



**Memorandum from the Office of the Inspector General**

December 19, 2017

David M. Czufin, LP 3R-C

**REQUEST FOR FINAL ACTION – EVALUATION 2017-15464 – TVA NUCLEAR  
CORRECTIVE ACTION PROGRAM – SEQUOYAH**

Attached is the subject final report for your review and final action. Your written comments, which addressed your management decision and actions planned or taken, have been incorporated into the report. Please notify us when final action is complete. In accordance with the Inspector General Act of 1978, as amended, the Office of the Inspector General is required to report to Congress semiannually regarding evaluations that remain unresolved after 6 months from the date of report issuance.

Information contained in this report will be subject to public disclosure. Please advise us of any sensitive information in this report that you recommend be withheld.

If you have any questions or wish to discuss our findings, please contact John Anthony H. Jacosalem, Auditor, at 423-785-4821 or E. David Willis, Director, Evaluations, at (865) 633-7376. We appreciate the courtesy and cooperation received from your staff during the evaluation.

David P. Wheeler  
Assistant Inspector General  
(Audits and Evaluations)  
ET 3C-K

JAJ:FAJ  
Attachment  
cc (Attachment):

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OIG File No. 2017-15464



Office of the Inspector General

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# *Evaluation Report*

To the Senior Vice President,  
Nuclear Engineering and  
Operations Support

# **TVA NUCLEAR CORRECTIVE ACTION PROGRAM – SEQUOYAH**

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Auditor  
John Anthony H. Jacosalem

Evaluation 2017-15464  
December 19, 2017

## **ABBREVIATIONS**

|           |                                      |
|-----------|--------------------------------------|
| CAP       | Corrective Action Program            |
| CR        | Condition Report                     |
| CWEL      | Chilled Work Environment Letter      |
| MRC       | Management Review Committee          |
| NPG       | Nuclear Power Group                  |
| NRC       | Nuclear Regulatory Commission        |
| PI        | Performance Improvement              |
| PICs      | Performance Improvement Coordinators |
| QA        | Quality Assurance                    |
| Sequoyah  | Sequoyah Nuclear Plant               |
| SPP       | Standard Programs and Processes      |
| TVA       | Tennessee Valley Authority           |
| Watts Bar | Watts Bar Nuclear Plant              |
| WM        | Work Management                      |

**TABLE OF CONTENTS**

EXECUTIVE SUMMARY ..... i

BACKGROUND..... 1

OBJECTIVE, SCOPE, AND METHODOLOGY ..... 2

FINDINGS AND RECOMMENDATIONS ..... 4

    CONDITION REPORTS CLASSIFIED AS CORRECTIVE ACTION  
    PROGRAM WERE GENERALLY RESOLVED EFFECTIVELY ..... 4

    ONE CONDITION REPORT WAS NOT PROPERLY CLASSIFIED..... 4

    OPPORTUNITY FOR IMPROVEMENT RELATED TO ROUTING  
    OF ANONYMOUS CONDITION REPORTS ..... 5

    NEED FOR ADDITIONAL CORRECTIVE ACTION PROGRAM  
    TRAINING ..... 7

**APPENDIX**

E-MAIL DATED DECEMBER 13, 2017, FROM DAVID M. CZUFIN TO  
DAVID P. WHEELER



# Evaluation 2017-15464 – TVA Nuclear Corrective Action Program – Sequoyah

## EXECUTIVE SUMMARY

### Why the OIG Did This Evaluation

The Nuclear Regulatory Commission defines a Corrective Action Program (CAP) as the system by which a utility finds and resolves problems at a nuclear plant. The CAP includes a process for evaluating the safety significance of the problems, setting priorities in correcting the problems, and tracking them until they have been corrected. According to the Tennessee Valley Authority (TVA), its CAP identifies and drives the correction of conditions, and is designed to address conditions in a manner consistent with the nature of the condition and its importance to plant safety, personnel safety, or plant reliability.

In March 2016, the Nuclear Regulatory Commission issued a Chilled Work Environment Letter for TVA's Watts Bar Nuclear Plant and called into question whether the CAP had been effective at identifying and resolving safety culture issues. As a result of the Chilled Work Environment Letter issued to TVA, we initiated evaluations to determine if the CAPs at Browns Ferry, Sequoyah, and Watts Bar Nuclear Plants were effective in resolving concerns. This report summarizes our review of the CAP at Sequoyah.

### What the OIG Found

In summary, we determined the Sequoyah CAP was generally effective in resolving employee concerns during calendar years 2015 and 2016. Specifically, we determined condition reports (CRs)<sup>i</sup> classified as CAP were addressed effectively and in a timely manner. However, we identified areas for improvement related to (1) the classification of CRs, (2) routing and documentation of anonymous CRs, and (3) CAP training.

### What the OIG Recommends

We made five recommendations to the Senior Vice President, Nuclear Engineering and Operations Support related to developing a more robust review of CRs to ensure items are properly classified, improving the handling of anonymous CRs, and providing additional training and reference material. Our detailed recommendations are listed in the body of this report.

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<sup>i</sup> A CR is a computer generated or paper form used to document evaluation and resolution of issues (CAP and non-CAP) in the CR Application within Maximo (TVA's work management system). The CR is considered within the scope of CAP if the issue is associated with a safety-related or quality-related system, structure, component, or program, or other regulatory significant programs. All other issues are considered non-CAP.



## Evaluation 2017-15464 – TVA Nuclear Corrective Action Program – Sequoyah

### EXECUTIVE SUMMARY

#### TVA Management's Comments

In response to our draft report, TVA management agreed to implement four of our five recommendations, but did not intend to change its review process because its CR screening process is consistent with industry practice and provides acceptable results.

See the Appendix for TVA management's complete response.

#### Auditor's Response

We concur with TVA management's comments and planned actions for four of the five recommendations. However, we believe TVA could implement further process improvements to ensure CRs are properly classified.

## **BACKGROUND**

The Nuclear Regulatory Commission (NRC) defines a Corrective Action Program (CAP) as the system by which a utility finds and resolves problems at a nuclear plant. The CAP includes a process for evaluating the safety significance of the problems, setting priorities in correcting the problems, and tracking them until they have been corrected. The NRC further states that an adequate CAP supports a safety conscious work environment because it enables employees to identify concerns that may affect facility safety and security and provides a formal mechanism for the review and resolution of such concerns.

NRC's *Code of Federal Regulations*, Title 10, Part 50, Appendix B, outlines the expectations of a nuclear plant's CAP. It states:

Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition. The identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken shall be documented and reported to appropriate levels of management.

The Tennessee Valley Authority's (TVA) Nuclear Power Group (NPG) Standard Programs and Processes (SPP) 22.300, Corrective Action Program, states the CAP (1) identifies and drives the correction of conditions and (2) is designed to address conditions in a manner consistent with the nature of the condition and its importance to plant safety, personnel safety, or plant reliability. The procedure states the scope of CAP includes: (1) documentation and resolution of conditions adverse to quality and (2) documentation of conditions that potentially affect structures, systems, components, or programmatic elements that are safety-related,<sup>1</sup> quality-related,<sup>2</sup> or related to other key elements such as design, licensing, regulated events, and nuclear safety culture. All other issues are considered non-CAP.

In March 2016, the NRC issued a Chilled Work Environment Letter (CWEL) for the Watts Bar Nuclear Plant which concluded a "chilled work environment"<sup>3</sup> existed in the Operations Department because of a perception that operators were not free to raise safety concerns using all available avenues without fear of

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<sup>1</sup> A term that relates primarily to accident prevention and/or mitigation functions.

<sup>2</sup> A term that encompasses quality assurance program requirements, describing activities that affect structures, systems, and components.

<sup>3</sup> According to the NRC Inspection Manual, Inspection Procedure 93100, "A 'chilled work environment' is one in which employees perceive that raising safety concerns to their employer or to the NRC is being suppressed or is discouraged and can occur because of an event, interaction, decision, or policy change."

retaliation. Additionally, the NRC called into question whether the CAP had been effective at identifying and resolving safety culture issues. The NRC further stated that information from the CAP had provided opportunities for management to identify changes in certain aspects of the safety culture, but the information was not fully acknowledged and acted upon by TVA. As a result of the CWEL, TVA conducted a root cause analysis, which acknowledged a weakness in the CAP. TVA stated in the root cause analysis, "The administration of CAP was determined to have contributed to the cause of the chilled work environment, as it did not provide opportunities for management to identify issues sooner."

As a result of the concerns raised in the CWEL, we initiated evaluations of the CAPs at Browns Ferry, Sequoyah, and Watts Bar Nuclear Plants to determine if the CAPs were effective in resolving concerns. This report summarizes our review of the CAP at Sequoyah.

## **OBJECTIVE, SCOPE, AND METHODOLOGY**

Our objective was to determine if the Sequoyah CAP was effective in resolving concerns. The scope included all Sequoyah condition reports (CRs)<sup>4</sup> initiated between January 1, 2015, and December 31, 2016.

To achieve our objective, we:

- Reviewed TVA-NPG-SPPs applicable to our evaluation, including:
  - NPG-SPP-01.16, Condition Report Initiation
  - NPG-SPP-22.000, Performance Improvement Program
  - NPG-SPP-22.300, Corrective Action Program
  - NPG-SPP-22.301, Service Request/Condition Report Initiation
  - NPG-SPP-22.302, Corrective Action Program Screening
  - NPG-SPP-22.303, PER Actions, Closures and Approvals
  - NPG-SPP-22.600, Issue Resolution
- Reviewed the following internal assessments to identify issues related to the Sequoyah CAP:
  - TVA's 2015 Employee Engagement Survey
  - Sequoyah Quality Assurance (QA) reports
  - Performance Improvement (PI) self-assessments
  - Nuclear Safety Relations Board quarterly minutes
- Reviewed the following external assessments to identify issues related to the Sequoyah CAP:
  - NRC Problem Identification and Resolution reports

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<sup>4</sup> A CR is a computer generated or paper form used to document evaluation and resolution of issues (CAP and non-CAP) in the CR Application within Maximo (TVA's work management system).

- Sequoyah 2016 The World Association of Nuclear Operators<sup>5</sup> Peer Review
- Institute of Nuclear Power Operations 2016 Sequoyah Diagnostic Report
- Randomly selected 45 of 9,975 CAP CRs to determine if they were resolved effectively and timely by:
  - Reviewing the documentation for reasonableness and completeness.<sup>6</sup>
  - Verifying that corrective action plans were developed within the required number of days.
  - Verifying corrective actions for CAP CRs were completed by the scheduled finish date in Maximo.
  - Interviewing the employees who originated the CRs (or worked on the CRs if the originator was unavailable)<sup>7</sup> to obtain additional information about the CR.
- Randomly selected 45 of 22,891 non-CAP CRs to determine if they were classified correctly. For the selected non-CAP CRs, we interviewed the employees who originated the CRs (or worked on the CRs if the originator was unavailable)<sup>8</sup> to obtain additional information about the CR and the CAP. We did not review non-CAP CRs for effectiveness or timeliness.
- Tested all 31 anonymous CRs submitted at Sequoyah from January 1, 2015, to December 31, 2016, to determine if (1) anonymous CRs were routed to the appropriate personnel in accordance with the SPP, and (2) actions were completed in a timely manner. We did not examine anonymous CRs to determine if they were addressed effectively because we were unable to speak to the employees who originated the CRs.
- Interviewed all 4 personnel from the PI Department<sup>9</sup> and all 9 Performance Improvement Coordinators (PICs),<sup>10</sup> to obtain additional information about the CAP. The PICs represented the following departments: Operations, Maintenance, Radiation Protection, Chemistry, Training, Engineering, Security, Maintenance Services, and Work Management (WM).

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<sup>5</sup> The World Association of Nuclear Operators (also known as WANO) is an independent organization with a mission to maximize the safety and reliability of nuclear power plants worldwide by assessing, benchmarking, and improving performance through mutual support, exchange of information, and emulation of best practices.

<sup>6</sup> Supporting documentation included: (1) CR information and related work orders obtained from Maximo, (2) interview responses, and (3) PI Department responses to our CR questions.

<sup>7</sup> We interviewed 38 employees who were associated with 45 CAP CRs.

<sup>8</sup> We interviewed 35 employees who were associated with 37 non-CAP CRs.

<sup>9</sup> The Site PI Manager maintains governance of CAP across the site and exercises decision-making authority associated with program implementation. Also, the PI Department is responsible for the implementation of the site CAP process, and ensures the desired standards and expectations of CAP are met.

<sup>10</sup> PICs are assigned to perform PI duties for an organization. Their responsibilities include (1) prescreening and ensuring trend codes are appropriately applied to CRs; (2) maintaining proficiency in CAP procedures and functions; (3) supporting and training department employees in the CAP process; and (4) assisting general users in CR analysis, action development, and closures.

This evaluation was performed in accordance with the Council of the Inspectors General on Integrity and Efficiency's *Quality Standards for Inspection and Evaluation*.

## **FINDINGS AND RECOMMENDATIONS**

In summary, we determined the Sequoyah CAP was generally effective in resolving employee concerns during calendar years 2015 and 2016. As discussed below, we determined CRs classified as CAP were addressed effectively and in a timely manner. However, we identified areas for improvement related to (1) the classification of CRs, (2) routing and documentation of anonymous CRs to appropriate personnel, and (3) CAP training.

### **CRs CLASSIFIED AS CAP WERE GENERALLY RESOLVED EFFECTIVELY**

We determined the Sequoyah CAP was generally effective in resolving employee concerns. We interviewed 38 employees who were associated with 45 CAP CRs. Most employees reported the corrective actions taken addressed their concerns. In addition, we reviewed supporting documentation for these CRs to determine if actions were reasonable. Based on the results of our interviews and documentation reviewed, we determined that CRs classified as CAP were generally resolved effectively and in a timely manner.<sup>11</sup>

### **ONE CR WAS NOT PROPERLY CLASSIFIED**

We reviewed documentation and interview responses from personnel associated with a randomly selected sample of 45 non-CAP CRs from the population of 22,891 non-CAP CRs. We determined that 1 (2.22 percent) of the 45 non-CAP CRs should have been classified as CAP. Although the CR was effectively addressed as a non-CAP CR, it should have been included in the CAP because it cited concerns regarding TVA's deviation with reporting requirements of thermoluminescent dosimeter<sup>12</sup> limits for members of the public in accordance with *Code of Federal Regulations* Title 40, Part 190, Environmental Radiation Protection Standards for Nuclear Power Operations.

TVA Nuclear is responsible for ensuring that CAP CRs are identified, managed, and corrected in accordance with TVA's CAP guidelines. If CRs are improperly classified as non-CAP rather than CAP, TVA runs the risk of applying less resources and management attention than would be required under CAP for appropriate resolution.

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<sup>11</sup> We could not determine if actions were effective or timely for 5 CRs because work is scheduled for completion at a later date.

<sup>12</sup> Thermoluminescent dosimeters are passive radiation detection devices that are used for personal dose monitoring or to measure patient dose.

**Recommendation**

We recommend the Senior Vice President, Nuclear Engineering and Operations Support, develop a more robust review of CRs to ensure items are properly classified.

**TVA Management's Comments** – TVA management stated they did not intend to change their review process because the CR screening process is already robust, and is then reviewed by the Management Review Committee (MRC), which is consistent with industry practice and provides acceptable results. However, TVA management stated that it would prepare and distribute a lessons learned to the MRC<sup>13</sup> at all three sites and the corporate office.

See the Appendix for TVA's complete response.

**Auditor's Response** – We believe TVA could implement further process improvements to ensure CRs are properly classified, based on the following:

- Our sample indicated 2.22 percent of all CRs at Sequoyah could be misclassified.
- A QA<sup>14</sup> oversight report issued for Sequoyah in May 2016 stated that QA “continues to observe weaknesses in the effectiveness of the PSC<sup>15</sup> and MRC to correctly code and classify CRs. QA identified some examples of CRs that have been incorrectly classified as not in the scope of CAP when they should have been in CAP scope.”

**OPPORTUNITY FOR IMPROVEMENT RELATED TO ROUTING OF ANONYMOUS CRs**

Although we found the Sequoyah CAP was effective at resolving concerns, we identified opportunities for improvement related to (1) routing of handwritten, anonymous CRs, and (2) documenting CRs are routed to the appropriate personnel.

**Handwritten, Anonymous CRs**

NPG-SPP-01.16, Condition Report Initiation, requires all anonymous CRs (CAP and non-CAP) be routed to appropriate personnel. Employees have the option to submit handwritten CRs anonymously. During interviews, a Sequoyah employee stated that several people had expressed concerns about managers identifying their handwriting on anonymous CRs. Additionally, a CR was submitted at Watts

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<sup>13</sup> The MRC is chartered with providing oversight of the Performance Improvement Program execution at a site.

<sup>14</sup> QA is responsible for maintaining the TVA Nuclear Quality Assurance Plan and determining if the QA and quality requirements are being implemented by performing verification activities and informing management of quality problems.

<sup>15</sup> The Plant Screening Committee (PSC) reviews newly initiated CRs for completeness and clarity of the problem descriptions, approves changes in CR classification, and is composed of individuals knowledgeable of Operations, Corrective Action Program, Work Management, and Engineering.

Bar stating that management might be able to determine the identity of employees initiating anonymous CRs based on the handwriting. Fifty-four percent (17 of 31) of the anonymous CRs received in calendar years 2015 and 2016 at Sequoyah were handwritten. Additionally, we determined that 12 out of the 17 handwritten, anonymous CRs were forwarded to management in their original format.

The current practice of sending the handwritten copy directly to management could increase the risk of retaliation and deter employees from submitting anonymous CRs.

### **Routing of CRs**

NPG-SPP-01.16, Condition Report Initiation, requires an anonymous CR to be routed to the following individuals:

- Employee Concerns Specialist/Employee Concerns Program Manager
- Director of Plant Support/Director, PI
- Plant Manager
- Site Vice President/Vice President
- Corporate Senior Program Manager, Safety Culture

TVA was not able to provide documentation showing 13 of the 31 anonymous CRs were routed to any of the appropriate personnel. Additionally, TVA was unable to provide documentation showing 3 of 31 anonymous CRs were routed to all individuals specified in the SPP.

Without documentation of routing, it would be difficult for management or oversight groups to determine if the appropriate personnel were made aware of potentially significant concerns raised within the plant.

### **Recommendation**

We recommend the Senior Vice President, Nuclear Engineering and Operations Support, require (1) handwritten, anonymous CRs to be typed prior to routing to appropriate personnel and (2) documentation to be maintained that verifies anonymous CRs are routed to the appropriate personnel.

**TVA Management's Comments** – TVA management generally agreed with the recommendations and stated both would be implemented. However, management indicated that for the first recommendation, handwritten and anonymous CRs would be required to be typed if forwarded outside the standard distribution and sent to the responsible department manager.

See the Appendix for TVA's complete response.

**Auditor's Response** – We concur with management's planned actions.

## NEED FOR ADDITIONAL CAP TRAINING

We interviewed 82 employees to assist in our determination of effectiveness and timeliness of CAP CRs and/or to obtain general information about the CAP. The most positive responses provided by employees regarding the Sequoyah CAP include:

- Eighty-six percent of all employees interviewed stated the CAP is effective.
- Ninety percent of all interviewees believe it is worth taking the time to initiate CRs.
- Ninety-three percent of all interviewees responded that there are other methods to escalate a CR if they feel it is not addressed effectively.

Although employees generally responded positively about the Sequoyah CAP, employees identified areas for improvement related to CAP.

### Employees Believe CAP Includes Items Outside the Scope of CAP

Sixty-two percent of all employees interviewed believe the CAP includes items such as non-CAP CRs and work orders<sup>16</sup> which are outside the scope of CAP. Some interview comments indicated that minor or less significant issues were sometimes excluded from the CAP. These responses indicate that when an employee refers to the CAP, or a CAP procedure, he or she could actually be referring to non-CAP items.

While interview responses suggested some issues should not have been included in CAP, if employees believe a non-CAP issue or work order is not receiving the proper attention or resolution and associates this issue with the CAP, they may be hesitant to raise actual CAP concerns in the future. Therefore, it is important for employees to know the distinctions between CAP versus non-CAP CRs, and work orders.

### More CAP or CR Training Needed

During interviews, Sequoyah personnel indicated a training gap exists. Nineteen percent of all interviewees stated they did not receive adequate CAP training. Interview comments suggested that the process beyond CR initiation needs more explanation and additional training.

TVA management began implementing a CAP boot camp at Watts Bar in 2016 that provided employees instructions on how to look up CRs and a step-by-step guide of how the CAP and WM processes operate. In addition to these guides provided to employees during the boot camp, Watts Bar also created a CAP Boot Camp Talking Points guide for instructors to use when delivering course material. This guide contains information that would be beneficial as a reference to any user who initiates a CR into the CAP, non-CAP, or WM process. This information includes

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<sup>16</sup> Work orders are maintenance or modification activities to be performed. Although the CAP frequently relies on work orders for resolution, it is not part of the CAP.

(1) CAP initiation, (2) clear distinctions between issues and requirements for CAP and non-CAP CRs, (3) interaction between CAP and WM processes, and (4) alternatives to the CAP. TVA management indicated a CAP boot camp may be implemented at Browns Ferry and Sequoyah as well.

**Recommendation**

We recommend the Senior Vice President, Nuclear Engineering and Operations Support, provide (1) additional training to reinforce the distinctions between CAP, non-CAP, and WM processes and (2) employees with all CAP boot camp guides to use as a reference.

**TVA Management's Comments** – TVA management agreed with the recommendations and stated they would be implemented as written.

See the Appendix for TVA's complete response.

**Auditor's Response** – We concur with management's planned actions.

**From:** Czufin, David Miller  
**Sent:** Wednesday, December 13, 2017 12:33 PM  
**To:** Wheeler, David P.  
**Cc:** Balduzzi, Michael Anthony; Dickens, Robertson Dale; Gambone, Robert L; Meade, Melissa A; Lanier, Dwain Kendrick; Rackley, Kevin D; Meade, Melissa A  
**Subject:** RE: Request for Comments - Draft Evaluation 2017-15464 - TVA Nuclear Corrective Action Program - Sequoyah  
**Sensitivity:** Private

David,

Thank you for your review of the SQN CAP Program. We have the following comments regarding the recommendations in the report:

Recommendation: *We recommend the Senior Vice President, Nuclear Engineering and Operations Support, develop a more robust review of CRs to ensure items are properly classified.*

TVA's process for screening CRs consists of a robust process. We use a multi-discipline team to initially screen CRs. The results of this screen is reviewed and challenged by a multi-discipline, and more experienced, group consisting of Senior Leadership Team members at the Management Review Committee. We do not intend to change our review processes. They are consistent with industry practice and provides acceptable results. The individual discrepancy identified was discussed with the SQN screening committee as a learning opportunity, and we plan to prepare and distribute a lessons learned for all 3 sites and the corporate office Management Review Committees.

Recommendation: *We recommend the Senior Vice President, Nuclear Engineering and Operations Support, require (1) handwritten, anonymous CRs to be typed prior to routing to appropriate personnel and (2) documentation to be maintained that verifies anonymous CRs are routed to the appropriate personnel.*

We agree with these two recommendations, but need to make a clarification for the first recommendation which was also a Watts Bar recommendation. We plan to revise our procedure to require typing of at least one copy of the handwritten anonymous CR if it is routed outside the standard distribution and sent to the responsible department manager. Nuclear will implement the second recommendation for better documentation of the CR distribution.

Recommendation: *We recommend the Senior Vice President, Nuclear Engineering and Operations Support, provide:*

- *Additional training to reinforce the distinctions between CAP, non-CAP, and WM processes.*
- *Employees with all CAP boot camp guides to use as a reference.*

Nuclear agrees with this recommendation and will implement it as written.

Let me know if you have any questions,

DCz