

“Assure Placement of Quality in Documentation”

**for the
American Society For Quality
Section 1530**

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By

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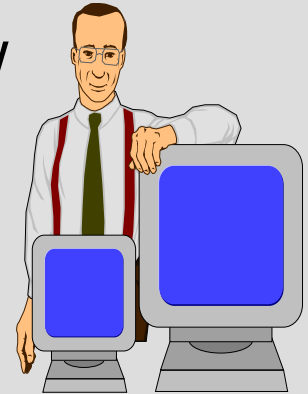
Quality Engineering Consultant

Ed Gardner's Background

- Current Employment
 - **Orion Registrar, Inc. – Certified ISO Lead Assessor**
 - Clients: Lockheed Martin, BEST CROSSMARK, Del-Jen, Inc., Avaya, Inc., Other
 - **Theseus Professional Services - Quality Engineering Consultant**
 - Clients: Citigroup, Inc., Miami-Dade Transit, Software Transformations, EAC Consulting, Inc., Florida government (IT consultant contract), Other
- Prior Employment: Lockheed Martin, Loral Space Systems, IBM, Computer Sciences Corporation, Veterans Administration
- Education: Bachelor of Science, University of Maryland
- Specialties: Organizational Consulting, Training, Organizational/Project Assessments, Technical Writing, Auditing, Process/Organizational Improvement

Topic Agenda

- Provide a review methodology by which quality can be assured within documentation
- Assure quality in terms of (internal/external) compliance, completeness, minimal defects, and meeting the objectives of the organization
- Identify the participants in a document review process and their roles
- Differentiate between a peer and a formal document review
- What constitutes a satisfactory (formal) document review



Definitions

- **Formal Document Review:** A formal methodology to thoroughly examine a work product to improve its technical correctness, by identifying, recording and removing defects introduced during the development process, identifying any action items useful for the project, and providing pertinent resultant information for analysis, trending, reporting and defect prevention.
- **Peer Review:** A review, not necessarily via a meeting, by which a work product is examined for suitability and correctness.

OK, So....What is *Correctness* Anyway?

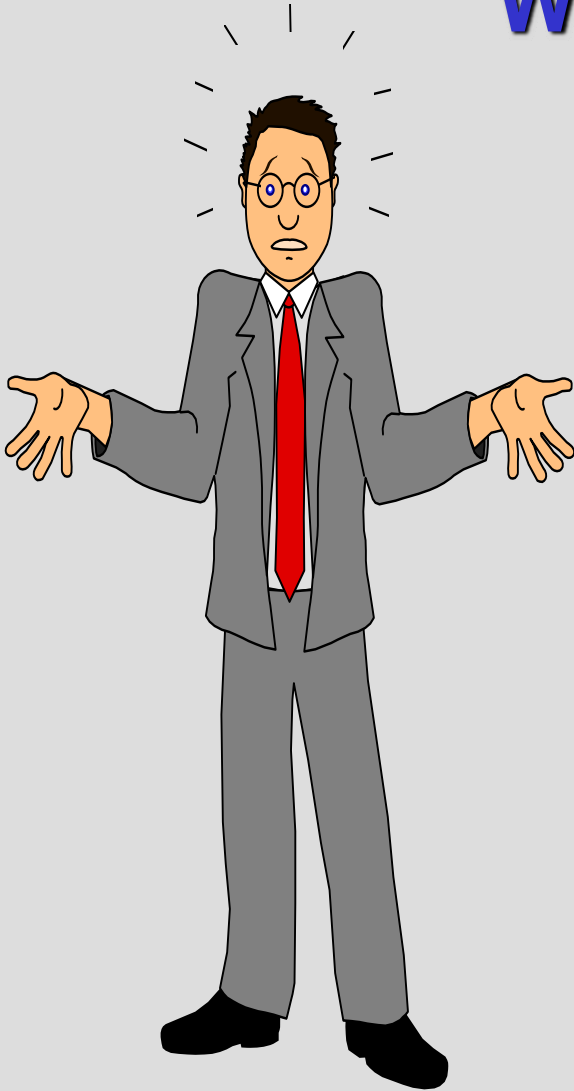
(or, What Makes a “Good” Work Product?)

MORE OBJECTIVE →

- **Conformance to requirements**
(form, fit, function, cost, standards, or guides)
- **‘Proper’ tolerances and dimensions**
- **‘Proper’ materials**
- **Adequacy and completeness**
- **Testability and verifiability**
- **Safety and human factors**
- **Top down architecture**
- **Minimized complexity**
- **Modularity**
- **Clarity**
- **Consistency**

←-MORE SUBJECTIVE

What is a Defect?



- **Does not conform to requirements or standard(s)**
- **Is not a correct refinement of the higher-level work product**
- **Missing, incomplete, or incorrect functionality**
- **Does not meet technical performance measurements**

When Do We Perform a Formal Document Review?

We have the following “drivers” --

- **CONTRACT, SOW, RFP, MASTER TEST PLAN**
- **DoD/State/Federal/CUSTOMER STANDARDS**
 - Quality Assurance and Quality Control Guidelines
 - MIL-Q-9858, MIL-STD-498
 - Sarbanes-Oxley Requirements
 - ISO 9001, ISO 14001
 - Florida State Requirements
 - American Society for Quality Requirements
 - Lee County Requirements
- **COMPANY REQUIREMENTS**
 - **Company Policies, Procedures**

The Usual Reasons for a Formal Document Review

THE USUAL REASONS FOR A FORMAL DOCUMENT REVIEW:

- Remove defects at earliest phase possible
- Provide a sound basis for the next development phase
- Gain agreement by interdisciplinary teams on technical issues
- Ensure work product quality (correctness, compliance, completeness, clarity, and consistency)
- Take advantage of the synergy and knowledge of the group
- Encourage standardization which makes maintenance much easier

Formal Review Documents

The following documents are candidates for a formal document review –

- **Design Documents**
- **Request for Proposals**
- **Statements of Work**
- **Organizational Proposals**
- **Drawings**
- **Policies**
- **Procedures**
- **Plans**
- **Project Schedules**

Other Benefits of Formal Document Reviews

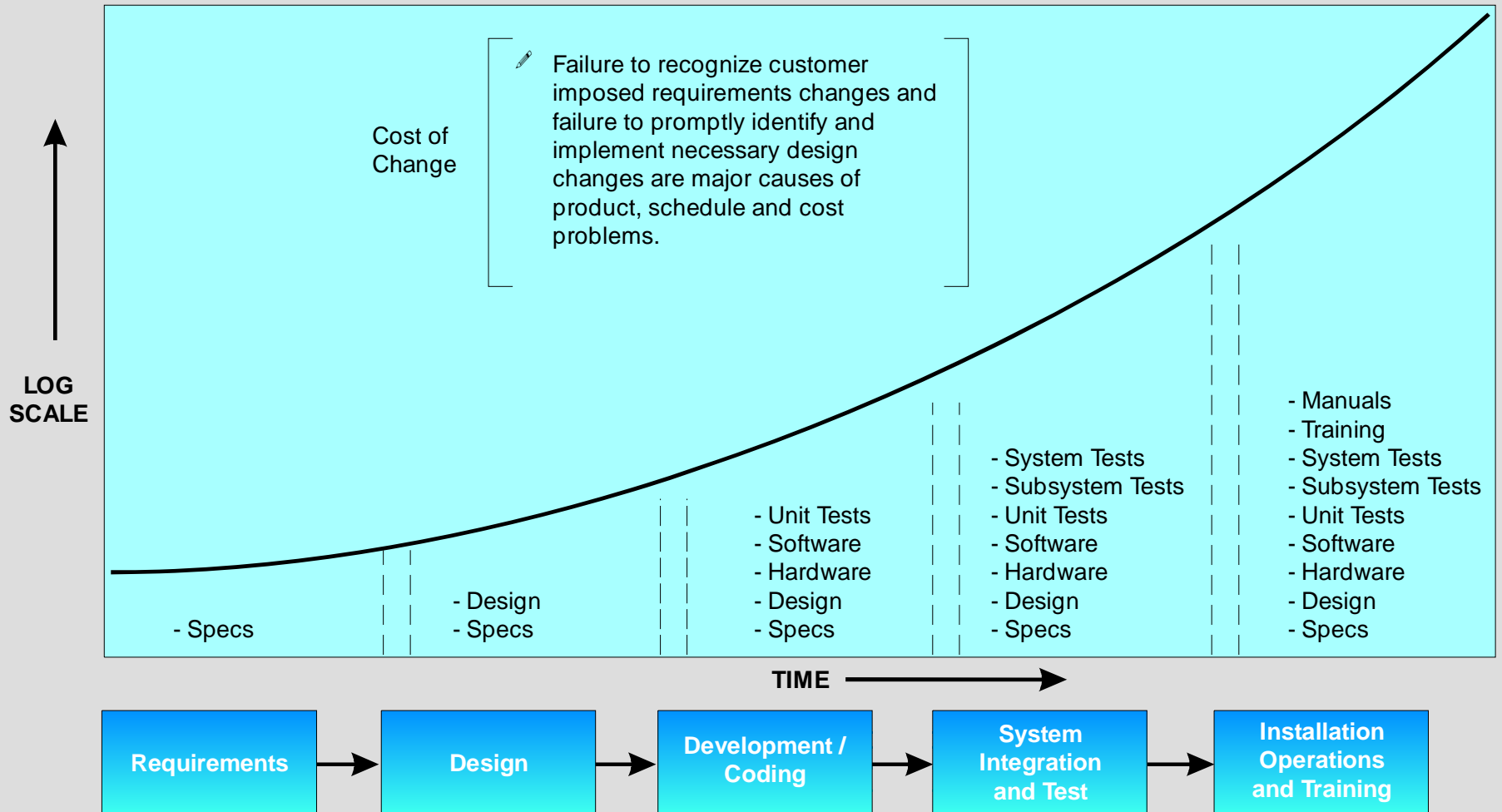
A GOOD WAY TO LEARN NEW/BETTER TECHNIQUES

- Seeing other people's work products often gives us good ideas. Don't be afraid to reuse a good idea!
- Conversely, we get a sixth sense for what is "bad"

A GOOD WAY TO LEARN ABOUT OTHER PARTS OF THE SYSTEM, TEAM, OR ORGANIZATION

- Seeing other people's work products gives us a better understanding of how the various pieces fit together
- This in turn gives us an appreciation for the overall project or system architecture

Cost of Fixing Defects in Products



The Formal Document Review Process

Steps of the Process

- Plan the formal document review strategy for the project
- For each formal document review
 - Define the scope and organize the material (Planning phase)
 - Disseminate material and have it reviewed (Preparation phase)
 - Conduct the document review meeting (Formal Document Review phase)
 - Address review findings and collect metrics (Rework phase)
- Conduct Lessons Learned meeting at end of project or at major milestones

The Author



- **Develops the material to be reviewed**
- **Helps identify the Review Team***
- **Reviews material with the Moderator to assure completeness**
- **Participates in the meeting (as a Reviewer)**
- **Reworks the material as needed to resolve defects**
- **Demonstrates to the Moderator that defects have been addressed and corrected**
- **Assists the Moderator in assuring that materials are retained properly**

*With the Help of the **DOCUMENT COORDINATOR** and/or **MODERATOR**

Moderator

- Helps identify the document review team, including any key reviewers (Optional)
- Reviews document review package from the Author to assess readiness for the review meeting
- Schedules the document review meeting
- Distributes the document review material to reviewers – at least three (3) working days prior to the review
- Determines that entry/exit criteria have been met for the document review
- Controls the document review meeting (ensures proper conduct, keeps it moving, etc.)

...The moderator is empowered to “pull the plug” if the materials are inadequate or the meeting is not being conducted properly!

Moderator (Continued)

- **May be an active participant/reviewer in the formal review**
- **Collects and gives defect list to the Author**
- **Requests a new document review if the initial review failed due to lack of preparation, too many defects, too many major defects**
- **Verifies disposition of defects and any action items**
- **Ensures that document review materials are suitably retained**
- **Determines the need for a follow on document review meeting**
- **Closes the document review following resolution of defects and tracking of any action items**

The Reviewers



- Review the material in the formal document review package prior to the meeting and note any defects
- Use review checklist if provided by the Moderator (**Review checklists are an option**)
- Participate in the formal review meeting
- Forward defect logs to the Moderator if unable to attend the formal document review meeting

The Presenter and The Recorder

The PRESENTER (Usually the Author)

- Sometimes called the 'Reader'
- May be the person who will take product through to the next development phase
- All the responsibilities of an Reviewer, and
- Presents the material (formal review package) at the meeting



The RECORDER (Usually the Moderator)

- All the responsibilities of an Reviewer
- Logs defects and actions as presented at the formal review meeting
- Listens and understands
- Prepares summary and forwards defect logs to the Moderator



The Formal Document Review

Coordinator (Optional)



- A liaison for the project
- Acts as single point of contact for formal document review-related issues
- Establishes and monitors formal document review schedules
- Helps identify potential moderators
- Reviews formal document review reports for issues and trends
- Focal point for document review metrics and status
- Interfaces with QA, chief engineer and management for status, trends and problems
- Participates in the meeting(s)

...This could be performed by the Project's Technical Lead or Metrics Coordinator. This function has proven to be optional on small projects, but is a "must" on medium to large projects.

Support Players

MANAGEMENT

- **Supports the formal document review process, provides resources, and ensures that all required personnel receive training**

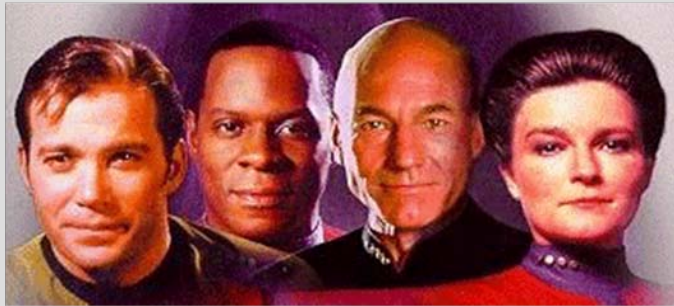
QUALITY ASSURANCE

- **Audits the formal document review process and metrics database:**
 - To detect issues, trends, problems
 - To identify/track solutions and help with process improvement
- **Participates in the meeting(s)**
- **Provides training in the formal document review process**

OTHER PARTIES Who May Observe or Participate

- **Subcontractor personnel**
- **Customer or contract representatives**

The Formal Document Review Team



**ALL MUST HAVE RECEIVED THIS TRAINING*

Required Personnel

- Author
- Moderator
- Presenter
- Recorder
- Document Reviewers

Rules of the Formal Review Process --

- Managers usually not invited - there are exceptions, however.
- The Moderator may not be the Author or the Presenter.
- The Moderator may be the Recorder.
- The Author may be the Presenter.
- QA (for independence/process monitoring) can be notified and may fulfill any of the needed roles (except Author).

Formal Document Review Process – Project Planning

Project Planning Activities:

- Firm up project schedules and budgets
- Complete the program process checklist. Based on program size and type, decide:
 - What metrics will be collected on the programs?
 - What informal or formal document reviews will be performed and when/how?
 - Who will be assigned the role of Formal Document Review Moderator (or Coordinator)?
 - What the guidelines are for another document review?
 - How to tailor or maintain the formal document review procedure?

Review Process: Planning Phase

Planning Phase Activities

AUTHOR:

- Verify that materials are ready for the formal review and that entry criteria are met
- Prepare the formal review package
- Decide whether an **overview stage** is desirable
- Identify the formal document review team
(Working with Moderator and Formal Document Review Coordinator)
 - Who is required to participate?
(e.g., All interfaces must be covered)
 - Who are non-essential, but desirable?
- Is there a Key Reviewer(s) required

Review Process: Preparation Phase

Preparation Phase Activities

AUTHOR, et.al.

- If the Author, Moderator and/or Technical Lead think it would be beneficial, provide an **Overview** of the document prior to the review
Then.....

ALL:

- All participants examine the materials (provided in the formal document review package) for defects
Reviewers should be given 3-5 working days for this.
- Log the defects for discussion at the formal review
(e.g., Annotate the materials themselves or keep a separate list)

Formal Document Review Process: Preparation Phase

Overview Phase Activities

- An optional part of the Preparation Phase
- Activities:
 - Hold a meeting of the document review team
 - Briefly review the formal review materials
 - Decide who will do what tasks (e.g., Recorder, Moderator)
 - Discuss
 - Interfaces
 - Potential problems, difficult areas
 - Possible questions and answers
- Can often make the preparation easier!

Formal Document Review Process: Review Phase

Review Meeting Activities



- **Open the Meeting (MODERATOR)**
 - Verify all present and ready (Key Reviewer Present ??)
 - Record preparation times for each reviewer
- **Conduct the Meeting**
(Should be kept to about 2 hrs.)
 - Material is presented to the team (**PRESENTOR**)
 - Defects are discussed and dispositioned / categorized
 - Presentation and discussion will often reveal additional defects (*the synergistic effect*)
 - All the above are recorded
 - Brief solution approaches may be offered (But don't get sidetracked trying to provide corrections)
- **Wrap-up (MODERATOR)**
 - Summarize the major defects
 - Decide whether a another document re-work and formal document review is advisable, and if so, who should attend

End of the Document Review Process

TO RE-REVIEW OR NOT TO RE-REVIEW?

- How complex/critical is the work product being reviewed?
- How complex will the rework be?
- How severe are the defects?
- Are there a large number of defects (*e.g., 30% or more of the material*)?
- Is a design change or major change necessary?
- Are the defects dispersed throughout the work product, or are they fairly localized?
- Is a major piece missing? Is a major re-write needed?
- Are external interfaces affected?
- What does the team think? (*And try not to let schedule hold too much weight!*)
- What are the consequences if this thing isn't fixed properly?

Formal Document Review Process: Rework Phase

Rework and Follow-up Activities

- **Correct the defect(s) (AUTHOR)**
- **Verify the corrections (MODERATOR)**
(Methods include eyeball, testing, re-review)
- **Complete the Defect Log**
- **Complete Summary Log**
- **Collect metrics**
- **Verify that Exit Criteria from the document review has been met**
- **At completion of the project or a major phase: Hold a defect prevention meeting and/or initiate process improvement changes.**

Formal Document Review: Analysis Phase

Analysis Activities

(DOCUMENT REVIEW COORDINATOR)

- Review reports and forms for accuracy and completion
- Analyzes document review data/reports for trends
- Perform qualitative analysis
- Perform quantitative analysis
 - Create SPC charts
- Communicates formal review analysis reports / charts
 - To project management and developers
- Initiates and participates in process improvement activities
- Share lessons learned and defect prevention with other programs and the organization

Formal Document Review Defect Log

Formal Document Review Defect Log

Date of Review: _____

Name of Author/Owner: _____

Document Reviewed: _____

Name of Moderator: _____

Total Reviewer Preparation Time: _____
Number of Reviewers: _____

Total Major Defects: __

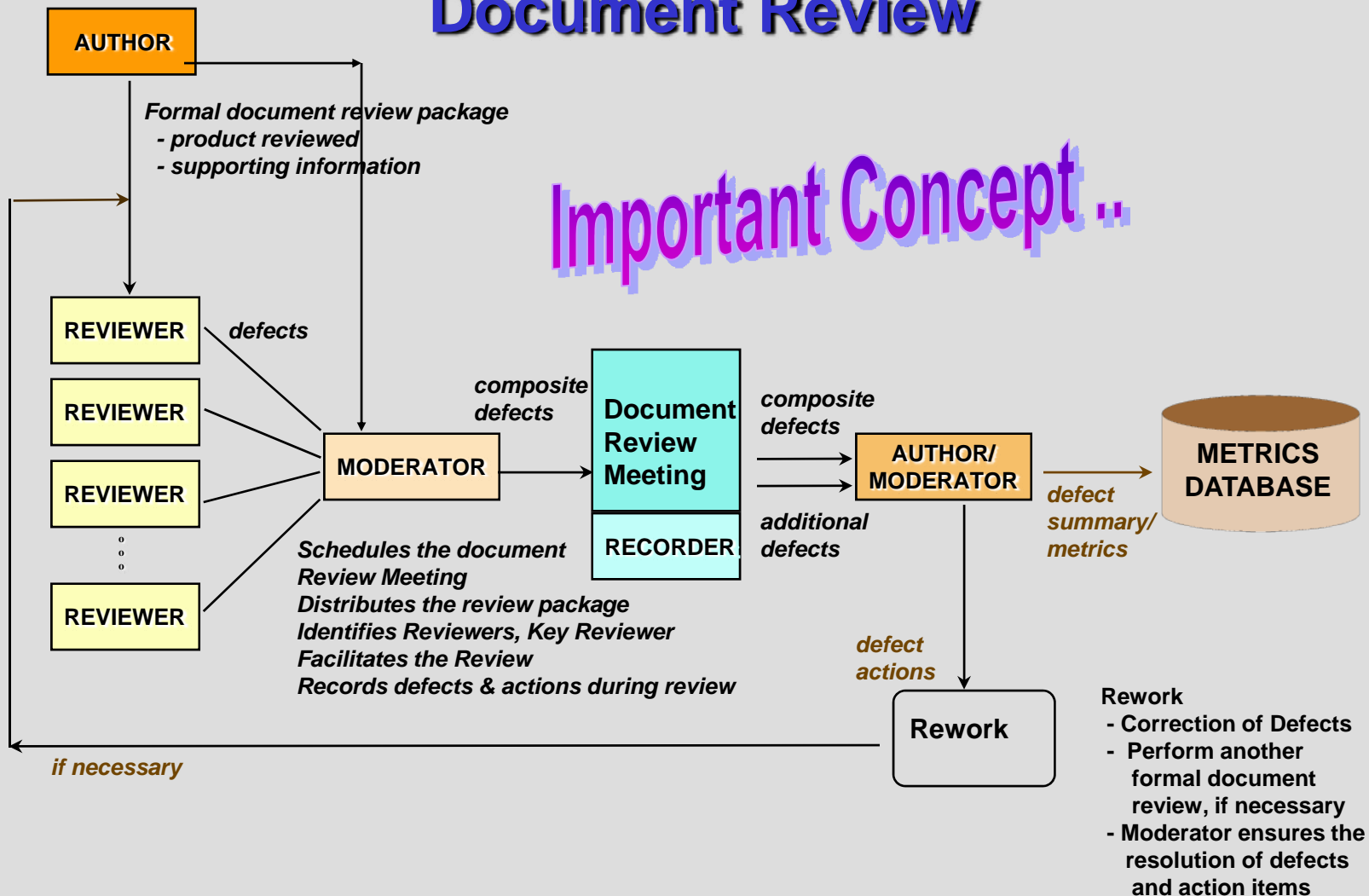
Total Minor Defects: _____

Document type: ___ Requirement ___ Design ___ Test ___ Blueprint ___ Other

Comment #	Page #	Description of Defect /Action Item	Defect Category (Major/Minor)	Date Corrected – Resolved (Verified by Moderator)
1				
2				
3				
3				
5				
6				
7				
8				
N				

General Flow of a Formal Document Review

Important Concept ..



- Rework**
- Correction of Defects
 - Perform another formal document review, if necessary
 - Moderator ensures the resolution of defects and action items

Formal Document Review Training



Where Do Defects Come From?

SOME OF THE USUAL SUSPECTS:

- Poor/incomplete requirements
- Requirements not well understood
- Lack of continuity between proposal team and contract performance team, or just plain turnover
- Inattention to requirements / standards & conventions / details
- Design overly complex
- “There’s just not enough time”

(but there’s always time to fix it later. On third shift. Over the weekend. Just before Christmas).

And don’t forget those old standbys:

- Inadequate tools
- Lack of proper training
- Inadequate resources



Moderator Roles

- **Coordinator**
 - Schedule resources for formal document reviews
 - Assign roles
 - Verify author's rework
- **Host(ess)**
 - Open the formal document review meeting
 - Cancel review meeting, if unprepared
 - Determine need for re-work of the document review
- **Motivator**
 - Sit at head of table
 - Encourage participation
 - Keep discussion on track
 - Control pace of meeting
 - Encourage positive, constructive discussion
- **Mediator**
 - See tables for how to handle difficult situations.

Formal Document Review Measurements and Metrics Tips

What Formal Document Review Measurements to Collect:

- Product size
- Type and number of defects found
- Preparation time per reviewer
- Number of reviewers
- Rework effort

Examples of Formal Document Review Metrics

- # Defects / Category
- # Defects / Type
- # Defects / Causes
- % of Re-Works

Use of Metrics

- Produce statistical process control charts to identify trends that need immediate attention and to perform defect projections

Formal Document Review Process Enhancements & Benefits

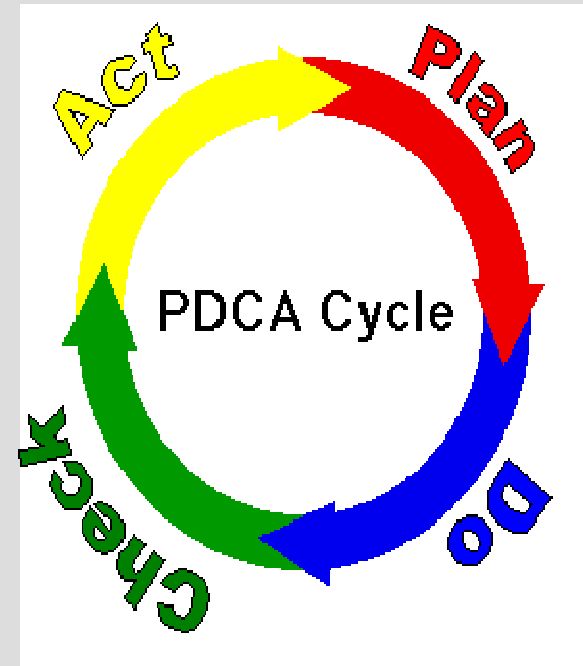
- **Enhancing the Formal Document Review Process**
 - Specialized Formal Document Review Checklists
 - To identify specific responsibilities of the reviewer
 - To help ensure adequate coverage of the document to be formally reviewed
 - To help ensure that specific project discipline areas participate in the document review and key reviewers make a contribution
 - Formal Document Review Report
 - Document Review Action Item Report
- **Identifying Key Document Reviewers**
- **Project Performance Using Formal Document Reviews**
- **Possible Formal Document Review Concerns related to**
 - The Formal Document Review Process
 - Insufficient Preparation of Reviewer
 - Quality of Documentation

Formal Document Review Process Enhancements & Benefits

- **Formal Document Review Benefits**
 - Identifying defects/actions early in the project
 - Better confidence in the work products
 - Better quality in the work project and project development methodology
- **Synergism** - The gains to be made by the formal document review through the interaction of participants within different areas of the organization
- **Moderator** – Deciding whether accept the review as presented or have a second review based upon lack of preparation, not having sufficient/appropriate reviewers, not having sufficient cooperation, or too many defects identified.
- **PDCA** - Applying the Plan-Do-Check-Act Methodology

Applying the cyclic PDCA Methodology to the Formal Document Review Process **

- **Plan**
 - Coordinate Formal Document Review Schedules
 - Conduct Formal Document Review Classes
 - Conduct Document Peer Reviews and Walk-Throughs
 - Identify Relevant Requirements and Standards for Upcoming Document Review
 - Complete Document Review Entrance Criteria
- **Do**
 - Disseminate Formal Document Review Meeting Notice and Supporting Material
- **Check**
 - Conduct the Formal Document Review
 - Record Reviewer Preparation Times, Defects and Actions
- **Act**
 - Conduct Process Improvement and Defect Prevention Tasks
 - Resolve defects and outstanding actions
 - Complete Formal Document Review Exit Criteria



** Note: The PDCA, Plan, Do, Check, Act process improvement cycle was originally conceived by Walter Shewhart in the 1930's, and later adopted by W. Edwards Deming.

In Conclusion....

The Formal Document Review Process works!

- The need for formal document reviews has been recognized in all international process standards
- The need for a documented process with additional training may be desirable

Any Questions ??