Automated Office Systems Support Quality Assurance Plan

A Model

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Title Page

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Executive Summary

Introduction

Automated Office Systems Support (AOSS) consists of a technical team of computer specialists that perform a variety of activities supporting the desktop computer environment and Local Area Networks (LAN) for the Department of Energy (DOE). In order to provide high quality products and services, each support team must adhere to processes, procedures and standards. Quality Assurance (QA) is a process used to monitor and evaluate the adherence to processes, procedures, and standards to determine potential product and service quality. It involves reviewing and auditing the products and activities to verify that they comply with the applicable procedures and standards, and assuring the appropriate visibility for the results of the reviews and audits.

QA activities should be an integral part of all AOSS activities. Within DOE, there is not a uniform set of products and services provided by all AOSS groups. This model plan provides QA activities appropriate to the following AOSS services and activities:

- AOSS Project Planning
- Network Administration and Operations
- Desktop Support
- Problem Tracking and Reporting
- Hardware/Software Configuration Management
- User Training
- Video Conferencing Network Procedures

Purpose

The purpose of this document, the Automated Office Systems Support (AOSS) Quality Assurance Plan - A Model, is to function as a guide to facilitate the establishment of Quality Assurance (QA) activities within processes and procedures used to deliver products and services in support of a programmatic office desktop/LAN computer environment and other activities performed by the AOSS team.   This model provides a planned systematic method to provide confidence that AOSS products and services are developed and delivered according to established processes. It defines the policy for QA activities, the organizational structure of the QA group, responsibilities of the QA group, responsibilities of affected groups, and identifies necessary reviews and audits.

This document serves as a model of AOSS QA activities and should be tailored by each AOSS team to fit their specific activities. This model will be updated on an on-going basis as a result of process improvement activities.

Methodology

The methodology used to establish the AOSS QA process is based on the methodology used to implement quality assurance for software products. The QA function and applied techniques are the same for AOSS and software products/services. The difference between the QA process is the placement of the QA activities.

The methodology presented in this document is based on the Software Engineering Institute's Capability Maturity Model (SEI/CMM) and the Institute for Electrical and Electronics Engineers (IEEE) standards for Information Management. The activities and standards set forth by SEI and IEEE are used as the foundation to guide AOSS QA activities.

References

The following references were used in developing this model. Identified standards were used as a guide to develop a format for this document. The standards were reviewed and tailored to fit the specific requirements of AOSS activities.

Department of Energy Standards and References

- Office of the Chief Information Officer, "Master Automated Information Systems Security Plan," Human Resources and Administration, September 1996
- Energy Research, "Network Baseline Document," November 1995
- Office of the Chief Information Officer, " Department of Energy, Netware 4.1 Network Directory Structure Standards," Human Resources and Administration, October 1996
- Department of Energy, "Software Engineering Methodology," March 1996.

Industry Standards and References

- ANSI/IEEE Std. 730.1 - 1989 Standard for Software Quality Assurance Plans
- ANSI/IEEE Standard for Software Reviews and Audits
- Software Engineering Institute, "Capability Maturity Model"

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A Model

1. Introduction

Automated Office systems Support (AOSS) consists of a technical team of computer specialists that perform a variety of activities that support the desktop computer environment and Local Area Networks (LAN) for the Department of Energy (DOE). In order to provide high quality products and services, each support team must adhere to processes, procedures and standards. Quality Assurance (QA) is a process used to monitor and evaluate the adherence to processes, procedures, and standards to determine potential product and service quality. It involves reviewing and auditing the products and activities to verify that they comply with the applicable procedures and standards, and assuring the appropriate visibility for the results of the reviews and audits.

1.1 Purpose

This Automated Office System Support Quality Assurance Plan (QAP) describes the standards, processes and procedures used to support the consistent delivery of high-quality, professional products and services provided in the support of an automated office environment. The quality assurance process is concerned with establishing the authority of the QA function, quality assurance standards, procedures, policies, and monitoring, and evaluation processes to determine quality in relation to established standards. QA provides standards against which the quality of the product/service being provided and the progress toward completion can be measured. Quality assurance activities concentrate on the prevention of problems through the continuous improvement of processes.

This document serves as a model of AOSS QA activities and should be tailored by each AOSS team to fit their specific activities. This model will be updated on an on-going basis as a result of process improvement activities.

1.2 Policy Statement

All AOSS activity is required to include QA activities as an integral part of processes used for the development and delivery of products/services. The policy supports:

- Quality Assurance goals must be rational to be accepted and supported.

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- Continual improvement effort must be supported.
- All quality control and quality measurement activities are documented.
- A manager or management team will be designated to be responsible for Quality Assurance.
- Technical Monitor/Senior Management will review Quality Assurance activities.
- The AOSS Quality Assurance Plan will be baselined and placed under Configuration Management control.
- Quality Assurance will work to foster constructive communication, provide feedback to detect and prevent development problems, control risks, discuss alternative solutions, and ensure quality is built-in to all products/services.

1.3 Scope

The scope of the model covers the AOSS activity for network activities and desktop computer support. This model discusses the following QA topics:

- Organizational structure
- Documentation required
- Procedures to be enforced
- Audits and reviews to be conducted
- Process improvement
- Problem reporting and resolution
- Quality Assurance metrics

The AOSS activities that will be reviewed by QA activities are:

- AOSS Project Planning
- Network Administration/Operations
- Desktop Support
- Problem Tracking and Reporting
- Hardware/Software Configuration Management
- User Training
- Video Conferencing Network Procedures

2. Management

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2.1 Organizational Structure

The QA function will be a separate entity and will maintain independence from the AOSS project management by possessing a direct reporting function to the technical monitor/senior management. This structure will protect the QA team's independence and objectivity concerning the assurance of high-quality, professional products and services. This team is responsible for the development of an AOSS Quality Assurance Plan (QAP) that will be used to identify the roles and responsibilities of the QA team.

2.2 Roles and Responsibilities

The role of the QA team is to assist the technical staff to continually improve the quality of their work products and services. The QA team is responsible for establishing processes and procedures that accurately verify and validate the adherence of desktop computer support and network activities to applicable standards, guidelines, and procedures.

The QA team will be involved at the start of the project. They will participate in the development of the AOSS Project Management Plan (PMP) to establish their function within the project and to provide input into the project's schedule and work breakdown structure (WBS) to ensure that QA activities are identified and that time is allotted for QA activities. Funding for the QA team members will be planned within the task hours and cost structure.

The organizational responsibilities as they relate to QA are:

2.2.1 Technical Monitor/Senior Management

- Provides management support, supervision, and oversight for the QA function
- Ensures the independence of the QA function
- Makes available staff and other resources as needed to support QA
- Ensures resolution of problem and concern issues
- Reviews QA audits and reports

2.2.2 AOSS Task Leader

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- Manages overall AOSS performance.
- Ensures QA activities are conducted
- Ensures compliance with the QA program
- Ensures responses to deficiency reports from QA reviews and audits

2.2.3 Quality Assurance Team

- Develops and maintains the Quality Assurance Plan
- Ensures work products adhere to the appropriate standard
- Conducts audits and reviews
- Develops audit and review procedures for AOSS activities
- Ensures the QA processes and procedures adequately control project quality
- Ensures the QA activities accurately measure the product, service, and process quality
- Reviews and approves specified deliverables for release to customer
- Promptly reports results of audits to the project task leader
- Periodically reports unresolved noncompliant items to technical monitor/senior management
- Maintains an on-going dialogue with the technical monitor and AOSS support staff to establish a common understanding of quality assurance activities as they apply to AOSS services and products
- Ensures that the expectations of QA activities are identified and understood between the technical monitor, task leader, and the team members
- Collects and analyzes metrics produced from the results of the QA process
- Recommends changes in procedures to improve processes

2.2.4 Technical Staff

- Implements task level quality control based on QA standards, policies, and procedures
- Participates in reviews and audits
- Performs corrective actions or process improvements in response to QA findings
- Manages and controls defects/errors and corrections
- Tracks the status of defects/errors until closed

The effectiveness of the QA team's effort depends on the support and commitment of the technical staff and all levels of management. All affected groups should be trained in the principles of quality assurance and be committed to the proper inclusion and performance of QA

activities within their work efforts.

3.0 Required Documentation

All required documents will follow the appropriate standards concerning content and format. Industry wide standards for AOSS management are frequently unavailable. When industry standards are not available, the QA team, along with input from the project team, must develop the standards or adapt documents developed by other groups to use as standards within the project. The information used from other group's documents will be used to ensure compatibility between other networks existing within the organization. Standards will be identified and followed for all required project documentation.

The AOSS activities are to be implemented according to customer requirements. The required documentation is necessary to ensure AOSS activities are planned, monitored and controlled and will be used to verify the adequacy of the actual processes and procedures used to develop and/or deliver products/services.   Required documentation, as applicable, includes:

- Network Management Project Plan
- Network Architecture
- Network Baseline
- Network Operations Manual
- Network Security Procedures
- Network Disaster Recovery Plan
- Desktop Computer Support Operations Manual
- Video Conferencing Operations Manual
- Configuration Management Plan

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Other documentation may need to be identified for specific tasks. For example, specific documentation for hardware repair or credit card purchases may be needed.

4.0 Quality Assurance Methodology

Different methods and techniques will be utilized depending on the specific quality assurance activity.   The techniques, tools, and methodologies that will be used are as follows:

- Walkthroughs - Formal or informal, structured walkthroughs are used for orientation, examining promising ideas, identifying defects or errors, and improving products at any

stage in the process.

- Reviews - An independent evaluation of an activity or process to assess compliance with the project plan; or to examine products or processes against quality factors through the use of checklists, interviews, and meetings.

- Audits - An independent examination of a work product or process to determine compliance with specifications, standards, contractual agreements, or other preestablished criteria.

- Evaluations - An evaluation activity that examines products/services to determine compliance to requirements.

- Process Improvement - A process improvement program designed to reduce the error rate in a process.

Quality Assurance will provide an independent review of the processes used at key check points. These reviews will seek to identify risks early, and will simplify monitoring and managing problem areas throughout the project. Due to the dynamic nature of AOSS activities and the need to provide quick response requests, the QA team and the technical monitor will identify the sign-off points at key check points of an activity to ensure that expressed goals and requirements are met.

4.1 Walkthrough Methodology

Walkthroughs are beneficial for evaluating plans, documentation and other deliverables and serve to orient staff members to new products or services. Walkthroughs will be conducted internally and on an as-needed basis. They will be used to:

- Present plans, documentation, or other deliverables for review and approval.
- Review material in the preparation stages.
- Critique and report quality deficiencies of plans, processes, and procedures.

Walkthroughs will be scheduled early enough to allow for revisions if problems are identified. Records of these walkthroughs will be maintained, along with issues that were identified and resulting action to be taken. Issues can be accepted "as is" or may require more work. If further discussion on the issue is required, additional walkthroughs can be scheduled.

4.2 Review Methodology

Reviews are important to assess compliance with a project plan. Specifically, the review process examines products/services from the context of quality factors. Quality factors are categories of product/service attributes. Examples of quality factors include:

- Correctness - The extent to which a product/service satisfies requirements and the stated objectives.
- Timeliness - The product/service is provided when needed.
- Reliability - The extent to which a product functions accurately or service is provided on a consistent basis.
- Productivity - The amount of resources to correctly produce the product or deliver the service, including the relationship between the amount of time needed to accomplish work and the effort expended.

4.2.1 Review Procedures

The QA team will plan and conduct a review according to accepted practices and standards. A typical review procedure includes:

1. Identify reviews in the WBS and project schedule
2. Verify correct review procedures are in place
3. Document review results against quality factors
    3.1 Verify product/service traceability, if applicable
    3.2 Verify product/service against contractual requirements
    3.3 Verify product/service against standards and procedures
4. Validate corrections by scheduling follow-up actions and reviews
5. Verify that defects or errors are tracked to closure
6. Document review results against product validation information
7. Summarize review findings for other technical groups/organizations (e.g., network engineering)
8. Enhance review procedures

4.3 Audit Methodology

The QA team is responsible for conducting product/service and process audits. The purpose of audits is to identify deviations in process performance, identify noncompliance items that cannot be resolved at the technical support or project management level, to validate process improvement/corrective action achievements, and to provide relevant reports to all management levels.

A product audit is an independent examination of work product(s) to assess compliance with specifications, standards, customer requirements, or other criteria. Product audits are used to verify that the product was evaluated before it was delivered to the customer, that it was evaluated against applicable standards, procedures, or other requirements, that deviations are identified, documented, and tracked to closure and to verify corrections. (IEEE STD 610)

A process audit is a systematic and independent examination to determine whether quality activities and related results comply with planned arrangements and whether these arrangements are implemented effectively and are suitable to achieve objectives. (ISO 1001)

The QA team will perform the following activities when conducting an audit.

1. Define the scope and purpose of the audit within the audit plan.
2. Prepare audit procedures and checklists for the audit.
3. Examine evidence of implementation and controls.
4. Interview personnel to learn the status and functions of the processes and the status of the products.
5. Discuss findings with the technical staff and task leader.
6. Prepare and submit an audit report to technical monitor/senior management
7. Refer unresolved deviations to technical monitor/senior management for resolution.

4.3.1 Audit Procedures

A typical audit would include the following steps:

1. Clearly understand and adhere to the audit scope
2. Conduct preparation meetings in advance of the audit.
   a. Define areas to be reviewed.
   b. Define review criteria.
3. Conduct an overview meeting in advance of the audit
4. Understand the organization, products, and processes.
5. Conduct the planned meetings, interviews, samples, etc.

6. Review the preliminary findings internally with the audit team.
7. Verify and classify findings from the audit.
8. Validate audit findings with the audit recipient.
9. Prepare the audit report for the audit client.
10. Provide recommendations on request only.
11. Follow-up on corrective action/process improvement.
12. Improve the audit process.

An audit is considered complete when:

1. Each element within the scope of the audit has been examined.
2. Findings have been presented to the audited organization.
3. Response to draft findings have been received and evaluated.
4. Final findings have been formally presented to the audited organization and initiating entity.
5. The audit report has been prepared and submitted to recipients designated in the audit plan.
6. Document audit findings and recommendations and report to Project Manager.
7. The recommendation report, if required by the plan, has been prepared and submitted to recipients designated in the audit plan.
8. All of the auditing organization's follow-up actions included in the scope of the audit have been performed.

4.4 Evaluation Methodology

Evaluations examine the activities used to develop/deliver products and services, ultimately determining if the activity is fulfilling requirements. The QA function establishes criteria for an evaluation, verifies the process has been performed, and collects the metrics to describe the actual results of those activities.

4.5 Process Improvement

The QA team is responsible for process improvement. Process improvement is successful when

an effective process emerges or evolves that can be characterized as: practiced, documented, enforced, trained, measured, and improvable.

A corrective action plan must be developed when a deficiency in the process is detected. Corrective action should prevent the problem from recurring.

Successive steps for implementing a process improvement approach are:

1. Detection of quality-related problems
2. Identification of responsibility
3. Evaluation of importance
4. Investigation of possible causes
5. Analysis of problem
6. Preventive action
7. Process controls
8. Disposition of nonconforming items
9 Permanent changes

The QA team will analyze the results of their findings in relation to the results of documented processes used to produce products or services. This comparison will be used to determine which process may need improvement and to determine the effectiveness of changes to the processes.   This comparison will also be used to identify best practices that should be continued or implemented at other sites.

5.0 Problem Reporting Methodology

Errors, defects, issues, deviations and noncompliance items identified in the AOSS activities must be itemized, documented, tracked to closure, and reported by the QA team. The QA team must verify all problems were tracked to closure and must provide continuing feedback to management and the technical support team concerning the status of the problem.

5.1 Noncompliance Reporting Procedures

1. Problems are resolved with the direct producer or the appropriate task leader, when

possible.
2. Problems that cannot be resolved with the technical team or task leader are elevated to the project manager.
3. Problems that have been referred to the project manager are reviewed weekly until they are resolved. Items that cannot be resolved by the project manager within six weeks are elevated to the technical monitor for resolution.

6.0 Quality Assurance Metrics

The QA team will work with the technical support staff to identify indicators and their associated measures (Metrics) that are needed to control performance and predict future status of processes used to produce products and services. The metrics will be used to help determine when and where a problem is occurring and what type of impact it will have on the product or service. The metrics will be used to base decisions concerning the selection of best practices to implement in the project.

Metrics that are necessary to monitor the effectiveness of QA processes and procedures are:

1. Number of reviews (QA activities) conducted
2. Status of non-conformance items identified
3. Status of action items open/closed/on-hold
4. Number of days to correct and close a non-conformance item
5. Customer satisfaction levels relating to product and service quality
6. Trends for process improvement
7. Lessons learned

AppendicesQuality Assurance Check Lists

Quality Assurance
Management Plan

Yes   **No**   **Check List Description**

___   ___   Are project tracking activities evident?

___   ___   Are project tracking and oversight being conducted?

___   ___   Are all plan reviews conducted according to plan?

___   ___   Are all issues arising from peer reviews addressed and closed?

___   ___   Are status and review meetings conducted according to the schedule?

___   ___   Is a WBS that supports all deliverables/long term projects developed?

___   ___   Is change managed according to the Configuration Management Plan?

___   ___   Have all deviations from standards and procedures documentation been approved?

___   ___   Are project roles and responsibilities defined?

Quality Assurance
Configuration Management

Yes	No	Check List Descriptions
___	___	Does a Configuration Management Plan (CMP) exist?
___	___	Is CMP being used?
___	___	Does the CMP contain a list of configuration items to be managed?
___	___	Does the CMP contain change control procedures?
___	___	Does the CMP contain the process to evaluate changes, including estimates and impact?
___	___	Does the CMP identify the person/group who can approve changes to the CMP?
___	___	Has the CMP been added under the configuration management baseline?

Quality Assurance
Network Management

Required Documentation

Yes   No   Description

___   ___   Does a Network Baseline exist?

___   ___   Does a Network Acceptance Plan exist?

___   ___   Does a Network Operations Manual exist?

___   ___   Does a Network Security Procedures Manual exist?

___   ___   Does a Network Disaster Recovery Plan exist?

___   ___   Does a Configuration Management Plan exist?

Quality Assurance
Network Management

Network Operations

Yes	No	Description

___   ___   Are changes to the Network documented?

___   ___   Are peer reviews implemented for network projects?

___   ___   Are problem reporting and tracking procedures used?

___   ___   Do network projects utilize project planning including a detailed work breakdown structure (WBS)?

___   ___   Are original copies of software loaded on the network subsequently placed in a secure CM library?

___   ___   Is disk space monitored and recorded on a regular basis?

___   ___   Are back up procedures followed?

___   ___   Is a secure destination for back up storage identified and used?

Quality Assurance
Network Management

Equipment Moves

Yes	No	Description
___	___	Has the physical layout of the room been planned?
___	___	Is there furniture available that will support the equipment?
___	___	Are LAN drops available?
___	___	Do the LAN drops work?
___	___	Are all necessary physical connections available?
___	___	Is there adequate power supply?
___	___	Is an UPS needed?
___	___	Have testing procedures been developed?
___	___	Has there been a peer review on the implementation plan?
___	___	Have the necessary requisitions been prepared?
___	___	Has all necessary procurement been received?
___	___	Are tools necessary for assembly/disassembly available?

Quality Assurance
Desktop Computer Support

Help Desk

Yes	**No**	**Description**
___	___	Does the help desk use problem reporting and tracking procedures?
___	___	Is there a problem escalation process?
___	___	Do the help desk technicians have a standard set of tools that may enable them to resolve a call on the first visit?
___	___	Are security procedures for equipment followed?
___	___	Are there testing procedures in place to verify that changes to a user environment did not adversely affect other applications?
___	___	Are virus detection procedures used?