

MLM-MU-89-68-0007

SOFTWARE QUALITY ASSURANCE REQUIREMENTS

OCTOBER 1, 1989

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AUTHORS:

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Authorizing Official

Date: 6/30/89

 **EG&G MOUND APPLIED TECHNOLOGIES**

P.O. BOX 3000

MIAMISBURG, OHIO 45343-0987

513-865-4020

operated for the UNITED STATES DEPARTMENT OF ENERGY

Contract No. DE-AC04-88-DP43495



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ABSTRACT

These presentations were developed for and given to the Applied Computer & Systems Technology Section. The purpose of the presentations was to provide specific, software quality-related training to the personnel of that Section in the following three areas:

1. Project Management Procedures
2. WR Software Quality Requirements
3. Non-WR Related Software Quality Requirements

Further the seminars were designed to familiarize personnel with the origins of the Section's SQA Procedures and Policies contained in Systems Manual 212. Specifically addressed are the requirements set forth in MD-10196, "Software Quality Assurance Policy/Procedure" and MD-10249, "Quality Plans".

PROJECT MANAGEMENT PROCEDURES

AC&ST Section Meeting

May 18, 1989

Phil Bantz

OUR PROJECT MANAGEMENT PROCEDURES
ARE DETAILED IN SM212, PROCEDURE BP.1

- o Types of Requests
- o Project Levels
- o Stages in the Project Life Cycle
- o Roles for PM, Managers and Staff
- o Project Management Checklist
- o SQA

CUSTOMER REQUESTS ARE CATEGORIZED
INTO THREE TYPES

- o Projects
- o Enhancements
- o Maintenance

A PROJECT IS AN IDENTIFIABLE TASK WITH STATED OBJECTIVES AND COMPLETION CRITERIA

- o Sponsor
- o Commitment of Manpower
- o Financial Resources
- o Project Manager

PROJECTS ARE INITIATED THROUGH THE ISM MANAGER

LEVEL 1

- Require significant, coordinated support from multiple AC&ST groups.
- Affect customers in multiple departments.
- Require significant interfacing.

LEVEL 2

- All others
- Lead technical person acts as Project Manager
- Enhancements

AN ENHANCEMENT IS A CHANGE OR ADDITION TO A CURRENT SYSTEM

- o Completed Quickly
- o Minimal or No Interfacing
- o No Impact to Other Project Commitments
- o Not Practical to Hold for Future Version

MAINTENANCE REQUESTS ARE TO FIX
A CURRENT SYSTEM THAT STOPS
FUNCTIONING PROPERLY

- o External Factors (New Operating System)
- o Logged Through Help Desk
- o Review with Your Manager if Impact on Projects
- o Document Changes in Project Folder
- o SQA Signoffs are Obtained

STAGES OF A PROJECT LIFE CYCLE

Initiation

Requirements

Design

Construction

Implementation

Release

Evaluation

INITIATION STAGE

- o Formally Start the Project
- o Define the Desired Results
- o Obtain Management Commitment
- o Initiate Project Log Book

INITIATION STAGE DOCUMENTS

- o Project Initiation Request Signed
- o Logged into PACS; Number Assigned
- o Project Charter
- o Priority Rating Worksheet

Applied Computer & Systems Technology
PROJECT INITIATION REQUEST

Project No. _____
Date Rec'd _____
SDA or _____
DSA No. _____

Project Name:

Desired Result(s):

Justification:

Requestor Name:
Sponsoring Cost Center:
Project Request Init. Date:

SPONSOR APPROVAL (SENIOR MANAGER)

WR SQA Procedures Apply:

(Y/N)

QC REVIEWER APPROVAL IF WR SQA REQUIRED:

----- ACCEPTANCE SIGNOFF -----

Requestor Signature: _____ Date: _____

----- AC&ST USE ONLY -----

Project Manager:

Lead Technical Person:

System Manual 212, BP.1, Appendix E (5/89)

PROJECT CHARTER*

The designated project manager will have authority to use required resources, expend approved AC&ST funds and to make use of designated resources from the sponsoring section.

A key functional contact from the sponsoring section, The Key Customer, will be assigned to this project. This Key Customer shall have the authority for final approval on mandatory and desirable system specifications, on final design, and of the delivered system. If appropriate, project goals will be established and included on the project Core Team members' (including sponsor department) JRAs.

The conduct of this project and the project deliverables shall be in accordance with Systems Manual 212 Section SF.1.

The sponsor personnel are jointly responsible with AC&ST personnel for supporting Software Quality Control and Computer Security procedures when they apply.

Sponsor Name: _____

Date: _____

Sponsor Approval (Senior Manager)

*This is an example of the content that should be included in a Project Charter. It may be necessary to modify this document to meet a specific project's needs.

PRIORITY RATING WORKSHEET FOR PROJECTS

Project No. _____ Project Desc. _____

MAJOR CATEGORY -----	WT. FACTOR (ASSIGNED) -----	CAT. RATING* 0-10(BEST) -----	CATEGORY SCORE -----	COMMENTS -----
External Requirement	10	X	—	—
Personnel Health & Safety				_____
DoE Directive				_____
CPAF Milestone				_____
Design Agency Requirement				_____
Government Requirement				_____
Schedule (Shipping Product)	8	X	—	—
WR Production				_____
WR Development				_____
Part Of Integrated Mfg. Pkg.				_____
CIM/CAE				_____
Reimbursable Order				_____
"B" Item				_____
Quality	6	X	—	—
Process Control				_____
Product/Process Analysis				_____
SPC				_____
SQA/Documentation				_____
Incident Investigation				_____
Vendor				_____
Cost (IROR)	4	X	—	—
Software				_____
Hardware				_____
Internal Rate of Return (IROR)				_____
Low <25% = 2				_____
Medium 25-50% = 6				_____
High >50% = 10				_____
Funding Availability				_____
General Customer Support	2	X	—	—
Primarily Internal				_____
Good Business Sense				_____
Stand-alone/Impact Other Sys.				_____
Effect Of Not Doing				_____

TOTAL RATING = _____

AC&ST PERSONNEL _____

DATE _____

* Use detailed factors to assign points to each Major category (max=10).
 Multiply category pts. by weight to get the category score.
 Total category scores to determine Priority Rating. Max. Rating =320

REQUIREMENTS STAGE

- o Define the requirements and obtain approval of the initial plan.
- o Assemble the Core Team.
- o Analyze and select approach for the implementation.
- o Formally present deliverables to sponsor.
- o Obtain sponsor signoff.
- o Freeze the requirements.

REQUIREMENT STAGE DOCUMENTS

- o Initial Plan
- o IROR
- o Schedule
- o Requirements
- o Deliverables

DESIGN STAGE

- o Document Design Specifications
- o Develop Implementation Plan
- o Design System

DESIGN STAGE DOCUMENTS

- o Design Specifications
- o Purchase Orders
- o ADP Acquisition Proposal
- o Conversion Plan
- o Training Plan
- o System Test Plan

CONSTRUCTION STAGE

- o Develop Detailed Design
- o Construct the Deliverables
- o Test the Deliverables

CONSTRUCTION DOCUMENTS

- o Detailed Design
- o Detailed Test Plan with Data
- o Peer Review Signoff
- o Screens, Code, Transactions, etc.

IMPLEMENTATION STAGE

- o Implement the Deliverables
- o Execute Test Plan
- o Provide Appropriate Training
- o SQA Requirements Satisfied

IMPLEMENTATION DOCUMENTS

- o Detailed Documentation
- o Test Plan Results
- o SQA Approves

RELEASE STAGE

- o Customer Acceptance of System Test Results
- o Obtain Sign-off for Project

RELEASE DOCUMENTS

- o Sign-off of Completed Project

EVALUATION STAGE

- o Document Project History
- o Document Project Performance (Deviations from IP)
- o Complete Team Member Evaluations

EVALUATION DOCUMENTS

- o Documents of Previous Stages Filed in Project Log Book
- o Evaluation of Project Performance, Team Members, and Project Manager.

THE PROJECT MANAGER IS RESPONSIBLE FOR THE TOTAL PROJECT AND IS THE PRINCIPLE POINT OF CONTACT WITH THE PROJECT SPONSOR

- o Coordinates Efforts of Project Team
- o Develops and Maintains Schedule
- o Maintains Project Log Book with Documentation
- o Ensures SQA Compliance
- o Mediates Project Conflicts

A GROUP MANAGER PERFORMS SUPERVISION AND ADMINISTRATIVE FUNCTIONS AND PROVIDES TECHNICAL RESOURCES FOR PROJECTS

- o Interacts with Project Manager to define project level and develop initial plan.
- o Stresses commitment to ensure schedule is met.
- o Ensures adherence to standards (SQA).
 - SQA, Hardware, Software, Communications, etc.
- o Plans for necessary training.

SECTION MEMBERS WILL PARTICIPATE
IN ALL STAGES OF A PROJECT AS ASSIGNED

- o Act As Lead Technical Person
and/or Project Manager
- o Provide Task Estimates to PM
- o Complete Assigned Activities
- o Report Project Status to PM
- o Adhere to Department Standards
- o Provide Maintenance for Existing Systems

PROJECT MANAGEMENT CHECKLIST*
Revised 5/17/89

Project No. _____ Proj. Mgr. _____

Project Description _____

INITIATION	Yes	Date	Documentation
Request Is Received	Signoff	_____	Proj. Initiation Request
Request Is Logged into PACS	_____		
Justification and Charter Reviewed With Customer	_____	_____	Charter
Priority Rating Determined	_____		Priority Rating Worksheet
Sponsor Management Commitment	_____		
REQUIREMENTS			
Project Level Determined	_____		
Initial Plan (IP) Development	_____		
Team Assigned	_____		
Lead Tech. Person Named (Lev 2)	_____		
Initial Plan Tasks			
IROR	_____		IROR Spreadsheet
Prem. Requirements	_____		
Estimate of Tasks	_____		
Project Duration	_____		
AC&ST Resource Req.	_____		
Sponsor Resource Req.	_____		
Other Resource Req.	_____		
Other Costs Hard/Soft	_____		
Total Costs	_____		
Graphic Network/Archit.	_____		
Review IP With ISM Group	_____		
Review IP With AC&ST Staff	_____		
Review IP With Computer Services	_____	_____	
Review With Sponsor Org.	_____	_____	
Obtain Approval/Go Ahead	Signoff	_____	Initial Plan
GL(s) Commits Resources	_____		
Core Team Assigned (LTP Level 1)	_____		

PROJECT MANAGEMENT CHECKLIST (Cont.)

REQUIREMENT (Cont.)	Yes	Date	Documentation
Core Team			
Refine Est. of Work	---		
Update Schedule	---		
Contract for Completion of Reqs. Stage	---		
Analysis Completed	---		
Review Requirements, Approach, Deliverables, Schedule with ISM, Comp. Services & AC&ST Personnel	---		
Presentation to Sponsor, etc.		_____	
Requirements Frozen	Signoff	_____	Requirements
Deliverables Set			
Resources Contracted for w/ GL	---		
DESIGN			
Development of Functional Specifications		_____	
System Flow			
Hardware/Software	---		ADP Plan, Pur. Req
Communications	---		
Conversion Plan	---		
Training Plan	---		
System Test	---		
Computer Security Sign-Off	---		Security Plan
Design Review with ISM, Computer Services & AC&ST Personnel	---		
Design Review with Sponsor, etc.	Signoff	_____	Design
Initial Plan Revised		_____	
Resources Contracted for w/ GL	---		
CONSTRUCTION			
Deliverables Tested			
Test Plan	---		
Walk-throughs	Signoff	_____	Peer Review

PROJECT MANAGEMENT CHECKLIST (Cont.)

IMPLEMENTATION

Detailed Documentation	_____	System and User
Conversion Ready	_____	
Test Plan Performed	_____	Test Results
Training Implemented	_____	
PM and Team Sign-Off	_____	_____

RELEASE

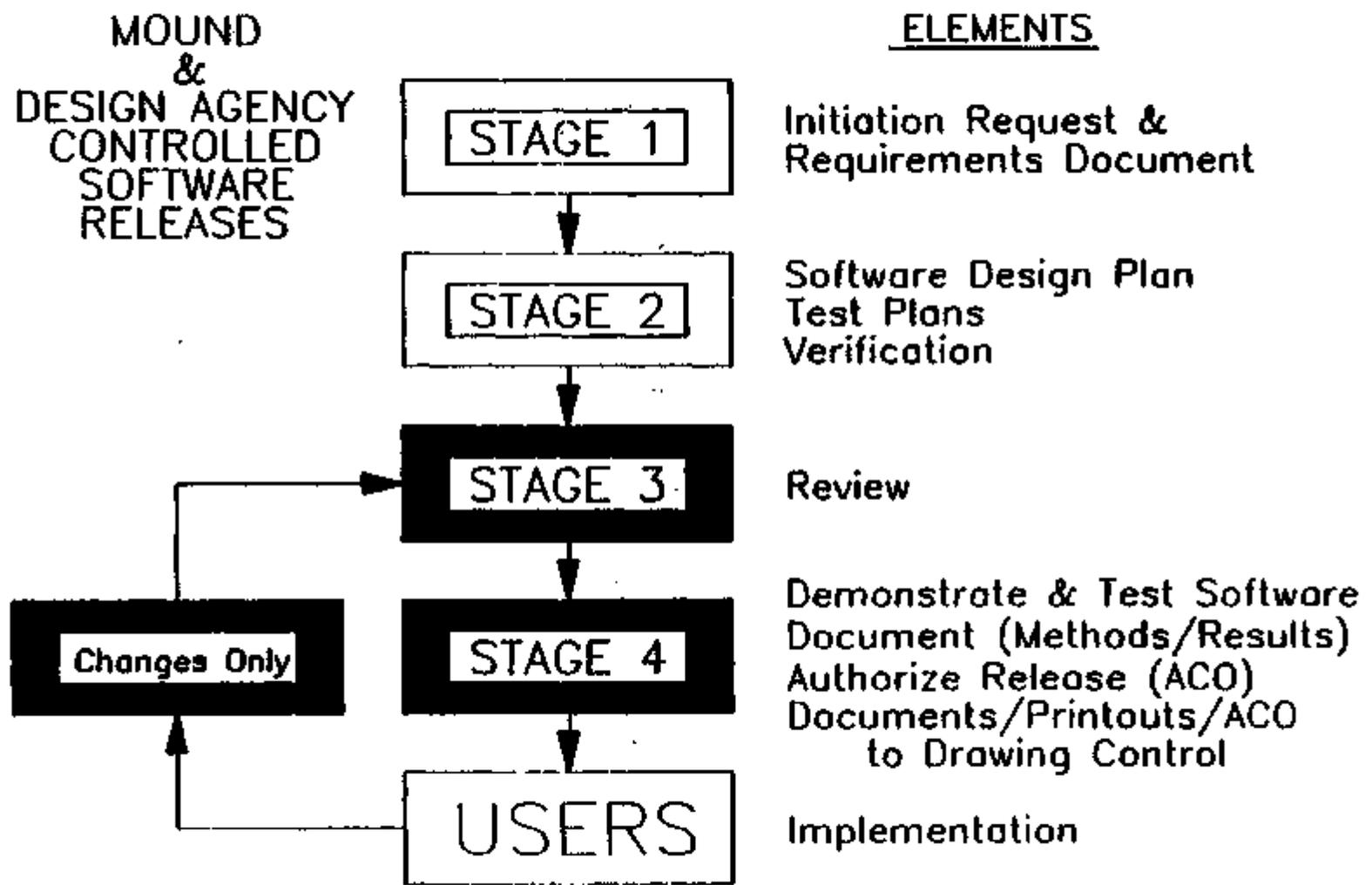
User Acceptance Test	_____	
Maintenance Resp. Assigned	_____	
Sponsor Personnel	Signoff	_____
Quality (WR)	Signoff	_____
Design Agency	Signoff	_____ SQA Req.

EVALUATION

Project Log Complete	_____	
Project Meeting Minutes	_____	
Project Performance Summary	_____	Evaluation
Individual Performance Input	_____	
Project Officially Terminated	_____	_____

*Project size and complexity will determine degree to which Checklist is completed.

MOUND SOFTWARE DEVELOPMENT STAGES



-28-

ACO 890122
R.O. 9/15

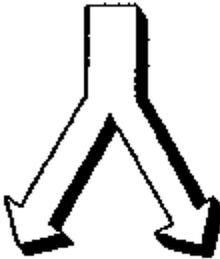
**SQA FOR WR-RELATED PROCESS
CONTROL & DATA ACQUISITION SYSTEMS**

**AC&ST SECTION MEETING
MAY 11, 1989**

RAY LOWREY

**SOFTWARE QUALITY ASSURANCE IS A COMMON SENSE
METHOD OF SOFTWARE DEVELOPMENT/MAINTENANCE
AND A CRITICAL BUSINESS PRACTICE**

SQA



WR
RELATED

QC-1

5700.6

NON-WR
RELATED



MD-10196

MD-10249

**MOUND'S METHOD OF SUPPORTING SQA FOR
WR-RELATED SOFTWARE IS DEFINED IN MD-10196
ISSUE 8**

- * OVERVIEW OF POLICY**
- * POLICY REQUIREMENTS**
- * AC&ST POLICY COMPLIANCE**

MD-10196 DEFINES THE BASIC POLICY REQUIREMENTS FOR MOUND'S WR-RELATED SQA PROGRAM

- * PURPOSE OF SQA**
- * SCOPE OF SQA**
- * COMPLIANCE DEFINITIONS**
- * SPECIFIC SQA REQUIREMENTS**

MD-10196 IS INTENDED TO PROVIDE GUIDANCE FOR...

**"..THE DEVELOPMENT, ACCEPTANCE AND CONTROL OF
COMPUTER SOFTWARE USED IN THE MANUFACTURING,
PROCESS CONTROL, INSPECTION, TESTING AND/OR
ACCEPTANCE OF WR MATERIAL, AND OTHER PROGRAMS
AS APPROPRIATE."**

**MD-10196 APPLIES TO ALL MOUND PERSONNEL
IMPLEMENTING SOFTWARE ON ALL SYSTEMS
EXCEPT FOR THE CCF**

- * MOUND GENERATED SOFTWARE**
- * EXTERNALLY DEVELOPED CUSTOM CODE**
- * COMMERCIALY AVAILABLE & PUBLIC DOMAIN CODE**

SOFTWARE MUST BE IMPLEMENTED IN COMPLIANCE WITH MD-10196 IF CERTAIN CRITERIA IS MET

- * PROVIDES COMMAND & CONTROL OF THE FUNCTION OF EQUIPMENT**

IBS, CRIMPING STATION

- * PROVIDES ANALYSIS CAPABILITY FOR THE REDUCTION OF DATA TO DETERMINE THE ACCEPTABILITY OF WR PRODUCT**

ELECT. MEAS. STATION, WEIGH STATION, XSTAT

- * PROGRAMS THE MEMORY OF ACTIVE (WR) COMPONENTS**

THE SPECIFIC REQUIREMENTS DEFINED IN MD-10196 ARE IN FOUR PRIMARY AREAS

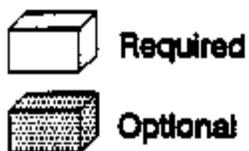
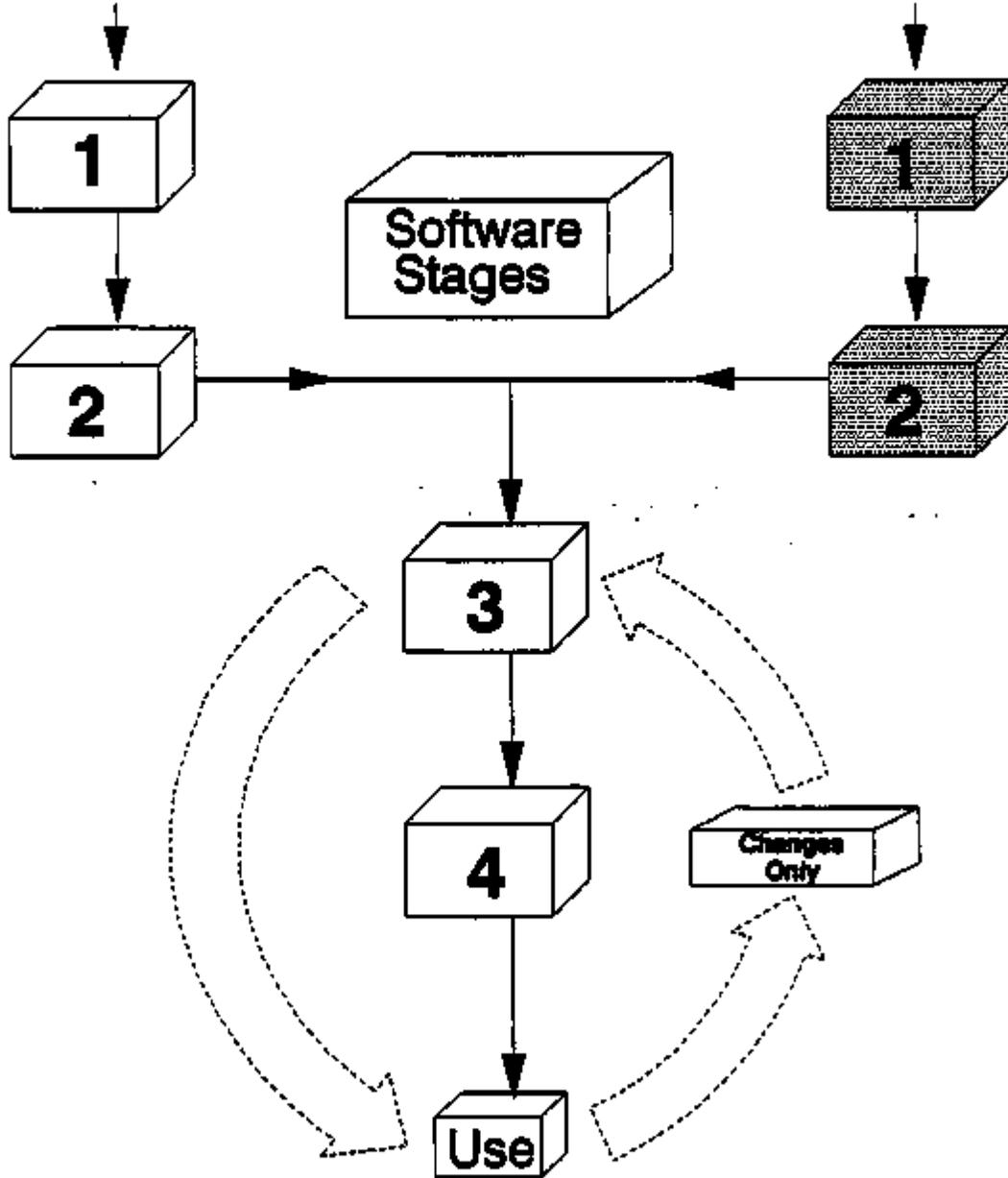
- * DEVELOPMENT AND VALIDATION**
- * CHANGE AND CONFIGURATION CONTROL**
- * OUTPUT FORMAT**
- * DOCUMENTATION AND IDENTIFICATION**

MD-10196 OUTLINES FOUR STEPS IN THE DEVELOPMENT AND VALIDATION PROCESS

- * STAGE 1 - INITIATION**
- * STAGE 2 - DEVELOPMENT PLAN**
- * STAGE 3 - CODE REVIEW**
- * STAGE 4 - FINAL ACCEPTANCE**

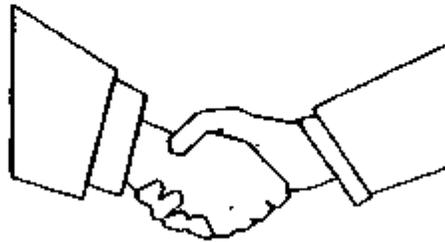
**Design Agency
Controlled**

**Mound
Controlled**



THE FIRST STEP IN ANY PROJECT IS INITIATING THE REQUEST & DEFINING THE REQUIREMENTS

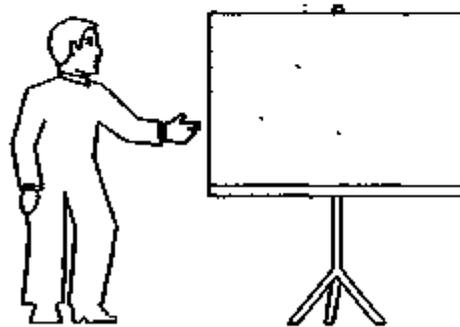
- * REQUEST/REQUIREMENTS FORMALLY SIGNED & RETAINED**
- * PRODUCT SPECIFICATIONS DEFINES DESIGN AGENCY
REQUIREMENTS**



NOTE: CURRENTLY OPTIONAL FOR MOUND CONTROLLED CODE

IT IS CRITICAL TO VERIFY THAT THE PROJECT DELIVERABLES WILL MEET THE CUSTOMER'S EXPECTATIONS

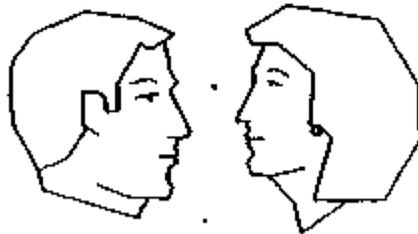
- * ADDRESSES THE IDENTIFIED REQUIREMENTS**
- * PERFORMS THE INTENDED TASKS**



NOTE: CURRENTLY OPTIONAL FOR MOUND CONTROLLED CODE

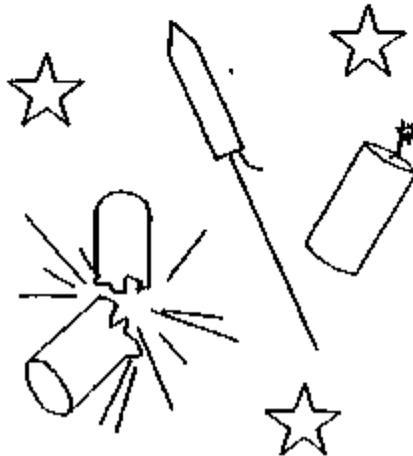
A PEER REVIEW IS ESSENTIAL TO ENSURE THAT THE FUNCTIONAL REQUIREMENTS WILL BE MET

- * SOFTWARE CODING IS ACCURATE**
- * TASK PERFORMANCE IS COMPLETE**
- * REVIEW IS RELATIVE TO THE SCOPE OF THE TASK**

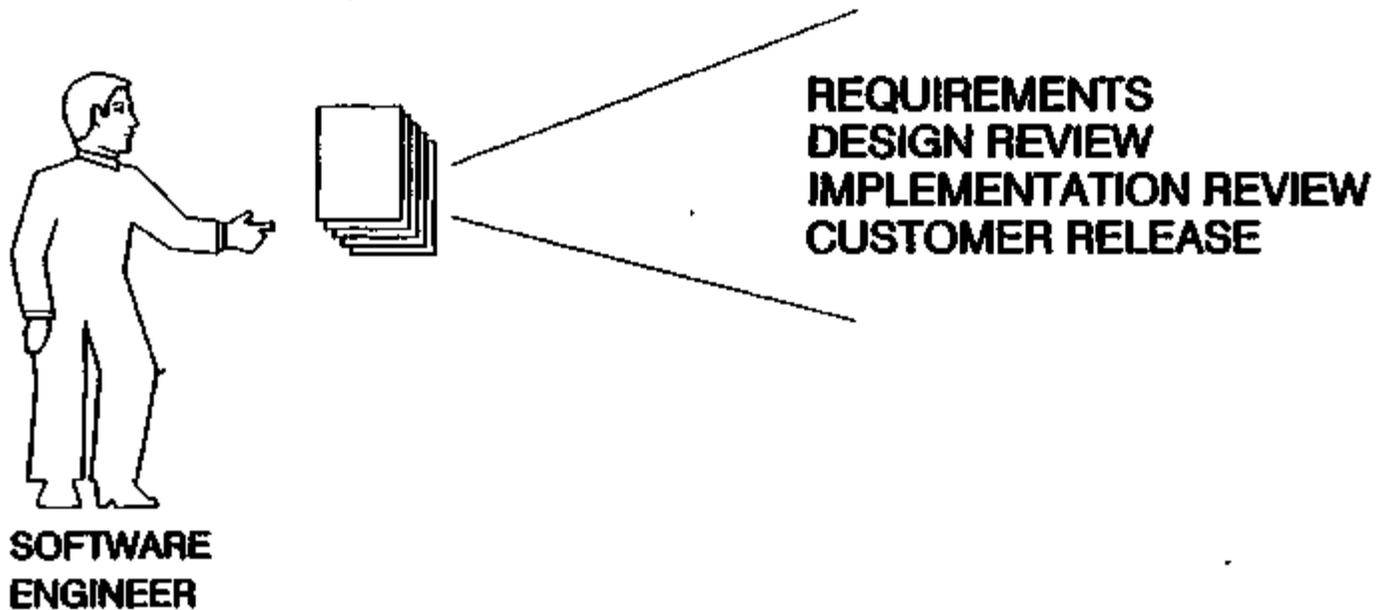


THE FINAL SOFTWARE ACCEPTANCE DOCUMENT IS CRUCIAL TO THE FINALIZATION OF THE SOFTWARE DRAWING PACKAGE

- * DEMONSTRATION TO CUSTOMER THAT REQUIREMENTS
ARE MET**
- * FORMAL APPROVAL THAT REQUEST HAS BEEN SATISFIED**



SQA DOCUMENTATION SHOULD BE VIEWED AS THE SOFTWARE DRAWING PACKAGE



CHANGE & CONFIGURATION CONTROL IS ESSENTIAL TO MAINTAINING A COMPLETE AUDIT TRAIL

- * DRAWING CONTROL MAINTAINS A RECORD OF HISTORICAL
HARD COPY LISTINGS**
- * INDIVIDUAL GROUPS MAINTAIN A MASTER COPY LIBRARY**
- * ALL CHANGES ARE APPROVED BY AUTHORIZED PERSONNEL
THROUGH MOUND'S ECN SYSTEM**

**ANY SOFTWARE THAT GENERATES AN OUTPUT REPORT
USED FOR A PERMANENT PRODUCTION RECORD MUST
COMPLY WITH MD-10196**

- * HEADER INFORMATION MUST BE COMPLETE ENOUGH TO
PROVIDE A RECORD OF THE PROCESS OR PROCEDURE
(LOT NUMBER, PRODUCT CODE, SOFTWARE CONTROL #)**
- * SPECIFICATION LIMITS MUST BE DISPLAYED IF THEY
ARE USES TO VERIFY DATA**
- * ERROR MESSAGES SHOULD BE RECORDED WHEN
APPLICABLE**

MD-10196 REQUIRES THAT SUFFICIENT DOCUMENTATION IS MAINTAINED TO DEMONSTRATE THAT SOFTWARE IS BEING EFFECTIVELY CONTROLLED

- * MOUND CONTROLLED SOFTWARE USED A DRAWING CONTROL NUMBER (DSA) PREFIX, A SIX DIGIT DRAWING NUMBER AND A THREE DIGIT ISSUE NUMBER**
- * A SOFTWARE DOCUMENTATION NUMBER (SDA) IS OPTIONAL FOR MOUND CONTROLLED SOFTWARE**

DSA-870733-D

PROBOND.C

**IN ORDER TO TRACE THE ACTUAL CODE, A
STANDARD LABELING METHOD IS DEFINED
IN MD-10196**

- * MASTER COPY IS IDENTIFIED WITH A BLUE LABEL
AND IS ATTACHED TO THE COPY KEPT IN THE
MASTER LIBRARY**
- * WORKING COPY IS IDENTIFIED WITH A RED LABEL
AND IS ATTACHED TO THE COPY USED IN
PRODUCTION**
- * SOFTWARE ON A HARD DISK OR ROM SHOULD
DISPLAY THE DSA NUMBER TO THE SCREEN
IF POSSIBLE**

THE SOFTWARE DRAWING PACKAGE IS A KEY ELEMENT OF THE TOTAL DOCUMENTATION SET FOR A MOUND BUILT PRODUCT

- * STAGE 3 DOCUMENTATION**
- * STAGE 4 DOCUMENTATION (INITIAL)**
- * SOFTWARE CONTROL NUMBER**
- * SOFTWARE TITLE & ORIGINATOR**
- * SOFTWARE CLASSIFICATION**
- * HARDCOPY LISTING**
- * APPROVED/COMPLETED ACO (CHANGES ONLY)**

AC&ST COMPLIES WITH MD-10196 THROUGH THE USE OF INTERNAL PROCEDURES AND PRACTICES

- * DEVELOPMENT AND VALIDATION IS TIED TO PROJECT MANAGEMENT PROCEDURES**
- * SOFTWARE CHANGES ARE MADE THROUGH THE ECN SYSTEM**
- * OUTPUT FORMATS INCLUDE ALL REQUIRED INFORMATION**
- * PHYSICAL MEDIA IS LABELED APPROPRIATELY**
- * INDIVIDUAL GROUPS MAINTAIN A MASTER COPY LIBRARY**

SQA REQUIREMENT

STAGE 1

STAGE 2

STAGE 3

STAGE 4

AC&ST DOCUMENT

**PROJECT REQUEST/
REQUIREMENTS SIGNOFF**

DESIGN REVIEW SIGNOFF

IMPLEMENTATION SIGNOFF

RELEASE SIGNOFF

ENGINEERING CHANGE NOTICE

*FOR DRAWING CONTROL USE ONLY (INITIAL & DATE)

DC DLK DES ALR PI _____ FB _____

Chg No.: 882400MD
Chg Cls: C
Rev No.: D

Subject: ECR ACO
From: MDI MIKE HICKS
To: MDI Drawing Control

FCO DTER
X-4640 A-153

SIER
WILL NOT be
Incorporated in
Drawing or Manual

Weapon Sys: WAF
P/N and Prod: 422599/1001 1438
A100A1 / H13026

Related Changes

Distribution

NO/JA. Thomas E225
KD Armstrong E225
SL Wacker, A177
D.D Reed A177
W.J. Spitzer COS-2
H S Hicks A-165
EM Cruise-A-63

Reason for Change: **TO ENHANCE REPORT CAPABILITIES AT EACH OPERATION.**

Reason for Revision:

DRAWING NUMBERS	DWG. LOC.	NEW SUPP.	NEW REL.	EFFECTIVITY (Other Effectivity Report Under Incorporating Instructions)
SEE ATTACHED				

Incorporating Instructions:

1234 A06303, A06304
A06305
11326 A05716, A05762, A05763
A05764

LET
ONS
001
004
003

EN

Date

SIER Application:

Reference and Remarks:

Engineering Coordination:

Doc A00	Rev 0	Prod Eng Approval <i>[Signature]</i>	QC Approval <i>[Signature]</i>	Agcy MTD	Date 12/9/83
------------	----------	---	-----------------------------------	-------------	-----------------

Description of Changes

- | | | |
|--------------------------|--------------------------|---------------------------|
| 1.0 DSA 871860 / ISSUE D | 5.0 DSA 871820 / ISSUE F | 9.0 DSA 871829 / ISSUE F |
| 1.1 RAISE ISSUE TO E | 5.1 RAISE ISSUE TO G | 9.1 RAISE ISSUE TO G |
| 2.0 DSA 871817 / ISSUE G | 6.0 DSA 871821 / ISSUE H | 10.0 DSA 871825 / ISSUE G |
| 2.1 RAISE ISSUE TO H | 6.1 RAISE ISSUE TO J | 10.1 RAISE ISSUE TO H |
| 3.0 DSA 871818 / ISSUE F | 7.0 DSA 871822 / ISSUE G | 11.0 DSA 871827 / ISSUE D |
| 3.1 RAISE ISSUE TO G | 7.1 RAISE ISSUE TO H | 11.1 RAISE ISSUE TO E |
| 4.0 DSA 871819 / ISSUE G | 8.0 DSA 871823 / ISSUE F | |
| 4.1 RAISE ISSUE TO H | 8.1 RAISE ISSUE TO G | |

***** UNCLASSIFIED *****

Serial Number Acceptance Report

PRODUCT : MC3926 - TOP ASS'Y
PRODUCT AO : A05716 LOT : L00004
DRAWING NO. : 410041 SUFFIX: 00
REEL : R029-00

WEDNESDAY, FEBRUARY 15, 1969 07:17 AM
PAGE NO: 1 TRAVELER ID: 625
SYSTEM: PROCODE-TAPE
DEAP 871860-E Version 3.0, R.545

<u>SERIAL NUMBER</u>	<u>LAST OPERATION</u>	<u>STATUS</u>	<u>STATUS REASON</u>
SN C10546	1300	REJECT	RC 984
SN C10547	1570	ACCEPT	
SN C10548	1570	ACCEPT	
SN C10549	1300	REJECT	RC 984
SN C10550	1400	REJECT	RC 850
SN C10551	1570	ACCEPT	
SN C10552	1570	ACCEPT	
SN C10553	1555	REJECT	RC 742
SN C10554	1570	ACCEPT	
SN C10555	1560	REJECT	RC 850
SN C10556	1400	REJECT	RC 850
SN C10557	1300	REJECT	RC 991
SN C10558	1570	ACCEPT	
SN C10559	1430	REJECT	RC 989
SN C10560	1570	ACCEPT	
SN C10561	1570	ACCEPT	
SN C10562	1430	REJECT	RC 335
SN C10563	1430	REJECT	RC 335
SN C10564	1300	REJECT	RC 984
SN C10565	1400	REJECT	RC 719
SN C10566	1430	REJECT	RC 335
SN C10567	1430	REJECT	RC 335
SN C10568	1430	REJECT	RC 335
SN C10569	1560	REJECT	RC 350
SN C10570	1430	REJECT	RC 335
SN C10571	1560	REJECT	RC 448
SN C10572	1430	REJECT	RC 335
SN C10573	1430	REJECT	RC 335
SN C10574	1300	REJECT	RC 984
SN C10575	1570	ACCEPT	
SN C10576	1430	REJECT	RC 335
SN C10577	1430	REJECT	RC 335
SN C10578	1430	REJECT	RC 335
SN C10579	1570	ACCEPT	
SN C10580	1430	REJECT	RC 335
SN C10581	1570	ACCEPT	
SN C10582	1570	ACCEPT	
SN C10583	1570	ACCEPT	
SN C10584	1430	REJECT	RC 335
SN C10585	1430	REJECT	RC 335
SN C10586	1555	REJECT	RC 742
SN C10587	1430	REJECT	RC 335
SN C10588	1400	REJECT	RC 850
SN C10589	1570	ACCEPT	
SN C10590	1570	ACCEPT	
SN C10591	1570	ACCEPT	

***** UNCLASSIFIED *****

FAILURE TO COMPLY WITH MD-10196 CAN DIRECTLY IMPACT PRODUCTION SHIP SCHEDULES

**"UNTIL SATISFACTORY CORRECTIVE ACTIONS HAVE BEEN
TAKEN TO CORRECT THESE DEFICIENCIES, MATERIALS
PROCESSED WITH THE PRODAC SYSTEM WILL NOT BE
ACCEPTED BY THIS OFFICE."**



WR SQA REQUIREMENTS

STAGE	MINIMUM ACTIVITIES	MINIMUM REQUIRED DOCUMENTATION	REQUIRED APPROVALS/SIGNATURES
#1 Initiation	<p>1a. Project Initiation Request</p> <p>1b. Develop & Approve Customer Requirements.</p>	<p>1a. Project Initiation Request, ACO, or Design Agency Product Specification.</p> <p>1b. Final requirements document or ACO.</p>	<p>1a. Sponsor or Requester and QC Reviewer.</p> <p>1b. Requester and Developer or Project Manager.</p>
#2 Software Design	<p>2a. Detail Design Prepared and Reviewed.</p> <p>2b. Test Plans Prepared and Reviewed.</p>	<p>2a. System Flow Diagrams, System Block Diagram, Functional Decomposition Schematics, Hardware Schematics, Process Flow Diagrams, Room Layouts, Fixture Designs, Data Base Schemas, File/Record Layouts, Screen Designs, Screen Logic, Report Layouts, Module Flow Diagrams, PSUEDO Code and Algorithms.</p> <p>2b. Test Plans for the systems test; Test Plans for each job or DCL string; Test Plans for each module.</p>	<p>2a. Software Developers and Reviewers. (Reviewers must be knowledgeable of the application requirements but not necessarily of programming.)</p> <p>2b. Software Developers and Reviewers. (Reviewers must be knowledgeable of the application requirements but not necessarily of programming.)</p>
#3 Software Review	<p>3a. Peer Review of the Execution of the Test Plans.</p>	<p>3a. Test Data, Test Scenarios, Test Scripts, Test Results, Problems encountered and Problem fixes.</p>	<p>3a. Software Developer(s) and Software Reviewer(s).</p>
#4 Software Acceptance	<p>4a. Customer Review of the Execution of the Test Plans.</p>	<p>4a. A Memo of Acceptance of the Software or and approved ACO.</p>	<p>4a. Requester, QC Reviewer, Developer and other Reviewers as appropriate.</p>

-54A-

NOTE: The amount of detail included in the documentation should be such that the intent of the four stages is met.

SOFTWARE QUALITY ASSURANCE
FOR WR-RELATED INFORMATION SYSTEMS
IBM AND DEC

AC&ST SECTION MEETING
MAY 25, 1989
ANDY JACKSON

THE CONCEPT OF SQA SHOULD BE AN INTEGRAL COMPONENT OF DOING BUSINESS IN THE INFORMATION SYSTEMS FIELD. THE INTENT IS TO INSURE A HIGH LEVEL OF QUALITY IN THE AREAS OF:

- * DESIGN AND DEVELOPMENT OF SOFTWARE
- * VALIDATION AND ACCEPTANCE OF SOFTWARE
- * CONTROL AND MANAGEMENT OF SOFTWARE

POLICIES AND PROCEDURES TO INSURE QUALITY OF
WR-RELATED SOFTWARE ARE DEFINED IN
MD-10196, ISSUE #8

- * OVERVIEW OF SQA POLICY
- * POLICY AND PROCEDURAL REQUIREMENTS
- * COMPLIANCE TO POLICY – IBM & DEC INFO.
SYSTEMS

POLICY OVERVIEW

THE PURPOSE OF MD-10196 IS DEFINE POLICIES AND PROCEDURES REGARDING QUALITY ASSURANCE OF WR-RELATED SOFTWARE.

- * MANUFACTURING
- * PROCESS CONTROL
- * INSPECTION
- * TESTING
- * ACCEPTANCE OF WR MATERIAL;
- * OTHER PROGRAMS AS APPROPRIATE.

POLICY OVERVIEW

THESE REQUIREMENTS MUST BE MET IF THE SOFTWARE

- * PROVIDES COMMAND AND CONTROL OF THE FUNCTION OF EQUIPMENT
- * PROVIDES ANALYSIS CAPABILITY FOR THE REDUCTION OF DATA TO DETERMINE ACCEPTABILITY OF WR PRODUCT
- * PROGRAMS THE MEMORY OF ACTIVE (WR) COMPONENTS

POLICY OVERVIEW

MD-10196 POLICIES AND PROCEDURES APPLY TO ALL WR-RELATED SOFTWARE, WITH THE EXCEPTION OF PC~~6~~ BASED SOFTWARE.

THREE CATEGORIES OF SOFTWARE:

- * SOFTWARE DEVELOPED AT MOUND
- * SOFTWARE CUSTOM-DEVELOPED BY OUTSIDE CONTRACTORS
- * "OFF THE SHELF SOFTWARE" — COMMERCIAL AND PUBLIC DOMAIN

POLICY OVERVIEW

POLICY REQUIREMENTS SPECIFICALLY DEAL WITH

- * DEVELOPMENT AND VALIDATION
 - * CHANGE AND CONFIGURATION CONTROL
 - * OUTPUT FORMAT
 - * DOCUMENTATION AND IDENTIFICATION
- . . . OF WR-RELATED SOFTWARE.

POLICY OVERVIEW

DEVELOPMENT AND VALIDATION REQUIREMENTS ARE INTENDED TO INSURE THAT THE REQUIRED LEVEL OF QUALITY IS ENGINEERED INTO THE SOFTWARE.

- * INITIATION
- * DEVELOPMENT PLAN
- * SOFTWARE REVIEW
- * FINAL ACCEPTANCE

POLICY OVERVIEW

INITIATION STAGE IS INTENDED TO ENSURE UNDERSTANDING OF THE REQUIREMENTS BETWEEN REQUESTOR AND DEVELOPER.

- * WRITTEN REQUEST SIGNED BY REQUESTOR AND DEVELOPER, ALONG WITH DEFINITION OF FUNCTIONAL REQUIREMENTS
- * REQUEST SUBMITTED AS A PRODUCT SPECIFICATION DOCUMENT
 - MANDATORY FOR DESIGN—AGENCY CONTROLLED SOFTWARE (ORIGINAL RELEASE)
 - RECOMMENDED FOR MOUND CONTROLLED SOFTWARE (ORIGINAL RELEASE)

POLICY REQUIREMENTS

DEVELOPMENT PLAN ACTIVITIES ENSURE THAT THE SOFTWARE DESIGN ADDRESSES IDENTIFIED REQUIREMENTS, AND THAT IT WILL PERFORM THE INTENDED TASKS.

- * DONE PRIOR TO CODING THE SOFTWARE
- * DESIGN MUST BE REVIEWED BY A PERSON NOT DIRECTLY INVOLVED WITH DEVELOPMENT OF THE SOFTWARE
- * SIGNATURES OF REVIEWER AND DEVELOPER ARE REQUIRED
 - MANDATORY FOR DESIGN-AGENCY CONTROLLED SOFTWARE (ORIGINAL RELEASE)
 - RECOMMENDED FOR MOUND CONTROLLED SOFTWARE (ORIGINAL RELEASE)

POLICY REQUIREMENTS

A SOFTWARE REVIEW IS PERFORMED TO ENSURE THAT THE SOFTWARE IS ACCURATE AND WILL PERFORM THE INTENDED TASKS.

- * DEMO IS GIVEN TO REVIEWER TO VALIDATE THAT ALL FUNCTIONAL REQUIREMENTS ARE MET
- * SIGNATURES OF DEVELOPER AND REVIEWER ARE REQUIRED
 - MANDATORY FOR ALL ORIGINAL RELEASES OF MOUND AND DESIGN-AGENCY CONTROLLED SOFTWARE
 - MANDATORY FOR ALL CHANGES TO SOFTWARE

POLICY REQUIREMENTS

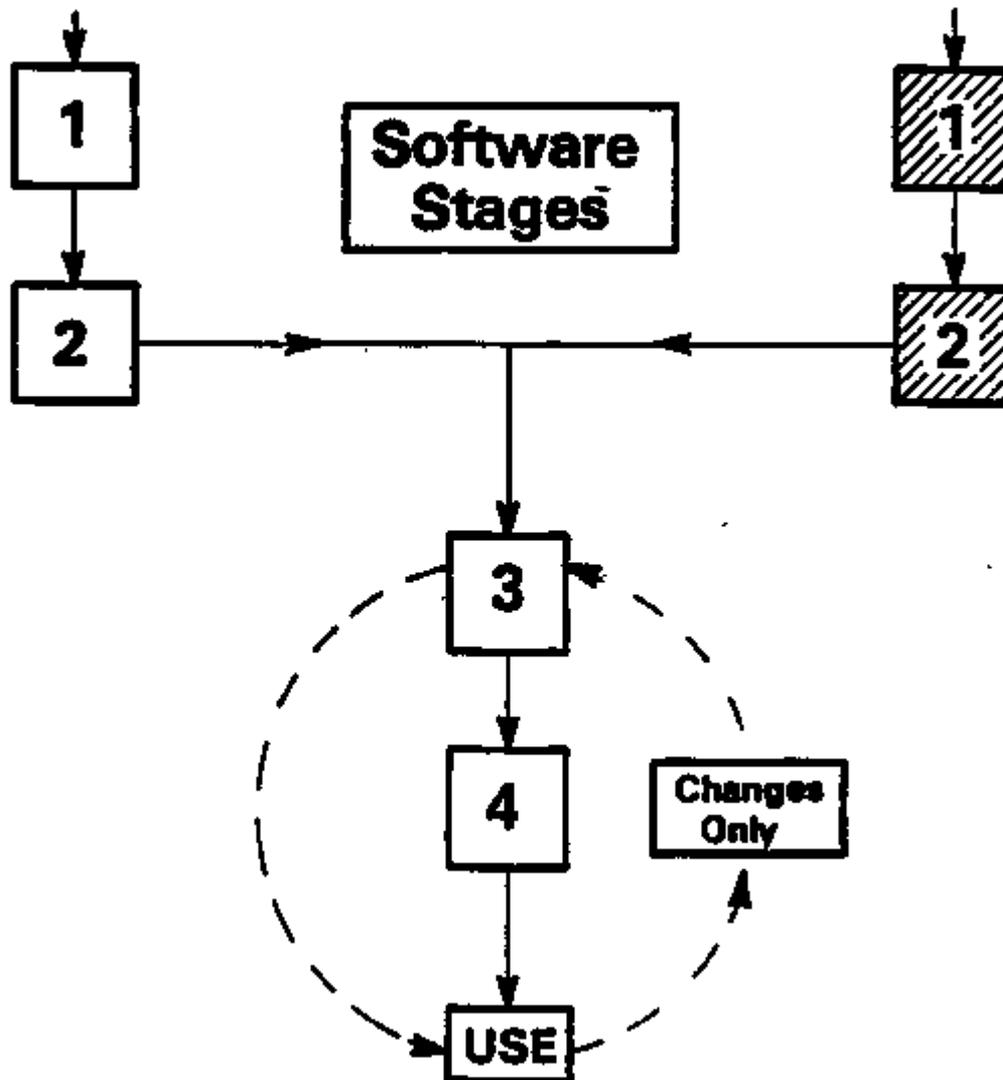
FINAL ACCEPTANCE ACTIVITIES ARE PERFORMED TO ENSURE THAT THE SOFTWARE PERFORMS THE REQUIRED FUNCTIONS PRIOR TO RELEASE AND IMPLEMENTATION.

- * DEMO FOR THE SOFTWARE ACCEPTANCE REVIEW TEAM
- * SIGNED CONCURRENCE BY ALL TEAM MEMBERS IS REQUIRED
 - MANDATORY FOR ALL ORIGINAL RELEASES OF MOUND AND DESIGN-AGENCY CONTROLLED SOFTWARE

QC ENGINEER	DATE	PROD. ENGINEER	DATE	TECH. RESP.	DATE	MANUAL NUMBER
R. L. Dehart,	10-20-86	P. D. Bantz,	10-20-86	R. L. Dehart,	10-20-86	MD-10196
MPC-ML-4565 (B-77)						GENOTEC CHANGE

**Design Agency
Controlled**

**Mound
Controlled:**



 Required

 Optional

FIGURE 1: ORIGINAL SOFTWARE RELEASE

Issue 8: 12

POLICY REQUIREMENTS

CHANGE AND CONFIGURATION CONTROL REQUIREMENTS ENSURE THAT CHANGES TO SOFTWARE ARE REQUESTED AND APPROVED BY AUTHORIZED PERSONNEL AND THAT EFFECTIVE TRACEABILITY IS MAINTAINED.

- * CHANGES MUST BE APPROVED BY AUTHORIZED PERSONNEL, AND PROCESSED THROUGH THE ECN SYSTEM

- * MASTER COPY LIBRARY WITH CONTROLLED ACCESS MUST BE MAINTAINED

POLICY REQUIREMENTS

ANY REPORT USED AS A PERMANENT PRODUCTION RECORD MUST INCLUDE:

- * HEADER INFORMATION TO PROVIDE A RECORD OF THE PROCESS OR PROCEDURE
- * SPECIFICATION LIMITS USED FOR VERIFICATION PURPOSES MUST BE INCLUDED ON THE REPORT
- * ERROR MESSAGES ARE REQUIRED TO PROMPT USER FOR PROPER ACTION IN EVENT OF EQUIPMENT OR PRODUCT PROBLEMS

POLICY REQUIREMENTS

DOCUMENTATION MUST BE MAINTAINED WHICH DEMONSTRATES EFFECTIVE CONTROL OF WR-RELATED SOFTWARE. SPECIFIC CONVENTIONS ARE IDENTIFIED IN THE POLICY FOR

- * DOCUMENTATION
- * IDENTIFICATION
- * LABELING
- * TOTAL DOCUMENTATION PACKAGE FOR DWG CONTROL

POLICY COMPLIANCE

MD-10196 SPECIFIES PROCEDURES TO BE MET BY ALL GROUPS, EXCEPT THE PCF. PCF PROCEDURES ARE DEFINED IN SM 212. THE GENERAL INTENT OF THE POLICY MUST BE MET.

- * ACCEPTABLE PERFORMANCE DEMONSTRATED PRIOR TO RELEASE AND IMPLEMENTATION
- * CHANGE & CONFIGURATION CONTROL PROCEDURES ARE ESTABLISHED AND MAINTAINED
- * SOFTWARE CHANGES ARE PROPERLY AUTHORIZED
- * ACCESS TO WR SOFTWARE IS CONTROLLED
- * TRACEABILITY IS AVAILABLE FOR ALL SOFTWARE CHANGES

POLICY COMPLIANCE

PCF SYSTEMS SATISFY THE INTENT OF MD-10196
THROUGH COMPLIANCE AND USE OF INTERNAL TOOLS
AND PROCEDURES

- * DEVELOPMENT & VALIDATION REQUESTS ARE MET
THROUGH DOCUMENTATION OF COMPLIANCE WITH
PM PROCEDURES

- * CHANGE AND CONFIGURATION CONTROL,
TRACEABILITY, AND ACCESS CONTROLS ARE
SUPPORTED THROUGH THE USE OF TOOLS
AVAILABLE ON IBM AND DEC MAINFRAMES

POLICY COMPLIANCE

DOCUMENTS GENERATED IN THE NORMAL PROJECT LIFE CYCLE FULFILL THE INTENT OF THE DEVELOPMENT AND VALIDATION REQUIREMENTS.

- * INITIATION → PROJECT REQUEST & REQUIREMENTS DEFINITION
- * DEVELOPMENT PLAN → DESIGN REVIEW
- * SOFTWARE REVIEW → IMPLEMENTATION SIGNOFF
- * FINAL ACCEPTANCE → RELEASE SIGNOFF

POLICY COMPLIANCE

FEATURES OF THE ON-LINE CHANGE MANAGEMENT SYSTEMS (IBM & DEC) ENSURE PROPER CHANGE AND CONFIGURATION CONTROL, AND TRACEABILITY.

- * CHANGES ARE SUBMITTED THROUGH THE CHANGE MANAGEMENT SYSTEM, AFTER RELEASE SIGNOFF
- * CHANGE MANAGEMENT SYSTEM UPDATES PRODUCTION LIBRARIES WITH THE NEW VERSION OF SOFTWARE (INFOMGT)
- * FULL ARCHIVING IS DONE, PROVIDING COMPLETE TRACEABILITY OF ALL PREVIOUS VERSIONS (LIBRARIAN, CMS)

POLICY COMPLIANCE

WR SOFTWARE IS CONTROLLED TO PREVENT
UNAUTHORIZED ACCESS

- * RACF – IBM
- * VMS SECURITY (ACL'S) – DEC

POLICY COMPLIANCE

GUIDELINES AND PROCEDURES ARE DETAILED IN EXISTING DOCUMENTS. FOLLOWING THESE PROCEDURES WILL ENSURE COMPLIANCE WITH THE INTENT OF THE SQA POLICY.

- * GENERAL PROCEDURES – SM 212, BP.1
- * CHANGE MANAGEMENT GUIDE –
OPERATIONS SUPPORT
- * LIBRARY NAMING CONVENTIONS –
IBM – SM 212, BP.13
DEC – DRAFT DOCUMENT IN REVIEW
– K. E. ZINK
- * LIST OF PRODUCTION LIBRARIES –
IBM – SM 212, BP.14
DEC – DRAFT DOCUMENT IN REVIEW
– K. E. ZINK

POLICY COMPLIANCE

WR SOFTWARE SHOULD BE CONSIDERED AN INTEGRAL COMPONENT IN THE MANUFACTURE OF A PRODUCT, AND SHOULD, THEREFORE, BE CONTROLLED AND MAINTAINED IN A MANNER WHICH ENSURES CONSISTENT QUALITY.

- * DEVELOPMENT AND VALIDATION
- * CHANGE AND CONFIGURATION CONTROL
- * AUTHORIZATION OF CHANGES
- * TRACEABILITY OF CHANGES
- * ACCESS CONTROL

**DOE 5700.6B QUALITY PLANS
FOR NON-WR RELATED PROCESS
CONTROL & DATA ACQUISITION SYSTEMS**

***ACAST SECTION MEETING
JUNE 8, 1989***

MARK SIZEMORE

SDA-1

**DOE/AL ORDER 5700.6B REQUIRES
ALL DOE PROGRAMS TO HAVE
QUALITY ASSURANCE (QA) PROGRAMS**

*NON-WR - NQA-1 (QA Program Requirements
for Nuclear Facilities)*

WR - QC-1 (DOE/AL Quality Criteria)

**MOUND'S METHOD OF SUPPORTING SQA
FOR NON-WR RELATED SOFTWARE IS
DEFINED IN MD-10249, ISSUE 1**

WR ACTIVITIES ARE DEFINED AS:

"All activities directly related to weapons operations including acquisition of research and technology data, development, design, engineering, testing, production, component fabrication, assembly, transportation, storage, stockpile evaluation, and retirement."

ATTACHMENT B

Weapons Activities

The following is a listing of some weapons activities that fall within the DOE Defense Program. This listing is not all inclusive but is intended to illustrate the scope of weapons activities.

- Research into the properties of materials in support of nuclear weapons concepts, engineering, design, or production. Classified research into the chemical, physical, nuclear, structural, metallurgical, hydrodynamic, compatibility, and aging properties of tritium, beryllium, heavy metals, specialized compounds, ceramics, alloys, composites, amorphous materials, and explosives falls into this category.
- The development and use of computer codes for the examination and development of nuclear weapons concepts, the conduct of nuclear weapons physics and engineering studies, and the development, transmission, and use of nuclear weapons design information.
- The design, preparation, conduct, and analysis of nuclear weapons design experiments, including laboratory experiments in support of component, subsystem, and system design, and nuclear explosive experiments conducted as part of the nuclear test program.
- Nuclear test device emplacement operations.
- Preparation and issuance of design sketches and design information.
- Fabrication and measurement of products for design experiments.
- Procurement of material and product for use in design and development tests and experiments.
- Tests of development hardware--this covers components and assemblies tested in laboratory and flight environments.
- Design reviews.
- Design and development effort on production tooling, testers, and gages for use in production.
- Design and development effort on instrumentation for development flight tests.
- General and specific procedures that are directive on the design organizations and engineers in their performance of research and development, design, and testing.
- Standards and calibration laboratories and their operating procedures.
- Development of reliability allocations.
- Process development related to nuclear weapons production.

ATTACHMENT B (continued)

- Preparation and issuance of design specifications and procedures for the production of weapon components and assemblies.
- Evaluation of production processes prior to authorizing production.
- Control of design specifications and procedures.
- Production activities covered by the Albuquerque Operations Office QA Policy QC-1 dated March 24, 1976.
- Transportation and storage of nuclear test devices and nuclear weapons, including matters related to safeguards and security.
- Disassembly, examination, testing, and final disposition of weapons and weapons components for purposes of stockpile evaluation.
- Disassembly and disposition of retired weapons and weapons components.

NON-WR ACTIVITIES ARE DEFINED AS:

"All activities outside the responsibility of DOE Defense Programs or those activities which provide General Operational Support of the Weapons Programs."

ATTACHMENT A

Nonweapons Activities

The following listing provides some examples of activities that would be covered under nonweapons. This list is not all inclusive but is intended to indicate the scope of nonweapons activities. When such activities involve Restricted Data, they would fall under weapons activities:

- Maintenance of facilities and utilities. Includes heating, cooling, ventilation, power systems, air compressors, hydraulic systems, structures, roofs, lighting systems, and cleanliness of facility.
- Health and safety activities.
- Installation and maintenance of security systems.
- Processing of commercial and manufacturing waste that needs controls because of environmental concerns.
- Design of new facilities or modifications to existing facilities.
- Construction and remodeling.
- Decontamination and decommissioning.
- Procurement of materials and equipment from commercial sources.
- Design, construction, operation, and maintenance of scientific apparatus for general use, such as particle accelerators, nuclear reactors, electron microscopes, scientific computers, and so on.
- Procurement, installation, operation, and maintenance of commercial machine tools, welding machines, and presses for general use.
- Air operations.
- Radiological controls.
- Utilities systems.
- Equipment and procedures for construction, mining, drilling, and general support for nuclear weapons design experiments.
- Cranes and hoists to be used to handle apparatus for nuclear weapons experiments.
- Containment radiological monitoring.
- Radioactive waste management.
- Fire protection.

**IF A NON-WR ACTIVITY INVOLVES
RESTRICTED DATA
IT IS NOW CONSIDERED WR AND
MUST FOLLOW WR REQUIREMENTS**

MD-10249 DEFINES THE BASIC POLICY REQUIREMENTS FOR MOUND'S NON-WR RELATED SQA PROGRAM

- * Purpose of Policy*
- * Scope of Policy*
- * Responsibilities*
- * Quality Indicators*

**THE PURPOSE OF MOUND'S 5700.6B
QUALITY PLAN POLICY AS DEFINED
IN MD-10249 IS TO INSURE
COMPLIANCE WITH AL ORDER 5700.6B
QUALITY ASSURANCE REQUIREMENTS
FOR NON-WR PROGRAMS**

**MD-10249 IS APPLICABLE TO AC&ST AND
COMPUTER SERVICES SECTIONS OF THE
TECHNOLOGY DEPARTMENT. TWELVE QUALITY
PLAN ELEMENTS WERE USED TO DEVELOP
MOUND'S QUALITY PLANS.**

- * Quality Plan for Process Control & Data
Acquisition Systems, Instrument & Process
Automation, and Product and Process
Analysis (PC&DAS, I&PA, and PAPA)*

RESPONSIBILITIES

*** DEPARTMENT DIRECTOR**

Review and approve the Quality Plans for implementation of AL Order 5700.6B to insure consistent, appropriate and timely application. (Tony Woltermann)

*** AC&ST MANAGEMENT**

Accept ultimate responsibility for the implementation, accuracy, and contents of the Quality Plans generated for thier groups/functions. (Dan Hill, Group Leaders)

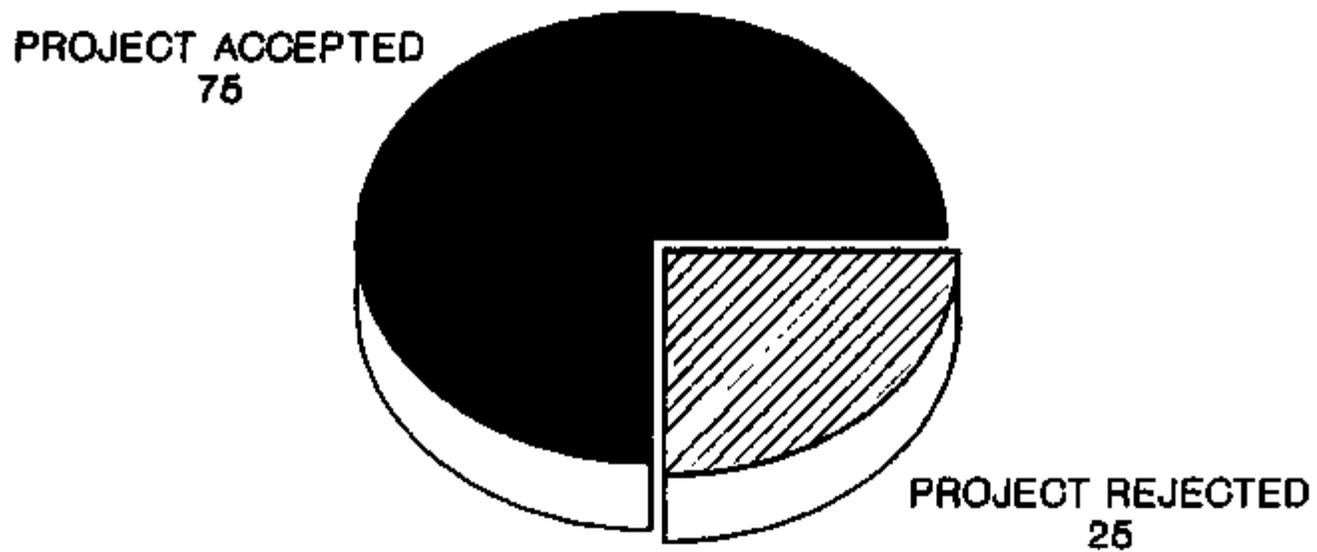
*** DEPARTMENT QUALITY ASSURANCE COORDINATOR**

Provide coordination and interpretation of changes in AL Order 5700.6B to the Q.A. Section Representatives (Elaine Liebrecht)

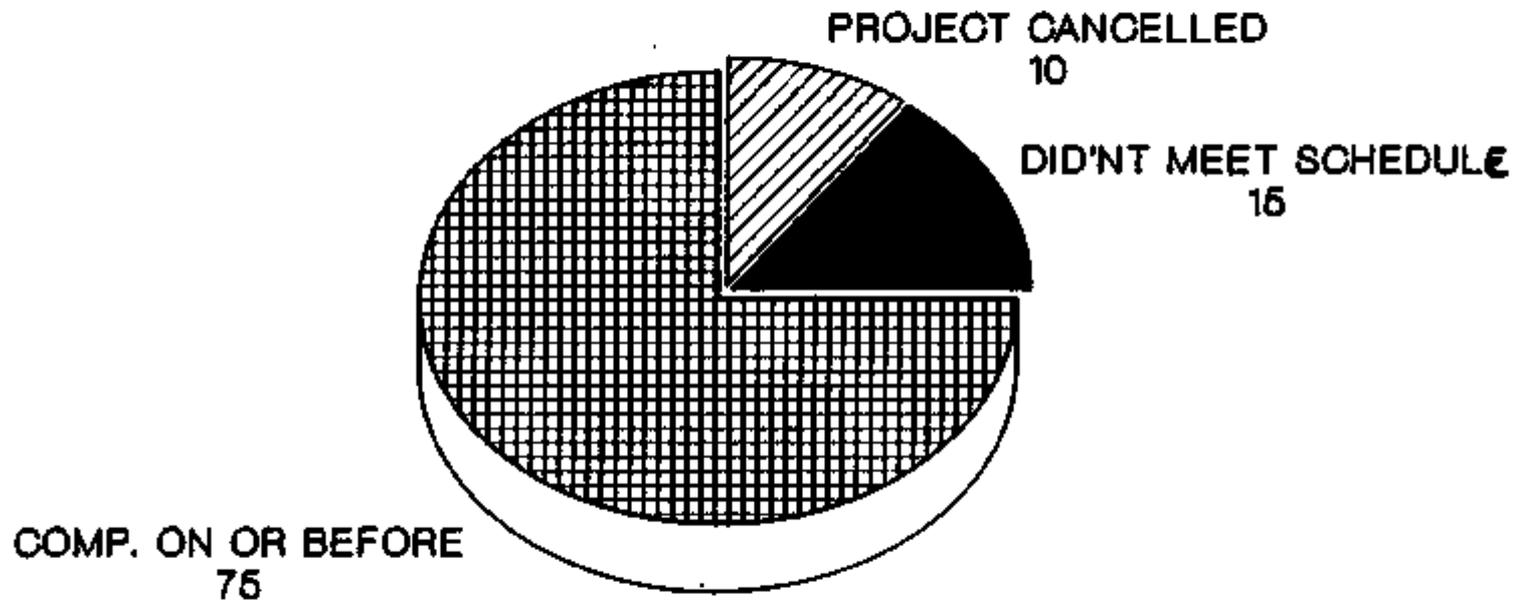
**QUALITY INDICATORS REPRESENT THE
OVERALL QUALITY OF THE VARIOUS
FUNCTIONS PERFORMED BY THE AC&ST
SECTION. (PC&DAS, I&PA, and PAPA)**

- * Project Acceptance*
- * Project Completion Data*
- * Error Reports*

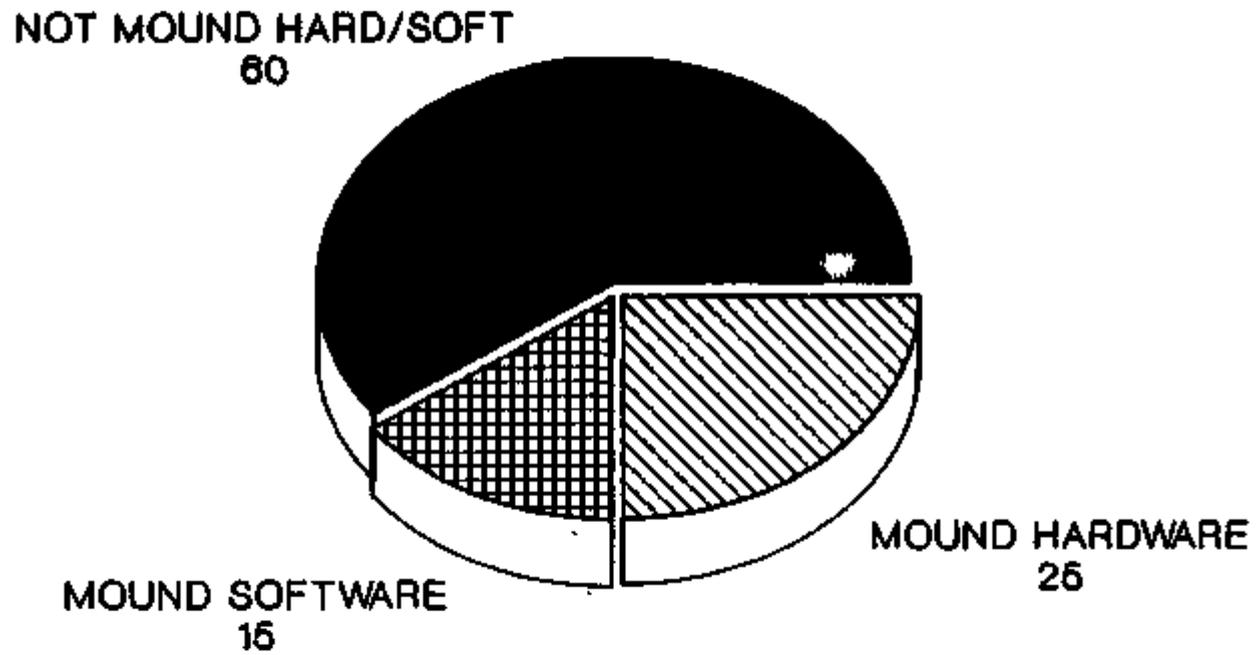
PROJECT ACCEPTANCE



PROJECT COMPLETION DATA



ERROR REPORTS



**TWELVE QUALITY PLAN ELEMENTS
CURRENTLY GUIDE THE PC&DAS,
I&PA, AND PAPA GROUPS.**

(AL ORDER 5700.6B DATED 4/24/84)

DESIGN CONTROL

- * Maintain drawings, specifications, and standards to assure that items are constructed, fabricated, inspected, and tested to the latest applicable requirements. Also to maintain task definitions for a service or operation to assure compliance.

- * Tasks are specified to the level of detail necessary to permit development activities to proceed in an orderly and systematic manner.

- Requires a joint effort by sponsor, PM, LTP, etc.
- Follow SMI 12, Section BP.1 (Proj. Man. Procedures)

PROCUREMENT

- **Maintain adequate control over procurement to assure that services and material conform to specified requirements.**
- ***Follow established Mound procedures as stated in "Volumes I & II, Purchasing Policy and Procedures". Purchase specification and requirement documents are the responsibility of the Group Leader.***

CONTROL OF PURCHASED ITEMS **AND SERVICES**

- * **Control shall provide for the following: source evaluation and selection, evidence of quality furnished by the Supplier, source inspection, audits, and examination of items or services upon delivery or completion.**
- * ***Purchased computer hardware and software are subject to acceptance testing by AC&ST Personnel.***
- * ***Major purchased items and services are guaranteed to perform as stated.***

ITEM IDENTIFICATION AND CONTROL

- **Establish adequate methods and facilities for controlling the identification, handling and storage of items and technology data.**
- ***An inventory of all major ADP equipment is maintained by the Computer Operations Group.
SM212, Section EP.7***
- ***Control of software and associated output(data) is detailed in SM212, Section BP.1***

INSPECTION

- **A program of inspections and tests shall be established to assure that development, production, facilities, operations and the acquisition of research and technology data are in conformance with required quality standards and design documents.**
- ***Inspections and tests are established to insure that equipment, components, and the acquisition of technological data are being maintained and are performing as expected. (SM212, Section BP.1)***

CONTROL OF NONCONFORMING EVENTS

- **Measures shall be established to control data, facilities, items, services or activities which do not conform to requirements.**
- ***Nonconforming events will be logged in the project documentation according to SM212, Section BP.1.***

CONTROL OF DEVELOPMENT **AND PRODUCTION**

- **Maintain sufficient control over development and manufacturing processes to prevent or minimize product defectiveness and variability.**
- ***All projects are controlled by Project Management Procedures as stated in SM212, Section BP.1.***

CONTROL OF MEASURING AND TEST EQUIPMENT

- **Assure accuracy and reliability of measurements and tests through the use of suitable inspection, measuring or test equipment of the range, accuracy, and type required.**
- ***Development measuring and test equipment are to be maintained in calibration by the Mound Standards Group.***

CONTROL OF MEASURING AND TEST EQUIPMENT (CONT.)

- **Establish and maintain a calibration system which adheres to nationally recognized standards values and assure proper calibration and maintenance of gages and test equipment.**
- ***MD-10096, Mound Standards and Calibration System, is used to maintain compliance to requirements.***

QUALITY RECORDS

- **Records shall be maintained to furnish evidence of the quality of facilities, services, items, and activities. These include results from reviews, inspections, tests, audits, material analyses, etc.**
- ***Documentation to be maintained for each project is defined in SM212, Section BP.1***

CORRECTIVE ACTION

- **Establish and maintain a system to assure that conditions adverse to quality are promptly identified and corrected.**
- ***Corrective actions will be logged in the project documentation according to SM212, Section BP.1.***

PERSONNEL TRAINING

- **Necessary training shall be provided to assure that proper quality is achieved and maintained.**
- ***Group Leaders determine the degree of training and education needed to assure proper quality. Records of the individuals training are maintained by Mound personnel.***

QUALITY REVIEWS

- **Establish a system for conducting reviews to verify compliance with all aspects of the quality program. Results are to be documented.**
- ***Self audits are conducted within AC&ST per SM212, Section DP.7.***
- ***A minimum of one self-evaluation of compliance with this quality plan is conducted per year by personnel not responsible for the function or execution of the procedure being evaluated.***
- ***Development operations are subject to internal, self and to external reviews/verifications.***

**CHANGES ARE UNDERWAY FOR
MD-10249 BASED UPON AL ORDER
5700.6B, REVISION 1; DATED
9/13/88. THIS CHANGE IS TO
BE COMPLETED BY 9/30/89.**

**THE TWELVE QUALITY ELEMENTS
HAVE NOW BEEN EXPANDED TO
EIGHTEEN QUALITY ELEMENTS.**

INSTRUCTIONS, PROCEDURES, AND DRAWINGS

- **Activities affecting quality shall be performed in accordance with documented instructions, procedures, or drawings. Quantitative or qualitative acceptance criteria shall be included.**

DOCUMENT CONTROL

- * **The preparation, issue, and change of documents that specify quality requirements or prescribe activities affecting quality, shall be controlled to assure that correct documents are being employed.**

CONTROL OF PROCESSES

- **Processes affecting quality of items or services shall be controlled. Qualified personnel are to be used for special processes.**

TEST CONTROL

- **Tests required to verify conformance to requirements and to demonstrate that items perform satisfactorily in service, shall be planned and executed. *(and documented)***
 - **System tests**
 - **ACO change tests**

HANDLING, STORAGE, AND SHIPPING

- ♦ **Handling, storage, cleaning, packaging, shipping, and preservation of items, shall be controlled to prevent damage or loss and to minimize deterioration.**

INSPECTION, TEST AND OPERATING STATUS

- **Status of inspection and test activities shall be identified to assure required inspections and tests were performed and to assure that items that have not passed the required inspections and tests, are not inadvertently installed, used, or operated.**

AUDITS (WAS QUALITY REVIEWS)

- **Planned and scheduled audits shall be performed to verify compliance with all aspects of the quality assurance program and to determine its effectiveness.**

**DoE 5700.6B QUALITY PLANS
FOR INFORMATION SYSTEMS**

**AC&ST SECTION MEETING
JUNE 1, 1989**

AL GOLDMAN

BACKGROUND

- * DoE/AL Order 5700.6B requires that all DoE programs, including the weapons, must have Quality Assurance (QA) programs.
- * Weapons programs are exempt from the specific provisions of the order.

DEFINITIONS

- * **NONWEAPONS ACTIVITIES:** All activities outside the responsibility of DoE Defense Programs or those that provide general operational support
- * **WEAPONS ACTIVITIES:** All activities related to weapons activities, including research through retirement.

See document published by D. Blane

Nonweapons Versus Weapons Activities

1. Purpose: To provide a definition or distinction between weapons and nonweapons activities.
2. Background: DOE/AL Order 5700.6B requires that all DOE programs, including the weapons, must have Quality Assurance (QA) programs. However, Order 5700.6B exempts weapons programs from the specific provisions of the Order. Nonweapons QA activities are to be developed per the requirements of NQA-1 (QA Program Requirements for Nuclear Facilities) and QA activities for weapons under the auspices of QC-1 (DOE/AL Quality Criteria).
3. Definitions
 - a. Nonweapons Activities: All activities outside the responsibility of DOE Defense Programs or those activities which provide general operational support of the weapons programs. Examples would include actions associated with all aspects of facilities acquisition, maintenance and operations; general procurements, safety and health activities, waste management, environmental controls, etc. (see Attachment A).
 - b. Weapons Activities: All activities directly related to weapons operations, including acquisition of research and technology data, development, design, engineering, testing, production, component fabrication, assembly, transportation, storage, stockpile evaluation, and retirement. (See Attachment B for examples.)

D. E. Blane

ATTACHMENT A

Nonweapons Activities

The following listing provides some examples of activities that would be covered under nonweapons. This list is not all inclusive but is intended to indicate the scope of nonweapons activities. When such activities involve Restricted Data, they would fall under weapons activities.

- Maintenance of facilities and utilities. Includes heating, cooling, ventilation, power systems, air compressors, hydraulic systems, structures, roofs, lighting systems, and cleanliness of facility.
- Health and safety activities.
- Installation and maintenance of security systems.
- Processing of commercial and manufacturing waste that needs controls because of environmental concerns.
- Design of new facilities or modifications to existing facilities.
- Construction and remodeling.
- Decontamination and decommissioning.
- Procurement of materials and equipment from commercial sources.
- Design, construction, operation, and maintenance of scientific apparatus for general use, such as particle accelerators, nuclear reactors, electron microscopes, scientific computers, and so on.
- Procurement, installation, operation, and maintenance of commercial machine tools, welding machines, and presses for general use.
- Air operations.
- Radiological controls.
- Utilities systems.
- Equipment and procedures for construction, mining, drilling, and general support for nuclear weapons design experiments.
- Cranes and hoists to be used to handle apparatus for nuclear weapons experiments.
- Containment radiological monitoring.
- Radioactive waste management.
- Fire protection.

ATTACHMENT B

Weapons Activities

The following is a listing of some weapons activities that fall within the DOE Defense Program. This listing is not all inclusive but is intended to illustrate the scope of weapons activities.

- Research into the properties of materials in support of nuclear weapons concepts, engineering, design, or production. Classified research into the chemical, physical, nuclear, structural, metallurgical, hydrodynamic, compatibility, and aging properties of tritium, beryllium, heavy metals, specialized compounds, ceramics, alloys, composites, amorphous materials, and explosives falls into this category.
- The development and use of computer codes for the examination and development of nuclear weapons concepts, the conduct of nuclear weapons physics and engineering studies, and the development, transmission, and use of nuclear weapons design information.
- The design, preparation, conduct, and analysis of nuclear weapons design experiments, including laboratory experiments in support of component, subsystem, and system design, and nuclear explosive experiments conducted as part of the nuclear test program.
- Nuclear test device emplacement operations.
- Preparation and issuance of design sketches and design information.
- Fabrication and measurement of products for design experiments.
- Procurement of material and product for use in design and development tests and experiments.
- Tests of development hardware--this covers components and assemblies tested in laboratory and flight environments.
- Design reviews.
- Design and development effort on production tooling, testers, and gages for use in production.
- Design and development effort on instrumentation for development flight tests.
- General and specific procedures that are directive on the design organizations and engineers in their performance of research and development, design, and testing.
- Standards and calibration laboratories and their operating procedures.
- Development of reliability allocations.
- Process development related to nuclear weapons production.

ATTACHMENT 8 (continued)

- Preparation and issuance of design specifications and procedures for the production of weapon components and assemblies.
- Evaluation of production processes prior to authorizing production.
- Control of design specifications and procedures.
- Production activities covered by the Albuquerque Operations Office QA Policy QC-1 dated March 24, 1976.
- Transportation and storage of nuclear test devices and nuclear weapons, including matters related to safeguards and security.
- Disassembly, examination, testing, and final disposition of weapons and weapons components for purposes of stockpile evaluation.
- Disassembly and disposition of retired weapons and weapons components.

QA FOR NONWEAPONS SYSTEMS

NQA-1
ANSI/ASME-NQA-1

Quality Assurance Requirements
for Nuclear Facilities

⋮

AL Order
5700.6B

The requirements of this order
apply to Non-Weapons Quality
Assurance Activities

⋮

MD-10249

Quality Plans for AC&ST and
Computer Services. Consistent
with 5700.6B

SQA FOR WEAPONS SYSTEMS

QC-1

DoE Quality Criteria

⋮

MD-10196

Software Quality Assurance for Information Systems directly related to weapons operations.

Study/initiative underway to determine if 5700.6B and QC-1 can be combined into a common document.

5700.6B is three plans
(MD 10249 Issue 1)

1. Quality Plan for ADP Production
 - AC&ST
 - Computer Services
2. Quality Plan for the Systems Software Group
3. Quality Plan for:
 - Instrument and Process Automation
(Sizemore)
 - Process Control and Data Acquisition
(Lowrey)
 - Product and Process Analysis
(Ciramella)

MD-10249 Issue 1 is currently under review and will be revised

This presentation is based on the current plan.

- Stewart, Beck, Evans, Lindesmith and Cole are AC&ST representatives.

QUALITY PLAN ELEMENTS FOR AC&ST AND COMPUTER SERVICES

- * Design Control
- * Procurement
- * Control of Purchased Items and Services
- * Item Identification and Control
- * Inspection
- * Control of Nonconforming Items (N/A)
- * Control of Development and Production
- * Control of Measuring and Test Equipment (N/A)
- * Quality Records
- * Corrective Action
- * Personnel Training
- * Quality Reviews

QUALITY PLAN ELEMENTS

DESIGN CONTROL

- * Design Control procedures are outlined in the AC&ST Project Management Procedures of SM212, BP.1
 - New projects, maintenance and enhancements
 - Defines policies and procedures for the project life cycle
 - Presentation by P. Bantz

- * Audit Staff review of System Design detailed in SM212, BP.5
 - Evaluation of program application design
 - Check of original design against final installed system

QUALITY PLAN ELEMENTS (CONT'D)

PROCUREMENT

- * Procurement procedures for the acquisition of computer equipment software, and resources are detailed in SM212, EP.1
- * Procedures administered by the Computer Advisory Council (CAC)
(P. Bantz is chairman)
- * In addition, all ADP acquisitions must comply with the procedures outlined in AL 1360.1C
(Acquisition and Management of Computing Resources and Policy Procedure 4016)

QUALITY PLAN ELEMENTS (CONT'D)

CONTROL OF PURCHASED ITEMS AND SERVICES

- * Purchased hardware and software are subject to acceptance testing by technically competent AC&ST and Computer Services Personnel.
- * Purchased items and services are contractually guaranteed to perform as stated
- * Problems are resolved between Mound personnel, the vendor, and Purchasing

QUALITY PLAN ELEMENTS (CONT'D)

ITEM IDENTIFICATION AND CONTROL

- * Computer Operations has the responsibility of verifying that output is distributed to the intended recipients per an authorization list
- * Developer has responsibility for identification of output per SM212:
 - Standard Mound COBOL classification routine "RPTCLASS" in SM212, BP.11
 - Job Card security classification parameter in SM212, PB.12
- * ADP equipment inventory maintained by Operations per SM212, EP.7
- * Magnetic tape library inventory is controlled by an automated management system.
SM212, CP13–19

QUALITY PLAN ELEMENTS (CONT'D)

INSPECTION

- * The Computer Security Group performs risk analyses for applications that process sensitive unclassified data on any type of computer system at Mound.
SM212, CP.21
 - Calculated annual loss expenditures

- * Random reviews of user data files used on Mound systems to minimize misuse or abuse.
SM212, CP.23

QUALITY PLAN ELEMENTS (CONT'D)

CONTROL OF DEVELOPMENT AND PRODUCTION

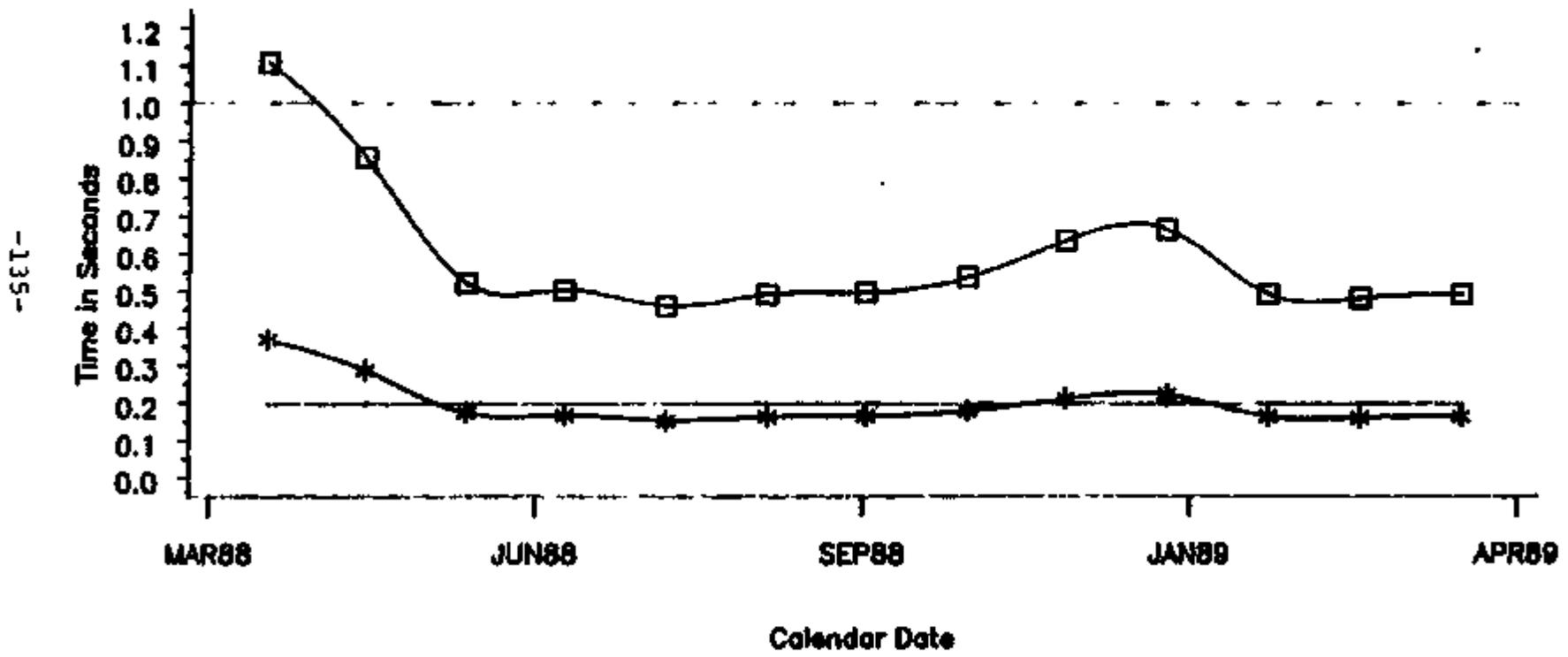
- * Project Development is governed by Project Management Procedures
- * Changes to the PCS are controlled by the online Change Management System per SM212, DP.5 (General) and DP.6 (Specific)
 - Change Management provides archiving and traceability for software and hardware changes
- * Production jobs are controlled by an automated job scheduler
- * Security administration is decentralized -- Group Administrators and/or Computer Operations. SM212, DP.1

QUALITY PLAN ELEMENTS (CONT'D)

QUALITY RECORDS

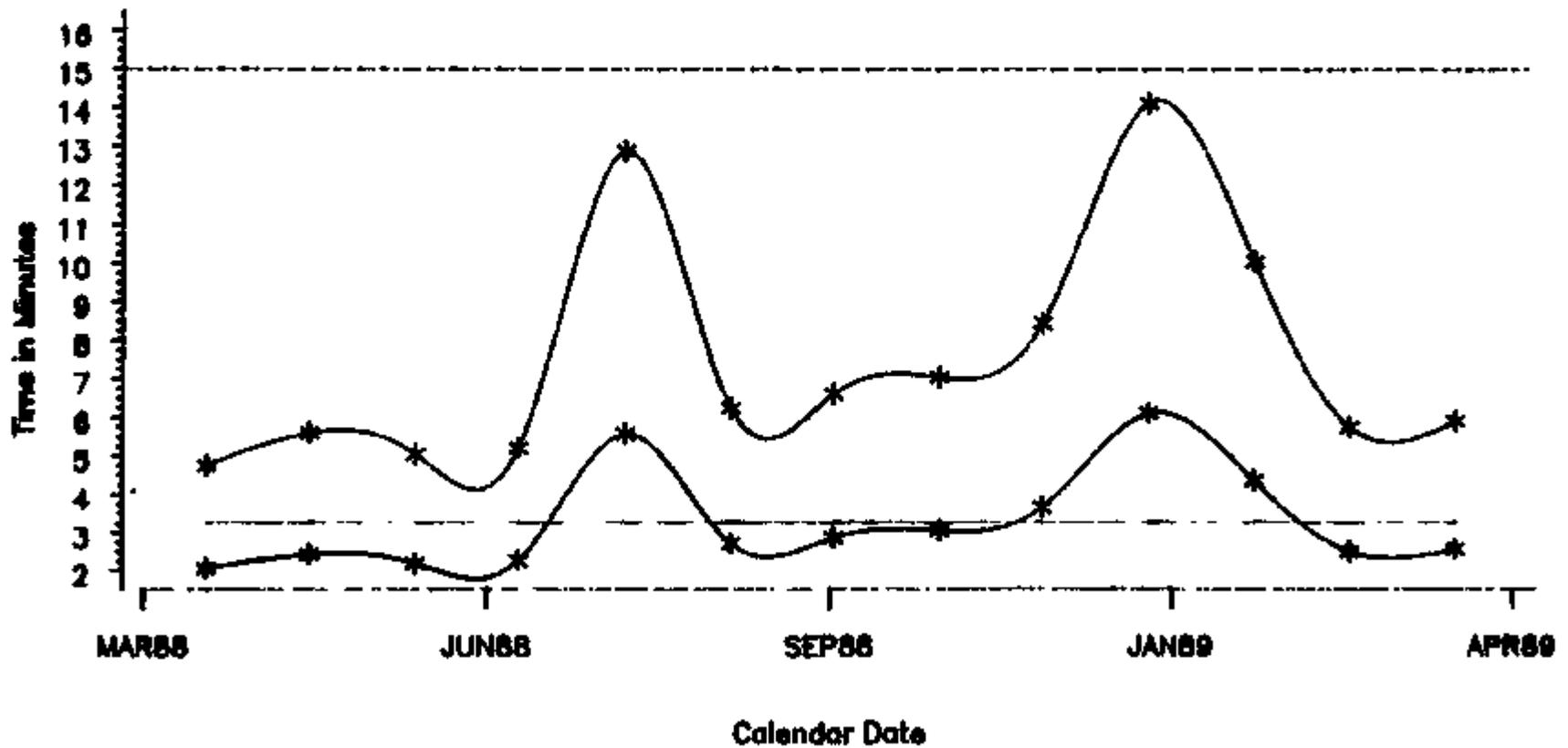
- * PCF system availability charts are generated monthly.
- * Charts and graphs of implemented changes and reported problems are produced monthly.
- * Training requirements for various personnel is the responsibility of supervisors. (The training section maintains records of training for all employees).
SM 212 DP.4.
- * Evaluation reports and checklists for self-evaluations are maintained by Computer Operations.

***** SYSTEM MANAGEMENT FACILITY - COMPUTER PERFORMANCE ANALYSIS *****
Transaction Processing (IMS) Trend Analyses and Short Term Projections
Transaction Processing (IMS) Response Time Trends
Class One Transactions



Color notation is: Mean Service Time, Service Level, Grand Mean, 95th Percentile
 Symbolic notation is: Star - Mean Service Time, Square - 95th Percentile
 Dashed - Service Level, Solid - Grand Mean

***** SYSTEM MANAGEMENT FACILITY - COMPUTER PERFORMANCE ANALYSIS *****
 Batch Processing Trend Analyses and Short Term Projections
 Prime Shift Batch Turnaround Times



-136-

Color Notation is: Service Time, Service Level, Grand Mean, 90th Percentile

Monsanto

Monsanto Research Corporation • MRC • Mound

SECTION: MANAGEMENT CONTROL

TITLE: PERSONNEL TRAINING

SYSTEMS MANUAL NO.	212
PROCEDURE NO.	DP.4
DATE EFFECTIVE	4/21/86
DATE REVISED	
PAGE	1 of 3

APPENDIX A - SOFTWARE SKILLS INVENTORY MATRIX

SKILLS	*COMPUTER OPERATIONS & TECHNOLOGY					*IS APPLICATIONS
	SUPGP	SYSGP	TECGP	AUDGP	OPSGP	
ALL-IN-ONE	0	0	R	R	0	0
ASSEMBLER	0	0	0	0		0
BASIC	0	0	0	0		0
BTS	0	0				0
C-LANGUAGE	0	0	0	0		0
CHANGE MANAGEMENT	R	R	0	R	0	R
CLIST	0	0	0	R		0
CMF	0	0				0
COBOL	0	0	0	0		R
DATAEDIT	0		0	0		0
DATARETRIEVE	0	0	0	0		0
DBASE	0	0	0	0		0
DCF	0	0	0	0		0
DPSORT	0	0	0	0		
DIALOG MANAGER	0	0	0	0		0
EXPEDITER	0	0				0
FORTRAN	0	0	0	0		0
GENM	0	0	0	0		0
IMP	0	0			0	

QUALITY PLAN ELEMENTS (CONT'D)

CORRECTIVE ACTION

- * The HELP desk facility allows Mound users to make a single phone call to report DP related problems.
 - Problems are logged into the Problem Management System for tracking and resolving problems as detailed in SM212, DP.2.
- * Production rerun instructions are provided in the event production jobs need to be rerun. SM212 BP.6
- * Critical production files are backed up on a scheduled basis and recovery procedures established. SM212, CP.11.
- * Corrective actions specified as a result of self-evaluations must be completed within 30 days.

QUALITY PLAN ELEMENTS (CONT'D)

PERSONNEL TRAINING

- * Supervision/management is responsible for all aspects of training needs as outlined in SM212, DP.4.

QUALITY PLAN ELEMENTS (CONT'D)

QUALITY REVIEWS

- * Self audits are conducted with AC&ST and Computer Services in accordance with SM212, DP.7 to insure that procedures are followed.
- * One self-evaluation for each AC&ST quality plan is to be conducted each year by personnel not responsible for the execution of the procedures being evaluated. (Project Management Procedures this year).
- * Stages of the project life cycle are subject to quality reviews both by the developers and end users of the system.
- * AC&ST and Computer Services are subject to DoE/AL evaluations audits such as the Annual A1 Security Survey, the ADP Management Survey, and the Inspection and Evaluation Audit (I&E).

SUMMARY

- * Plans Exist

- 5700.6B
- MD-10249
- SM212

- * Adhere to SM212

- * Failure to do so can result in Audit findings.

DISTRIBUTION

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