SOFTWARE QUALITY & SYSTEMS ENGINEERING PROGRAM

System Maintenance Checklist

The following checklist is intended to provide system owners, project managers and other information system developers and maintainers with guidance in identifying and planning system maintenance activities.

The objectives of system maintenance are summarized as:

• Resolution of errors, faults, and failures.

• The requirements for system maintenance initiates lifecycle changes. The change is remapped and executed, thereby treating the maintenance process as iterations of development.

Maintenance Checklist	SEM Reference	Comments
☐ A procedure exists for handling emergency changes that cannot be implemented as part of a scheduled release.	Chapter 10 Maintenance	
☐ An identification number is assigned to the modification.	Chapter 10 Problem/Modification Identification Stage	
☐ The modification is categorized as corrective, adaptive, emergency, scheduled, perfective, mandatory, required, or nice to have.	Chapter 10 Problem/Modification Identification Stage	
☐ The modification is analyzed to determine whether to accept, reject or further evaluate.	Chapter 10 Problem/Modification Identification Stage	
☐ Changes are assigned an initial priority ranking.	Chapter 10 Problem/Modification Identification Stage	
☐ Modification requests and process determinations have been uniquely identified and placed into the project file.	Chapter 10 Problem/Modification Identification Stage	
☐ A peer review has been conducted (as appropriate) on problem/modification identification	Chapter 10 Problem/Modification Identification Stage	
☐ Metrics are recorded (e.g., number of requests, time expended for problem validation)	Chapter 10 Exhibit 10.0-3	
☐ A preliminary estimate of the modification size/magnitude has been made.	Chapter 10 Analysis Stage	
☐ The impact of the modification has been assessed.	Chapter 10 Analysis Stage	

Maintenance Checklist	**SEM Reference**	**Comments**
☐ The modifications are coordinated with other ongoing maintenance tasks.	Chapter 10 Analysis Stage	
☐ Once modifications are agreed to, firm requirements have been defined.	Chapter 10 Analysis Stage	
☐ Elements of the modification have been identified.	Chapter 10 Analysis Stage	
☐ Safety and security issues have been identified.	Chapter 10 Analysis Stage	
☐ A test and implementation strategy exist (includes unit, integration and user-oriented functional tests).	Chapter 10 Analysis Stage	
☐ All appropriate analysis and project documentation has been updated and properly controlled.	Chapter 10 Analysis Stage	
☐ It has been verified that the change schedule can support the proposed test strategy.	Chapter 10 Analysis Stage	
☐ Resource estimates and schedules have been reviewed and their accuracy verified.	Chapter 10 Analysis Stage	
☐ The Feasibility Report includes identification of short and long term costs, solution approach, safety and security implications, and human factors.	Chapter 10 Analysis Stage	
☐ A Maintenance Plan exists that shows how the design, implementation, testing, and delivery of the modification is to be accomplished with a minimal impact to current users.	Chapter 10 Analysis Stage	
☐ Structured Walkthroughs, In-Stage Assessments, and a Stage Exits have been conducted for the Analysis Stage.	Chapter 10 Analysis Stage SWT guide, ISA guide, Stage Exit guide	

Maintenance Checklist	SEM Reference	Comments
☐ Metrics have been recorded (i.e., # of requirements changes, etc).	Chapter 10 Exhibit 10.0-3	
☐ For the design, selected software modules have been identified.	Chapter 10 Design Stage	
☐ Software module documentation has been modified (e.g., data and control flow diagrams).	Chapter 10 Design Stage	
☐ Test cases have been created for the new design.	Chapter 10 Design Stage	
☐ Regression tests have been identified and created.	Chapter 10 Design Stage	
☐ Documentation update requirements have been identified (user/system).	Chapter 10 Design Stage	
☐ Modification list has been updated.	Chapter 10 Design Stage	
☐ Any known constraints and any possible actions taken or recommended that mitigate risk have been documented.	Chapter 10 Design Stage	
☐ The new design/requirement has been documented as an authorized change.	Chapter 10 Design Stage	
☐ Inclusion of new design material has been verified.	Chapter 10 Design Stage	
☐ The appropriate test documentation has been updated.	Chapter 10 Design Stage	
☐ Traceability of the requirements to the design has been completed.	Chapter 10 Design Stage	

Maintenance Checklist	SEM Reference	Comments
☐ Structured Walkthrough(s), In-Stage Assessment, and Stage Exits for design have been conducted as appropriate.	Chapter 10 Design Stage	
☐ Change to the code has been implemented and unit test performed.	Chapter 10 Construction Stage	
☐ After coding and unit test, the modified software has been integrated with the system, at appropriate intervals, and integration and regression tests refined and performed.	Chapter 10 Construction Stage	
☐ All effects (e.g., functional, performance, usability, safety) of the modification have been assessed and noted. A return to coding and unit testing is made to remove any unacceptable impacts.	Chapter 10 Construction Stage	
☐ Risk analysis and review have been performed periodically during the Construction Stage.	Chapter 10 Construction Stage	
☐ Metrics/measurement data have been used to quantify risk analysis.	Chapter 10 Construction Stage	
☐ A Test Readiness Review has been conducted.	Chapter 10 Construction Stage	
☐ Structured Walkthrough(s), In-Stage Assessment, and Stage Exits of construction have been conducted as appropriate.	Chapter 10 Construction Stage	
☐ System testing (system function, interface, regression, and test) has been performed on the fully integrated modified system.	Chapter 10 System Test Stage	
☐ System tests have been conducted by an independent part as feasible.	Chapter 10 Acceptance Stage	
☐ The test function has reported status of activities established in the test plan.	Chapter 10 Acceptance Stage	

Maintenance Checklist	SEM Reference	Comments
☐ Software code, Modification Requests, and test documentation has been placed under configuration management	Chapter 10 Acceptance Stage	
☐ Acceptance testing (functional level, interoperability, regression) has been performed on the modified system.	Chapter 10 Acceptance Stage	
☐ A Functional Configuration Audit has been performed.	Chapter 10 Acceptance Stage	
☐ A new system baseline has been established and documented	Chapter 10 Acceptance Stage	
☐ The acceptance test items (i.e., software units, documentation) have been placed under configuration management.	Chapter 10 Acceptance Stage	
☐ An Acceptance Test Report has been created.	Chapter 10 Acceptance Stage	
☐ The Project Plan has been update.	Chapter 10 Acceptance Stage	
☐ Modification request log has been revised as appropriate.	Chapter 10 Acceptance Stage	
☐ Structured Walkthrough(s), and Stage Exits of acceptance testing have been conducted as appropriate.	Chapter 10 Acceptance Stage	
☐ Approval has been obtained from the change authority that the change has been successfully completed.	Chapter 10 Acceptance Stage	
☐ A Physical Configuration Audit has been performed.	Chapter 10 Delivery Stage	
☐ The User Community has been notified.	Chapter 10 Delivery Stage	

Maintenance Checklist	SEM Reference	Comments
☐ An archival version of the system has been created for backup.	Chapter 10 Delivery Stage	
☐ Installation and training has been performed at the user facility.	Chapter 10 Delivery Stage	
☐ Access has been provided to the system materials for users	Chapter 10 Delivery Stage	
☐ The version description document has been completed and placed under configuration management.	Chapter 10 Delivery Stage	
☐ Structured Walkthrough(s), In-Stage Assessment, and Stage Exits are conducted of acceptance process completion are conducted as appropriate.	Chapter 10 Delivery Stage	
☐ Collect feedback data for product and documentation improvement and system tuning have been collected as changes are implemented.	Chapter 10 Maintain system	
☐ Responses to technical questions and problems have been provided as needed.	Chapter 10 Maintain system	
☐ The production system is monitored and supported on an as needed basis.	Chapter 10 Maintain system	
☐ Consultation has been provided on future enhancements.	Chapter 10 Maintain system	

REFERENCES

The following standards can be referenced for additional information on information systems maintenance practices and procedures.

DOE Systems Engineering Methodology, September 2002

Software Engineering Institute's Software Capability Maturity Model (SEI CMM)
Software Configuration Management is a Key Process Area in Level 2 of the Model.

Institute of Electrical and Electronic Engineers (IEEE)
The IEEE Standard for Software Life Cycle Processes

Organization for Standardization (ISO)
ISO 9001.

Inroads to Software Quality "How-to Guide and Tool Kit" by Alka Jarvis and Vern Crandall, Prentice Hall, 1997