

MPG 1280.4

REVISION C

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MARSHALL PROCEDURES AND GUIDELINES

QS01

MSFC CORRECTIVE ACTION SYSTEM

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DOCUMENT HISTORY LOG

Status (Baseline/ Revision/ Canceled)	Document Revision	Effective Date	Description
Baseline		5/14/99	Document converted from MSFC-P14.1 to a Directive. Previous history retained in system as part of canceled or superseded ISO Document files.
Revision	A	8/16/99	Changes made to incorporate new organizational terminology. Paragraph 1.4, "MWI 8730.9" changed to "MWI 1280.2" and paragraph 1.5, "MWI 8730.11" changed to "MWI 1280.4."
Revision	B	3/26/01	Replaced reference to deleted document MPG 1700.1 with MWI 8621.1; Added S&MA inform management of trends and management respond appropriately; Included Office as well as Project and Directorate; Added POC appearing at MMS Implementation Team meeting to status delinquent response.
Revision	C	1/24/03	Change footer URL; Replace "Quality Comment" with "Customer Feedback"; Change QS10-R-012" to QS-R-012"; Replace URL "http:msfcsma1/dbwebs/cas" with "https://msfcsma1.msfc.nasa.gov"

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PREFACE

P.1 PURPOSE

This document establishes the Marshall Space Flight Center (MSFC) responsibilities and procedures for corrective action system (CAS) activities which fall within the scope as described in MPD 1280.1, "Marshall Management Manual."

P.2 APPLICABILITY

This Marshall Procedures and Guidelines (MPG) is only applicable to problems which were identified after its baseline effective date, November 10, 1997.

Corrective actions taken during MSFC Internal Quality Audits are addressed in MPG 1280.6, "Internal Quality Audits." Corrective actions required to correct supplier/subcontractor discrepancies are addressed in MPG 5000.1, "Purchasing", and related instructions. Corrective actions for mishaps are addressed in MWI 8621.1, "Close Call and Mishap Reporting and Investigation Program." This document does not apply to, or preclude, those corrective action systems imposed by NASA Program direction or by contract, including the Shuttle, Payload, and Space Station Problem Reporting and Corrective Action (PRACA) flight hardware/software systems.

P.3 AUTHORITY

MPD 1280.1, "Marshall Management Manual"

P.4 APPLICABLE DOCUMENTS

- a. MPD 1280.1, "Marshall Management Manual"
- b. MPG 1280.6, "Internal Quality Audits"
- c. MWI 8621.1, "Close Call and Mishap Reporting and Investigation Program"
- d. MPG 5000.1, "Purchasing"
- e. MPG 8730.3, "Control of Nonconforming Product"
- f. MWI 1280.2, "MSFC Customer Feedback System"

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- g. MWI 1280.3, "Corrective/Preventive Action Notification System"
- h. MWI 1280.4, "MSFC Quality System Deficiency Notice System"
- i. QS-R-012, "S&MA (QS) Operation of the MSFC Corrective Action System"

P.5 REFERENCES

None

P.6 CANCELLATION

MPG 1280.4B dated March 26, 2001

Original signed by
Axel Roth for

A. G. Stephenson
Director

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DOCUMENT CONTENT

1. DEFINITIONS

1.1 Corrective Action. Action taken to correct nonconformances and to eliminate the cause of nonconformances to prevent recurrence.

1.2 Discrepancy Record (DR). Copy 1 of MSFC Form 460.

1.3 Nonconformance. A condition of any article, material, software, service, or activity in which one or more characteristics do not conform to requirements. This includes failures, discrepancies, defects, malfunctions, and noncompliances.

1.4 Customer Feedback. The documented result of an MSFC customer communication (e.g., complaint, observation, or compliment) regarding delivered MSFC products and services as specified by MWI 1280.2, "MSFC Customer Feedback System."

1.5 Quality System Deficiency Notice (QSDN). Quality System nonconformances which are documented as specified by MWI 1280.4, "MSFC Quality System Deficiency Notice System."

1.6 Recurrence Control Action Request (RCAR). A request initiated by Safety and Mission Assurance (S&MA) to responsible organizations to investigate a nonconformance for the purpose of identifying the root cause and actions necessary to prevent recurrence. An RCAR is used to record the results of the investigation, justification for not taking corrective action (explanation) or actions taken to implement the corrective action to include the effectiveness. The RCAR is an electronic data base entry screen and may be viewed at <https://msfcsma1.msfc.nasa.gov>.

1.7 Root Cause. The underlying reason for, or cause of, one or more nonconformances or deficiencies identified through investigations and studies which, when corrected, will prevent occurrence or prevent or reduce recurrence.

1.8 Severity Categories for Software Problems.

<u>Severity</u>	<u>Potential Effect of Failure</u>
1	Code problem which causes loss of control, explosion, or other hazardous effect.
2	Code problem which causes inability to achieve mission objectives such as launch, mission duration, payload deployment, etc.

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1.9 Government Supplied Equipment (GSE). Equipment procured by a separate organization and provided by the government for use by a different organization.

2. RESPONSIBILITY

2.1 Safety and Mission Assurance Office will:

2.1.1 Ensure overall implementation of this system.

2.1.2 Evaluate all hardware/software DRs (MSFC Form 460), QSDNs, and Customer Feedbacks to determine the need for recurrence control action. Perform trend analyses on DRs to determine the need for corrective action. Initiate RCARs as required.

2.1.3 Maintain a list of appropriate point(s) of contact (POC) for receipt of RCARs.

2.1.4 Provide periodic reports as necessary to appropriate Center Management, Program/Project Manager or Systems Engineer, responsible directorates or offices, and S&MA representative in the project office for each project denoting the open/delinquent status of unresolved hardware/software RCARs. Provide periodic reports as necessary to appropriate management for open/delinquent status of unresolved Customer Feedbacks and quality system deficiencies RCARs. Provide periodic reports as necessary to appropriate management for response to adverse trends of open or newly opened Customer Feedbacks, discrepancy reports, and quality system deficiencies RCARs.

2.1.5 Evaluate and assess the completeness of the data provided to support the closure of the RCAR.

2.1.6 Provide administrative support for Corrective Action Board (CAB) and realtime tracking and statusing for all RCARs.

2.2 Organizational POCs as Assigned/Directorate or Office POCs/Document OPRs/Process Owners will:

2.2.1 Resolve any S&MA problems concerning the completeness of the data provided to support the closure of the RCAR.

2.2.2 Establish appropriate milestones for flight readiness assessment of open recurrence control actions.

2.2.3 Review the monthly status report for delinquent recurrence control actions and take necessary action to expedite closure.

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2.2.4 Resolve and establish analysis and recurrence control action priorities in cases where schedule and resources conflicts exist.

2.2.5 Determine the need for and perform, or coordinate the performance of, all necessary investigations to determine the root cause of the nonconformance.

2.2.6 Determine appropriate recurrence control action as required.

2.2.7 If cause and/or recurrence control action cannot be determined, document appropriate rationale for closure as an explained problem and input into the MSFC CAS data base.

2.2.8 Record the required recurrence control action in the MSFC CAS data base or return it to S&MA for data entry, to include all reports (in Adobe Acrobat [PDF] Format) and all images/photos (in JPG format).

2.2.9 Implement the required recurrence control action through established channels.

2.2.10 Require additional investigation where close-out rationale is judged to be inadequate or insufficient.

2.2.11 Provide support to Problem Review Boards as required.

2.3 Corrective Action Board Members will:

2.3.1 Review RCAR packages.

2.3.2 Provide management direction and support.

2.3.3 Resolve conflicts in approaches to corrective actions.

2.3.4 Assign CAB action items.

2.3.5 Close RCARs upon verification that corrective action has been taken and that it is effective.

2.4 Center, Project/Program, and/or Directorate or Office Management will take steps in rectifying issues regarding identified adverse trends in problem areas or lack of adequate responsiveness within their organization.

3. PROCEDURE

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The three sources for initiation of corrective action/recurrence control are hardware/software nonconformances, Customer Feedbacks, and quality system deficiency notices. Each process is described separately in the following sections:

3.1 RCAR Processing Initiated by MPG 8730.3, "Control of Nonconforming Product."

Actionee

Action

3.1.1 Screening Process

S&MA

3.1.1.1 Upon receipt (hard copy or electronically via the MSFC Nonconformance data base) of a DR, S&MA shall screen the DR to determine if it requires the initiation of an RCAR. (Remedial action/immediate correction of the hardware/software nonconformance will be accomplished through the DR process as described in MPG 8730.3, "Control of Nonconforming Product.")

3.1.1.2 Screening of hardware/software nonconformances is as follows:

Flight Hardware, Flight Software, and Ground Support Equipment which Directly Interfaces with Flight Hardware	
Problems which require corrective action	Problems which do not require corrective action
Hardware failures	One-time use or one-of-a-kind unit that is unrelated to other flight hardware/software/GSE
Severity 1 and 2 Software problems	A benign condition which does not have a potential effect of increasing risk or affect form, fit, or function
An event which could lead to a nonconformance such as contamination or corrosion	Clearly defined and agreed-to standard repair to bring the item into specification or performance parameters already
An event which could lead to a nonconformance such as structural cracks or handling damage	

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<p>Unexplained anomaly</p> <p>Overstress or potential overstress of hardware</p> <p>Any nonconformance which has shown by S&MA trend analysis to need corrective action</p> <p>Any problem which requires corrective action per Project Manager's direction</p> <p>NOTE: S&MA will coordinate with the organization involved prior to RCAR initiation if S&MA trend analysis is the prime criteria prompting generation of an RCAR.</p>	<p>exist. NOTE: Repeated failures will be tracked through S&MA trending and elevated to RCARs if instances become frequent.</p> <p>No effect on flight safety, mission performance, reuse, or refurbishment</p>
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Figure 1. Corrective Action Screening Criteria

3.1.1.3 If the DR has been determined to require recurrence control action, S&MA shall initiate an RCAR using the MSFC CAS data base.

3.1.1.4 S&MA shall, within 5 working days of the initiation of the hardware/software nonconformance, provide notification of the RCAR to the directorate or office POC, Program/Project Manager or Systems Engineer, and colocated S&MA Engineer.

3.1.2 **Investigation**

Directorates
and/or
Offices

The directorate or office POC receiving the RCAR shall respond to S&MA with its proposed approach within 10 working days of assignment (RCAR responses that are not provided in 10 working days from time of notification are considered delinquent unless S&MA is notified that an extension is required). The POC will:

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- 3.1.2.1 Access the online CAS data base at <https://msfcsmal.msfc.nasa.gov/> and determine if the problem can be closed as "corrective action not required" by using the screening criteria in Figure 1. If so, notify S&MA and request closure of the RCAR. If corrective action is required, proceed to step 3.1.2.2.
- 3.1.2.2 Investigate and determine the root cause.
- 3.1.2.3 Identify proposed corrective action(s).
- 3.1.2.4 Record the investigation results (reports, images, and analyses), root cause, and proposed corrective action or explanation into the MSFC CAS data base.

If a problem is understood to the point that only limited or no investigation is required, and the problem is not a constraint to flight, then the problem may be resolved by documenting the rationale as to why it is acceptable to proceed without corrective action (i.e., Explanation). All of the following data elements must be addressed to close this problem as explained or as an unexplained anomaly.

- a. Problem Clarification.
- b. Problem History.
- c. Planned Use.
- d. Analysis Results, Root Cause.
- e. Last Test Able to Detect Anomaly.

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- f. Methods of Detecting In-Flight.
- g. Mission Effect.
- h. Explanation Rationale. (This is the most important part of the narrative.)
- i. Corrective Action for Subsequent Vehicles/Hardware/Software (recurrence control).

Note: If any of the above mentioned elements does not apply, please explain in a brief statement why it is not applicable.

3.1.2.5 Identify whether the issue is believed to be generic/systemic and supporting rationale.

3.1.3 Corrective Action Implementation

Directorates
or Offices

3.1.3.1 Record the corrective action implementation data (i.e., engineering orders, revised procedures/documents, revised training records/documents, completed facility modification paper, and completed transportation/shipping changes) in the CAS data base. If changes in procedures or instructions result from corrective actions, the RCAR will be referenced in the document change history as the reason for the change.

3.1.3.2 Begin implementation of those corrective actions which do not require management approval.

3.1.4 RCAR Review for Completion

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S&MA 3.1.4.1 Upon receipt of the completed RCAR package, S&MA shall, within 10 working days, assess the completeness of the data provided to support the closure of the RCAR.

3.1.4.2 If S&MA does not concur that the RCAR package is complete, the RCAR package will be annotated with the S&MA rationale for returning the RCAR to the responsible directorate or office.

3.1.5 Delinquent RCAR Responses

S&MA A list of delinquent RCARs will be forwarded monthly to the appropriate directorate or office with a copy to the Director, S&MA, indicating the original date of the DR and RCAR submission and the projected closure date.

Directorate or Office 3.1.5.1 The directorate or office with delinquent POC response(s) will contact the POC(s) involved and resolve difficulties regarding timely RCAR response.

POC with Delinquent RCAR Response 3.1.5.2 The POC having a delinquent RCAR response will be present at the Marshall Management System (MMS) Implementation Team meeting to status the RCAR.

3.1.6 Closure Process

S&MA S&MA will facilitate the CAB. The CAB will consist of the responsible Project Manager (Chair), Systems Engineer (if applicable), and S&MA. The CAB closure process is as follows:

S&MA 3.1.6.1 Consolidates RCAR disposition materials and notifies CAB members.

CAB Members 3.1.6.2 Review RCAR disposition material

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prior to formal action.

- | | | |
|-------------|---------|--|
| CAB Members | 3.1.6.3 | Review and concur with corrective action, ensuring that the root cause is identified and addressed to preclude recurrence. |
| CAB Members | 3.1.6.4 | Determine if issue is generic/systemic. |
| S&MA | 3.1.6.5 | If generic/systemic, initiates the process in MWI 1280.3. |
| CAB Members | 3.1.6.6 | Assign follow-up actions to ensure that planned corrective actions are taken and are effective. |
| S&MA | 3.1.6.7 | Records, tracks, and statuses action items assigned. S&MA will record these actions in the CAS data base. |
| S&MA | 3.1.6.8 | Enters approved RCARs for closure into the MSFC CAS data base. |

3.2 RCAR Processing Initiated by MWI 1280.2, "MSFC Customer Feedback System."

Actionee

Action

3.2.1 Screening Process

- | | | |
|------|---------|---|
| S&MA | 3.2.1.1 | Upon receipt of Customer Feedbacks, S&MA shall screen the Customer Feedbacks to determine if they require the initiation of an RCAR. <ul style="list-style-type: none"> a. Hardware/software nonconformances will be processed in accordance with MPG 8730.3 and section 3.1 of this procedure. b. Quality system nonconformances will be processed in accordance with section 3.3 of this procedure. |
|------|---------|---|

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3.2.1.2 Screening of Customer Feedbacks is as follows:

Customer Feedbacks which require Corrective Action	Customer Feedbacks which do not require Corrective Action
Non-Hardware/Software and Non-Quality System Complaints <ul style="list-style-type: none"> • Considered Significant • Potential Impact to Quality of the Product or Service 	Compliments

Figure 2. Customer Feedback Screening Criteria

3.2.1.3 If the Customer Feedback has been determined to require recurrence control under this section, S&MA shall initiate an RCAR using the CAS data base.

3.2.1.4 S&MA shall, within 5 working days of the initiation of the Customer Feedback, provide notification of the RCAR to the responsible organization(s).

3.2.2 Investigation

Organization-
al POC As
Assigned

The MSFC organizational POC receiving the RCAR shall respond to S&MA with its proposed approach within 10 working days of assignment (RCAR responses that are not provided in 10 working days from time of notification are considered delinquent unless S&MA is notified that an extension is required). The organizational POC will:

3.2.2.1 Access the on-line CAS data base at <https://msfcsmal.msfc.nasa.gov/> and determine if the problem can be closed as "corrective action not required" by using the screening criteria in Figure 2. If so, notify S&MA and request closure of the RCAR. If

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corrective action is required, proceed to step 3.2.2.2.

3.2.2.2 Investigate and determine the root cause.

3.2.2.3 Identify proposed corrective action(s).

3.2.2.4 Record the investigation results (reports, images, and analyses), root cause, and proposed corrective action or explanation into the CAS data base.

If a problem is understood to the point that only limited or no investigation is required, then the problem may be resolved by documenting the rationale as to why it is acceptable to proceed without corrective action. All of the following data elements must be addressed to close this problem as explained or as an unexplained anomaly.

- a. Problem Clarification.
- b. Problem History.
- c. Planned Use.
- d. Analysis Results, Root Cause.
- e. Explanation Rationale. (This is the most important part of the narrative.)

3.2.2.5 Identify whether the issue is believed to be generic/systemic and supporting rationale.

3.2.3 Corrective Action Implementation

Organization-
al POC As
Assigned

3.2.3.1 Record the corrective action implementation data (i.e., engineering orders, revised

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procedures/documents, revised training records/documents, completed facility modification paper, and completed transportation/shipping changes) in the CAS data base. If changes in procedures or instructions result from corrective actions, the RCAR will be referenced in the document change history as the reason for the change.

3.2.3.2 Begin implementation of those corrective actions which do not require management approval.

3.2.4 RCAR Review for Completion

S&MA

3.2.4.1 Upon receipt of the completed RCAR package, S&MA shall, within 10 working days, assess the completeness of the data provided to support the closure of the RCAR.

3.2.4.2 If S&MA does not concur that the RCAR package is complete, the RCAR package will be annotated with the S&MA rationale for returning the RCAR to the assigned organizational POC.

3.2.5 Delinquent RCAR Responses

S&MA

A list of delinquent RCARs will be forwarded monthly to the appropriate directorate, office, or MMS document OPR, with a copy to the Director, S&MA, indicating the original date of the Customer Feedback and RCAR submission and the projected closure date.

Directorate,
Office, or
MMS Document
OPR

3.2.5.1 The directorate, office, or MMS document OPR with delinquent POC response(s) will contact the POC(s) involved and resolve difficulties regarding timely RCAR response.

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POC with Delinquent RCAR Response 3.2.5.2 The POC having a delinquent RCAR response will be present at the MMS Implementation Team meeting to status the RCAR.

3.2.6 **Closure Process**

S&MA S&MA will facilitate the CAB. The CAB will consist of the MMS Management Representative (Chair), the Assigned Organization Management, and S&MA. The CAB closure process is as follows:

S&MA 3.2.6.1 Consolidates RCAR disposition materials and notifies CAB members.

CAB Members 3.2.6.2 Review RCAR disposition materials prior to formal action.

CAB Members 3.2.6.3 Review and concur with corrective action, ensuring that the root cause is identified and addressed to preclude recurrence.

CAB Members 3.2.6.4 Determine if issue is generic/systemic.

S&MA 3.2.6.5 If generic/systemic, initiates the process in MWI 1280.3.

CAB Members 3.2.6.6 Assign follow-up actions to ensure that planned corrective actions are taken and are effective.

S&MA 3.2.6.7 Records, tracks, and statuses action items assigned. S&MA will record these actions in the CAS data base.

S&MA 3.2.6.8 Enters approved RCARs for closure into the CAS data base.

3.3 RCAR Processing Initiated by MWI 1280.4, "MSFC Quality System Deficiency Notice System."

Actionee

Action

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3.3.1 Screening Process

S&MA

3.3.1.1 Upon receipt (hard copy or electronically) of QSDNs, S&MA shall screen the quality system deficiencies to determine if they require the initiation of an RCAR.

3.3.1.2 Screening of quality system deficiency notices is as follows:

Quality System Deficiencies which require Corrective Action	Quality System Deficiencies which do not require Corrective Action
<p>Nonconformances against the MMM, MPGs, MWIs, and other documentation applicable to the Levels 1-3 MMS documents for which the following apply:</p> <ul style="list-style-type: none"> • Document violates the ISO 9001 Standard • Document contains overlapping or inconsistent requirements with other documents • Policy, procedure, instruction, or applicable document is not or cannot be performed as specified • Statutory or regulatory requirements need to be considered or implemented into the document <p>Nonconformances against OIs that are potentially generic in nature. Generic or systemic problem identified by the Internal Quality Audit System.</p>	<p>Minor problems with Quality System Procedures:</p> <ul style="list-style-type: none"> • Spelling • Wording <p>Nonconformances against Organizational Issuances (OI) that are unique to an instruction and do not have generic applicability.</p>

Figure 3. Quality System Deficiency Notice Screening Criteria

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3.3.1.3 If the quality system deficiency has been determined to require recurrence control action, S&MA shall initiate an RCAR using the MSFC CAS data base.

3.3.1.4 S&MA shall, within 5 working days of the initiation of the quality system deficiency notice, provide notification of the RCAR to the responsible quality system document OPR or process owner.

3.3.2 Investigation

Document
OPR/Process
Owner

The document OPR/process owner receiving the RCAR shall respond to S&MA with proposed approach within 10 working days of assignment (RCAR responses that are not provided in 10 working days from time of notification are considered delinquent unless S&MA is notified that an extension is required). The document OPR/process owner will

3.3.2.1 Access the on-line CAS data base at <https://msfcsma1.msfc.nasa.gov/> and determine if the problem can be closed as "corrective action not required" by using the screening criteria in Figure 3. If so, notify S&MA and request closure of the RCAR. If corrective action is required, proceed to step 3.3.2.2.

3.3.2.2 Investigate and determine the root cause.

3.3.2.3 Identify proposed corrective action(s).

3.3.2.4 Record the investigation results (reports, images, and analyses), root cause and proposed corrective action or explanation into the CAS data base.

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If a problem is understood to the point that only limited or no investigation is required, then the problem may be resolved by documenting the rationale as to why it is acceptable to proceed without corrective action. All of the following data elements must be addressed to close this problem as explained

- a. Problem Clarification.
- b. Problem History.
- c. Analysis Results, Root Cause.
- d. Explanation Rationale. (This is the most important part of the narrative.)

3.3.3 Corrective Action Implementation

Document
OPR/Process
Owner

3.3.3.1 Record the corrective action implementation data (i.e., engineering orders, revised procedures/documents, revised training records/documents, completed facility modification paper, and completed transportation/shipping changes) in the CAS data base. If changes in policy, procedures, instructions, or any documents applicable to MMS documentation result from corrective actions, the RCAR will be referenced in the document history log or equivalent as the reason for the change.

3.3.3.2 Begin implementation of those corrective actions which do not require management approval.

3.3.4 RCAR Review for Completion

S&MA

3.3.4.1 Upon receipt of the completed RCAR

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package, S&MA shall, within 10 working days, assess the completeness of the data provided to support the closure of the RCAR.

3.3.4.2 If S&MA does not concur that the RCAR package is complete, the RCAR package will be annotated with the S&MA rationale for returning the RCAR to the document OPR/process owner.

3.3.5 Delinquent RCAR Responses

S&MA A list of delinquent RCARs will be forwarded monthly to the MMS Management Representative, with a copy to the Director, S&MA, indicating the original date of the QSDN and RCAR submission and the projected closure date.

MMS Management Representative 3.3.5.1 The MMS Management Representative will contact the POC(s) involved and resolve difficulties regarding timely RCAR response.

POC with Delinquent RCAR Response 3.3.5.2 The POC having a delinquent RCAR response will be present at the MMS Implementation Team meeting to status the RCAR.

3.3.6 Closure Process

S&MA S&MA will facilitate the CAB. The CAB will consist of the MMS Management Representative (Chair), responsible document OPR/process owner Management, and S&MA. The CAB closure process is as follows:

S&MA 3.3.6.1 Coordinates RCAR disposition and notifies CAB members.

CAB Members 3.3.6.2 Review RCAR disposition materials prior to formal action.

CAB Members 3.3.6.3 Review and concur with corrective

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action, ensuring that the root cause is identified and addressed to preclude recurrence.

- | | | |
|-------------|---------|---|
| CAB Members | 3.3.6.4 | Assign follow-up actions to ensure that planned corrective actions are taken and are effective. |
| S&MA | 3.3.6.5 | Records, tracks, and statuses action items assigned. S&MA will record these actions in the CAS data base. |
| S&MA | 3.3.6.6 | Enters approved RCARs for closure into the CAS Database. |

4. RECORDS

Hard copy records of DRs and Customer Feedbacks shall be maintained by S&MA for a minimum of 3 years, and the MSFC CAS electronic data base records will be maintained permanently by S&MA. QS-R-012, "S&MA (QS) Operation of the MSFC Corrective Action System," will document where and by whom the hard copy records will be maintained. This S&MA OI will also describe the electronic system backup methods and frequency of backup.

5. FLOW DIAGRAM

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