is no clear documentation that training materials are maintained current based upon the results of training program evaluations.

**This criterion was not met.** However, the Infrastructure Division does evaluate training facilities regularly and is working to improve its Maintenance Training Facility. Additionally, corrective actions planned by the Training Effectiveness Program Yellow Belt team will address this criterion and ensure that facility problems are captured and reported to BWXT management for resolution.

**ISSUES:**

All issues were pre-identified to the team and will not be repeated or used in this report. Specific issues are discussed under individual criteria.

**STRENGTH:**

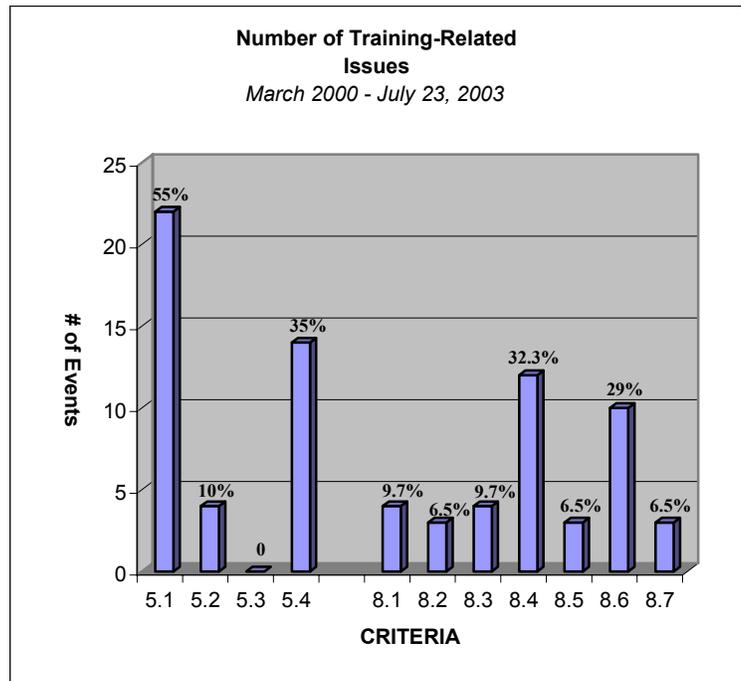
The Infrastructure Controls Department Maintenance Training Group has been doing a consistent and effective job in relation to training effectiveness. Their commitment to provide this critical feedback should be followed by other BWXT training organizations.

**CONCLUSION:**

Accountability is not well defined and there is poor coordination of training program evaluation. Training responsibility is fragmented throughout the Organization. Most training groups have demonstrated strong and consistent training programs.

During the 42-month period of January 2000 through July 23, 2003, Pantex experienced 78 training-related issues in the Criteria areas of 5.0 and 8.0. The prominent areas of difficulty were under Training Program Materials, Continuing Training Program, Change Actions, and Training Program Evaluations. BWXT Pantex has recognized these deficiencies/weaknesses and has instituted the EPIC Yellow Belt Project Evaluation of Training Effectiveness. This draft plan self-identifies BWXT's inability to consistently demonstrate that it meets the "periodic, systematic evaluation of training programs"

requirement of the DOE Order 5480.20A. This plan is a corrective action that has not yet been implemented. The schedule, however, is to initiate a more thorough training effectiveness program by December 31, 2003. Again, these issues should be resolved by the controls and corrective actions planned by the Training Effectiveness Program Yellow Belt Team.



Inspector: <u>J. Patrick Rhone</u> J. Patrick Rhone	Team Leader: <u>Jefferson G. Underwood</u> Jefferson G. Underwood Team Leader
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