european space agency
agence spatiale européenne

Pages 1 to 16

ESA/SCC NON-CONFORMANCE

CONTROL SYSTEM

ESA/SCC Basic Specification No. 22800

space components
coordination group

Issue/Rev.	Date	Approved by	
		SCCG Chairman	ESA Director General or his Deputy
Issue 2	February 2002		

DOCUMENTATION CHANGE NOTICE

Rev. Letter	Rev. Date	Reference	CHANGE Item	Approved DCR No.
		This Issue supercedes Issue 1 and incorporates all the changes agreed in the following DCRs:-		
		Cover Page		221636
		DCN		None
		T of C	: Appendices: Appendix I deleted and subsequent Appendices renumbered	221636
		Para. 4.4	: Insert "Basic Specification No. 20800"	221636
		Para. 5.3	: Final Sentence, Appendix renumbered	221636
		Para. 6.1(c)	: Title, Appendices renumbered	221636
		Para. 6.2	: Title, Appendix renumbered	221636
		Para. 6.3.1	: Title, Appendices renumbered	221636
		Para. 6.3.2	: Title, Appendices renumbered	221636
		Para. 7.5	: Second alinea after document, "and is as shown in Appendix I of Basic Specification No. 20800.	221636
		Appendix I	,: Appendix I deleted, all subsequent Appendices renumbered	221636

TABLE OF CONTENTS

		Page
1.	INTRODUCTION	5
2.	APPLICABILITY	5
3.	APPLICABLE DOCUMENTS	5
4.	TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS	5
4.1	Non-conformance	5
4.2	Materials Review Board (MRB)	5
4.3	Waiver	6
4.4	Documentation Change Request (DCR)	6
4.5	Non-conformance Control Sheet (NCCS)	6
4.6	Classification of Non-conformances	6
5.	NON-CONFORMANCE SYSTEM	6
5.1	Purpose	6
5.2	Initiation	7
5.3	Non-conformance Procedures	7
6.	NON-CONFORMANCE DOCUMENTATION	7
6.1	General	7
6.2	Completion of Non-conformance Control Sheets	7
6.2.1	Identification Section	7
6.2.2	Description Section	8
6.2.3	Resolution Section	8
6.2.4	Close-out Section	9
6.3	Continuation Sheet(s) and Non-conformance Summary	9
6.3.1	Continuation Sheet(s)	9
6.3.2	Non-conformance Summary	9
6.4	Identification of Non-conformance Control Sheets	10
6.5	Distribution of Non-conformance Control Sheet	10
6.6	Notification of ESA/SCC	11
6.6.1	General	11
6.6.2	Common Telex Form	
7.	NON-CONFORMANCE REVIEW BOARDS	12
7.1	Local Materials Review Board (Level 1)	12
7.1.1	Responsibilities	12
7.1.2	Composition	12
7.1.3	Disposition	12
7.2	ESA/SCC Materials Review Board (Level 2)	13
7.2.1	Responsibilities	13
7.2.2	Composition	14
7.2.3	Disposition	14
7.3	Identification and Segregation of Non-conforming Material	14
7.4	Waiver Requests	14
7.5	Documentation Change Requests (DCR)	15
7.6	Failure Analysis	15

		Page
8.	CORRECTIVE AND PREVENTIVE ACTIONS	16
9.	CLOSE-OUT	16

APPENDICES

I Flow Diagram of Non-conformance Procedure
II Non-conformance Control Sheet
III Non-conformance Control Sheet (Continuation Sheet)
IV Non-conformance Summary

1. INTRODUCTION

This document specifies the requirements for the reporting and control of non-conformances identified in ESA/SCC-qualified components or components under ESA/SCC qualification and for the eventual disposition of affected materials. In case of component procurement, the document is recommended to be also applied by Users to the extent mentioned herein.

2. APPLICABILITY

The procedures specified in this document shall be applied by all ESA/SCC-certified inspectors or inspectors acting on behalf of ESA/SCC, including nominated chief inspectors employed by component manufacturing companies.

3. APPLICABLE DOCUMENTS

The requirements of the following ESA/SCC specifications form part of this specification. The relevant issues shall be those in effect on the date on which the purchase order is placed for the components in question, or - for qualification - on the date agreed between ESA/SCC and the Manufacturer.

(a) ESA/SCC Basic Specification No. 20100, Requirements for the Qualification of Standard Electronic Components for Space Application.

(b) ESA/SCC Basic Specification No. 20200, Requirements for the Evaluation of a Manufacturer for the Manufacture and Supply of Standard Electronic Components for Space Application.

(c) ESA/SCC Basic Specification No. 20600, Requirements for the Evaluation of Standard Electronic Components for Space Application.

(d) Generic and Detail Specifications applicable to the components in question.

(e) Relevant Process Identification Document (P.I.D.).

4. TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS

The terms, definitions, abbreviations, symbols and units specified in ESA/SCC Basic Specification No. 21300 shall be applicable. In addition, the following definitions are used:-

4.1 NON-CONFORMANCE

The departure of a characteristic from the requirements specified in the applicable documentation.

4.2 MATERIALS REVIEW BOARD (MRB)

A Materials Review Board (MRB) is a formal authority (established in accordance with Paras 7.1 and 7.2) responsible for the disposition of non-conforming materials. The Board's responsibilities include, but are not limited to:-

(a) The disposition of non-conforming devices, including the issue of instructions for the rework or retesting thereof.

(b) The approval of corrective actions to be taken to prevent recurrence.

(c) The request and review of failure analyses and any other reports deemed necessary.

(d) The distribution of non-conformance reports and maintenance of non-conformance record summaries.

4.3 WAIVER

A written authorisation to accept an item which, during production or after inspection, is found to depart from the specified requirements, but is nevertheless considered suitable for use "as is" or after rework by an approved method.

A distinction shall be made between a lot waiver and a Manufacturer waiver. The lot waiver is granted only when a non-conformance is typical of an entire lot; a Manufacturer waiver is granted only to a specific Manufacturer (e.g. in the case where he may wish to use an alternative test circuit).

If a Manufacturer waiver has been granted, a special note is included in the qualification certificate.

4.4 DOCUMENTATION CHANGE REQUEST (DCR) (SEE APPENDIX I, BASIC SPECIFICATION No. 20800)

A Documentation Change Request is an official ESA/SCC form for completion by ESA, National Space Agencies or Users of ESA/SCC documents for proposed changes to any ESA/SCC-controlled documents.

4.5 NON-CONFORMANCE CONTROL SHEET (NCCS) (SEE APPENDICES II AND III)

A Non-conformance Control Sheet is a form used to describe and report non-conformances and to record action taken, dispositions and corrective actions taken to prevent recurrence.

4.6 CLASSIFICATION OF NON-CONFORMANCES

All non-conformances are classified according to their severity as either minor or major. Any departure of a characteristic from the specified requirements which can be remedied by a corrective action and does not contravene the applicable ESA/SCC documentation is deemed to be a MINOR non-conformance and is dealt with by a Level 1 Materials Review Board (see Section 7, Para. 7.1). All other deviations are deemed MAJOR non-conformances and are dealt with by a Level 2 Materials Review Board (see Section 7, Para. 7.2).

5. NON-CONFORMANCE SYSTEM

5.1 PURPOSE

The non-conformance system detailed herein ensures that:-

(a) The non-conformance is identified and actions are taken accordingly.

(b) Decisions on the disposition of non-conforming components, or component lots, are properly taken and documented.

(c) Non-conformance reports are processed according to an established system.

(d) Investigations and analyses of non-conforming materials are made to assess failure modes, mechanisms and effects, and that subsequent corrective action is devised and implemented.

(e) The frequency and history of non-conformances are reviewed systematically and, when necessary, preventive action is initiated.

(f) Any action to correct a non-conformance and to prevent its recurrence is carried through to its conclusion.

(g) Components not conforming to the requirements of the applicable specifications or other requirements are identified as such, segregated and held for review.

5.2 INITIATION

The non-conformance system may be invoked by any person having detected a non-conformance. The system is especially designed for use by ESA/SCC inspectors employed by National Space Agencies and authorised personnel acting on behalf of ESA/SCC, including nominated chief inspectors and quality assurance personnel of manufacturing companies. If, during procurement, a component User identifies a non-conformance, he may invoke the non-conformance system. The chief inspector shall be responsible for the correct initiation of the system in any case of non-conformance.

5.3 NON-CONFORMANCE PROCEDURES

All non-conformances shall be notified by means of a Non-conformance Control Sheet (NCCS) to a Materials Review Board. The requirements and procedures for the ESA/SCC Non-conformance System are outlined in the following paragraphs. The overall flow diagram is provided in Appendix I.

6. NON-CONFORMANCE DOCUMENTATION

6.1 GENERAL

Non-conformance documentation shall comprise:-

(a) The non-conformance control sheet (NCCS) in which are described, initially, the details of the non-conformance and, later, the failure analysis, the Materials Review Board's decision and conformation that all necessary actions have been carried to their conclusion.

(b) One or more continuation sheets for additional information if the section for describing the non-conformance, failure analysis and MRB decision is insufficient.

(c) A cumulative non-conformance summary sheet (see Appendix IV).

6.2 COMPLETION OF NON-CONFORMANCE CONTROL SHEETS (NCCS) (SEE APPENDIX II)

6.2.1 Identification Section

Section 1, "Identification", shall comprise the following information:

- Details of the component family, type and relevant ESA/SCC specifications.
- Full ESA/SCC component marking, including the required testing level, variants, lot number, date code, serial number or, if applicable, range of serial numbers.

The NCCS shall be allocated a number by the Manufacturer's chief inspector (see Para. 6.4) who shall control NCCS identification by means of a non-conformance summary (see Para. 6.3.2). In the case of procurement, details of the purchase order and the Orderer shall be included.

6.2.2 Description Section

Section 2, "Description" shall be completed in full by the person having identified the non-conformance. He shall indicate the occasion during which the non-conformance occurred and list any relevant reference documents such as process instructions, test procedures, etc.

In this section, the symptoms of the observed non-conformance shall be characterised as accurately as possible. In particular, the following points shall be listed:

- The manufacturing or testing procedure at which the non-conformance occurred.
- The measured versus specified values, including tolerances, and precise details of the document and paragraph numbers against which the non-conformance has been noted.

The text shall include any other information deemed necessary and a description of the suspected cause of failure to provide for full comprehension of the non-conformance.

The initiator of an NCCS shall complete the last line of this section by entering his name and the date. The nominated chief inspector of the Manufacturer, where he is not the initiator, shall countersign to certify the correctness of the entry. In addition, the chief inspector shall indicate to which level the NCCS has to be classified.

In the case, where the NSA inspector has witnessed the identification of the non-conformance and agrees with the classification, he shall sign the corresponding box.

6.2.3 Resolution Section

Section 3, "Resolution", shall be completed by the MRB and shall document the cause of the non-conformance, all decisions taken and actions to be implemented, the name(s) of the person(s) responsible for such actions, and the dates on which they were - or will be - performed. Actions decided upon shall include, but not be limited to:

- Disposition for corrective action.
- Disposition of the actual product that is the subject of the non-conformance (e.g. whether or not it can be of further use).
- Any preventive measures taken.

Decisions of the MRB shall be unanimous and the NCCS shall be signed by all Members. The signatures of MRB Members and the date and place of the meeting shall be shown in the appropriate sections.

6.2.4 Close-out Section

This section shall be signed by the person responsible for the implementation of the MRB decisions to confirm that they have been fully complied with. The inspector of the National Space Agency concerned shall certify that, as a result of repair work and/or any other necessary corrective actions (e.g. the modification of applicable documents), all remedial actions have been taken in respect of the non-conformance.

6.3 CONTINUATION SHEET(S) AND NON-CONFORMANCE SUMMARY

6.3.1 Continuation Sheet(s) (see Appendix III)

If the space available for any entry in the Non-conformance Control Sheet is insufficient, one or more continuation sheets shall be used. The person completing such sheets shall specify to which section of the NCCS each additional sheet refers and place his signature thereon. Reference to any continuation sheet(s) shall be clearly made on the NCCS itself.

6.3.2 Non-conformance Summary (see Appendix IV)

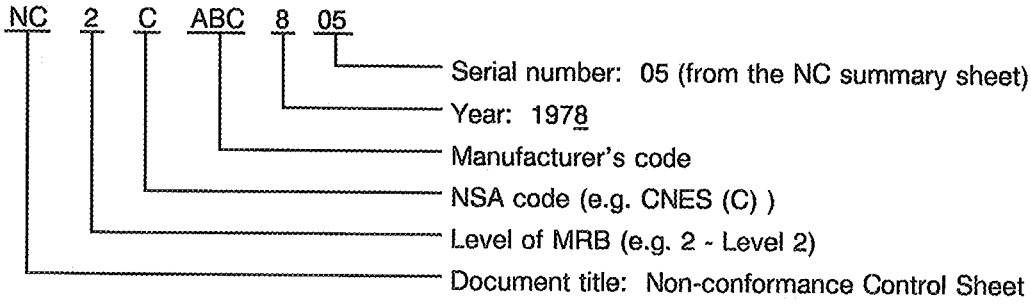
All Non-conformance Control Sheets shall be listed in a Non-conformance Summary. The consecutive numbering of Non-conformance Control Sheets shall be controlled by means of this summary. The number, date of occurrence and a brief description of the non-conformance shall be entered in this summary together with the progress made during its resolution. Thus, the Non-conformance Summary will serve as an overall situation report for the progress and follow-up of remedial actions. The Non-conformance Summary shall be kept by the Manufacturer's chief inspector. A copy of it shall be sent quarterly to the Qualifying Space Agency concerned and to ESA/SCC for inclusion in the qualification maintenance documentation.

6.4 IDENTIFICATION OF NON-CONFORMANCE CONTROL SHEETS

Each NCCS shall be identified by a number to be allocated according to the following system:-

Level of MRB (Level 1 or 2)	:	1 numerical digit
NSA - Code	:	1 letter
Manufacturing Code	:	3 letters (AAA to ZZZ)
Identification (last numeral of current year)	:	0 to 9
Serial number	:	01 to 99

For example:-



6.5 DISTRIBUTION OF NON-CONFORMANCE CONTROL SHEET

For both non-conformance levels (see Para. 4.6), copies of the Non-conformance Control Sheet shall be sent to the Members of the relevant MRB immediately upon completion of the "Identification" and "Description" sections (see Paras 6.2.1 and 6.2.2) by the Chief Inspector. In case of urgency, the use of telecopy equipment (see Paras 6.6.1 and 6.6.2) is recommended. After close-out by the MRB (see Para. 9), the NSA inspector shall be responsible for definition of the distribution list and distribution itself.

For both non-conformance levels, the standard distribution list shall include as a minimum:

- The Chief Inspector of the Manufacturer.
- The Qualification Manager of the Manufacturer.
- The NSA inspector concerned.
- ESA/SCC (level 1, for information only).
- The NSA concerned for incorporation in the qualification report (but only after "close-out").
- The Orderer (in case of procurement).
- Other persons concerned.

In the case of level 1, the original NCCS shall be kept by the Chief Inspector and, in the case of level 2, by the responsible NSA inspector.

6.6 NOTIFICATION OF ESA/SCC

6.6.1 General

On the occurrence of a level 2 non-conformance, ESA/SCC shall be notified by the Chief Inspector within two working days. For this purpose, the use of a standard telex message form is recommended. Prior to arranging a Materials Review Board meeting in respect of level 2 non-conformances, the NSA inspector shall notify ESA of the date and location planned for the meeting as well as the names of the MRB Members. For notification of any level 2 non-conformances, the following format shall be used for the telex message.

6.6.2 Common Telex Form

To: ESA/SCCG Secretary and MRB Members (see Para. 7.2.2)

From: Chief Inspector (Name, company)

Subject: Non-conformance level 2, SCC components.

1. Identification

   NC ..... (to be specified - see Para. 6.4)

   Manufacturer ..... (Name)

   Component family .....; Generic Specification No. .....

   Full component marking .....; Detail Specification No. .....

   Lot No. .....

   Serial No. ..... (if applicable).

2. Non-conformance description

   Identified during: ..... (e.g. procurement, qualification, testing, etc.)

   Location: ..... (e.g. precap, end-measurement Chart IV, Subgroup 3)

   Ref. document: ..... (e.g. manufacturing procedure document No.)

   Date: .....

   Description: .....

   Suspected cause: ..... (if applicable)

   Recommended actions: .....

   Date of MRB: ..... (planned date)

7. NON-CONFORMANCE REVIEW BOARDS

7.1 LOCAL MATERIALS REVIEW BOARD (LEVEL 1)

7.1.1 Responsibilities

Level 1 non-conformances shall be the responsibility of a local MRB. During its investigation, the local MRB shall:

- Decide on the disposition of affected items.
- Determine corrective and preventive actions to rectify the causes(s) of non-conformance and to prevent their recurrence.

The MRB shall take action within two days of the issue of a NCCS and subsequently enter its decisions in the appropriate section of the NCCS.

7.1.2 Composition

A local MRB shall be composed, as a minimum, of the following persons:

- Chief Inspector of the Manufacturer (Chairman).
- NSA inspector.
- Responsible engineer of Manufacturer.
- Representative of the Orderer (in the case of procurement).

Members of the MRB may call in specialists as required, but these shall have no voting rights.

7.1.3 Disposition

In determining the disposition and corrective action to be taken, the Board shall:

- Take all necessary action to investigate the cause(s) of non-conformance.
- Review the records of previous actions applicable to similar or identical cases.
- Consider the recommendations of specialists acting in an advisory capacity.
- Initiate failure analysis of failed items, if appropriate.
- Consider and record the effects of the non-conformance on contractual requirements.

Non-conforming components and/or materials and all relevant documentation shall be collated by the Manufacturer's Chief Inspector and made available to the MRB. Based on its findings, the MRB shall then decide which of the following procedures may be applicable:-

(a) Rejection from inspection lot

The materials (e.g. wafers or components) which fail the requirements (e.g. SEM inspection) shall be eliminated from the inspection lot.

(b) Return for completion of operations, rework or screening

If the non-conformance belongs to the category of "return for completion of operations" or "return for rework to drawings, specifications and procedures", the article or materials shall be returned for rework or completion in accordance with the established technical documents and operations. During, and at the end of such rework, the item shall be resubmitted to normal inspection.

(c) Submission of the matter to the higher level MRB (i.e. Level 2)

If the item is obviously unsuitable for use, it shall be disposed of in accordance with the approved procedures for identification, control and disposition of scrap.

The decisions of the MRB shall be unanimous. In the case where no agreement can be reached, the level 1 MRB shall refer the matter to the level 2 MRB for a decision.

7.2 ESA/SCC MATERIALS REVIEW BOARD (LEVEL 2)

7.2.1 Responsibilities

The ESA/SCC Materials Review Board (Level 2) shall be responsible for all decisions on level 2 non-conformances. After analysis of the non-conformance, the Board shall:

- Decide on the disposition of affected items.
- Determine corrective and preventive actions to rectify the causes(s) of non-conformance and to prevent their recurrence.
- Propose changes of specifications, drawings or procedures as appropriate.

(Note: The NCCS shall be considered as a waiver if changes are required in documents which were frozen after the evaluation phase).

7.2.2 Composition

The ESA/SCC MRB shall be composed, as a minimum, of the following persons:

- NSA Inspector (Chairman).
- Chief Inspector of the Manufacturer.
- Qualification Manager of the Manufacturer.
- ESA/SCC Representative having acceptance authority.
- Representative of the Orderer (if applicable).

Members of the ESA/SCC MRB may call in specialists as required, but these shall have no voting rights.

The decisions of the Board shall be unanimous. In the case where an Orderer does not agree to the Board's decision, the Board will order the removal of SCC marking from all items affected by the decision. The Manufacturer shall however be expected to take such preventive actions as have been determined by the Board. Failure to comply with such decisions may affect the qualification status of the items involved.

7.2.3 Disposition

In addition to the actions stated for the Level 1 MRB (see Para. 7.1.3), the ESA/SCC MRB may wish to consider any of the following:

- The use "as is" (i.e. without any rework).
- The use "as is", but relevant documentation to be modified.
- Rejection of all or part of the lot.
- Removal of SCC marking from the non-conforming components.

7.3 IDENTIFICATION AND SEGREGATION OF NON-CONFORMING MATERIAL

The Manufacturer shall properly identify non-conforming material and establish a quarantine store to prevent its inadvertent use.

The NSA inspector shall supervise the correct identification and segregation of non-conforming material when segregation is decided upon by a MRB.

7.4 WAIVER REQUESTS

With regard to non-conformances of Level 2, overall waiver requests will not be considered. The NCCS, signed by the ESA/SCC Representative, will constitute an approved waiver, but - unless otherwise stated on the NCCS - will be limited only to the non-conformance concerned.

7.5 DOCUMENTATION CHANGE REQUESTS (DCR)

A MRB at either Level 1 or Level 2 is not authorised to make changes of any kind in ESA/SCC specifications. In the case where the outcome of a MRB investigation indicates that a change is necessary or desirable, a proposal shall be submitted to ESA/SCC in the form of a Documentation Change Request (DCR).

A DCR is a formal ESA/SCC document and is as shown in Appendix I of Basic Specification No. 20800 which, in addition to particulars as to its origin, calls for a description of the proposed change, the justification thereof, and the proposed new text, criteria, etc. Normally, DCR's are submitted by the National Space Agency or ESA. However, any User of the ESA/SCC System may submit a DCR through a National Space Agency, provided such DCR is fully and correctly completed.

Standard DCR forms may be obtained from the National Space Agency or ESA/SCC. In general, when a DCR is received which affects components under ESA/SCC qualification, any activities in progress on the subject components will be stopped until the ESA/SCC Approval Authority has considered the DCR and decided if it is acceptable or otherwise.

In the case of procurement, the Orderer may authorise the Manufacturer to proceed in accordance with the proposed change if this change is acceptable to him. However, if ESA/SCC reject the DCR, or if a decision is not available prior to delivery of the components, the SCC marking shall not be used.

7.6 FAILURE ANALYSIS

Failure analysis of non-conforming material shall not be performed without specific authorisation from the relevant MRB. The MRB shall specify the type of analysis to be performed and the information required.

Non-conformances which involve the rejection of a qualification lot shall be analysed to determine the exact cause of non-conformance. A summary of the results of the analysis, when agreed by the MRB, shall be documented on the NCCR.

8. CORRECTIVE AND PREVENTIVE ACTIONS

Corrective and preventive actions shall form part of the MRB decision. Methods and procedures for corrective actions, especially repair or rework methods, shall be specified by the MRB and include any new acceptance criteria. Preventive measures may include:-

(a) Correction of Manufacturer's drawings, process, procedure or other technical documents.

(b) Correction of other identical items or materials at all locations.

(c) Technical analyses, such as stress analyses, operation analyses, FMECA drift analyses, etc.

The MRB shall nominate a person to be responsible for the follow-up and completion of corrective and preventive actions.

9. CLOSE-OUT

The last two lines on the NCCS allow for the confirmation and verification of the implementation of the MRB disposition. The NSA Inspector and the Chief Inspector shall ensure, through actual inspection, that all actions are completed. Close-out requires that, at least:-

(a) Corrective actions have been accomplished.

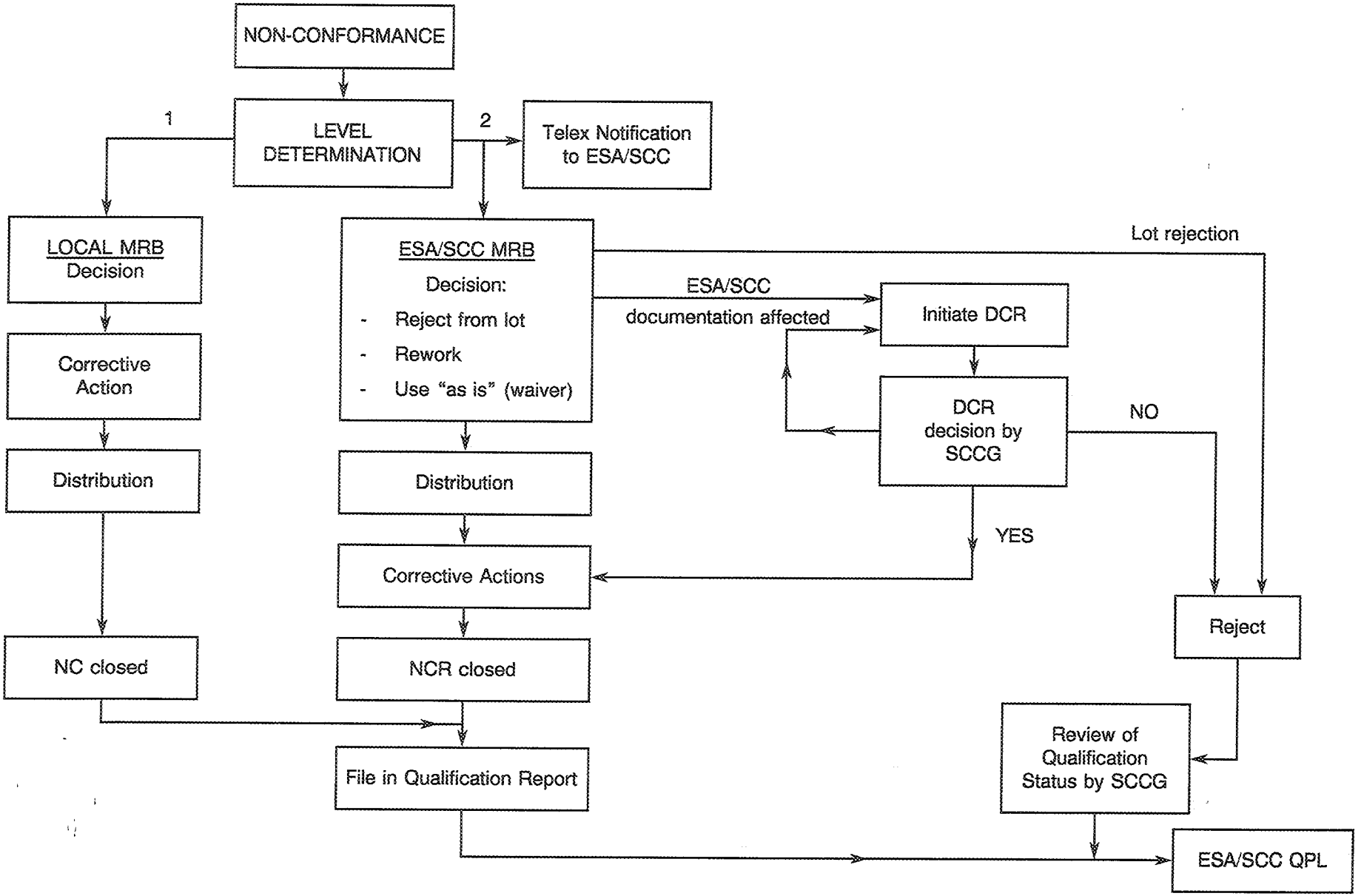
(b) The effectivity of preventive actions has been proven.

(c) The necessary design or documentation changes have been accomplished and verified by tests if so decided by the MRB.

(d) Preventive actions have been taken also in respect of identical material.

(e) The NCCS is signed off by the Chief Inspector and the NSA Inspector to evidence the technical review and completion of all actions decided upon by the MRB.

FIGURE 3 - FLOW DIAGRAM OF NON-CONFORMANCE PROCEDURE



APPENDIX I

APPENDIX II

Non-Conformance Control Sheet

NC

Date: Page(s) 1/

(1) Identification

Component Family		ESA/SCC Generic Spec No.	Issue:
ESA/SCC Comp. Type. No.	Purchase Order No. Order placed by	ESA/SCC Detail Spec. No.	Issue:
Manufacturer Name:		Plant Location	
Lot No	Date Code	Serial No or Range	

(2) Description

NC detected at: (other stage): Qualification ☐ Procurement ☐ Receiving Inspection ☐

Manufacturing	In-process Inspection	Precap Visual Insp	Final Prod. Tests	Burn-in or Screening	Lot Accept.
☐	☐	☐	☐	☐	☐

Non-conformance Description:

(a) Observed non-conformance

(b) Suspected cause

Initiator: Date:	Chief Inspector: Date:	NSA Inspector: Date:	Level 1 ☐ 2 ☐

(3) Resolution

Place of MRB: Date:	MRB Members (Name and Signature):	DCR required ☐ yes ☐ no
		As Waiver ☐ yes ☐ no

Actual cause of non-conformance:

MRB Decision and Actions (incl Individual(s) responsible for Action(s) and due Date(s)):

(4) Close-out

MRB decision implemented	Name: (Chief Insp):	Signature and Date:
Certification NSA Inspector	Name:	Signature and Date:

Distribution: ESA/SCC, Chief Inspector, NSA Inspector, Qualification Repr

APPENDIX III

SCC	**Non-Conformance Control Sheet** **Continuation Sheet**	NC Date: Page

to point..... of non-conformance report

SCC

Non-Conformance Summary

NCCS-No.	Short description	Date	MRB level	Cause eliminated?	Corrective actions carried out?

Name of Chief Inspector:	Manufacturer's name: Plant Location:	Issue: Date: