

OFFICE OF MANNED
SPACE FLIGHT

APOLLO PROGRAM

PREPARATION OF CONTRACTOR QUALITY PROGRAM PLAN

BASED ON
NPC200-2

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PREFACE

This guideline, Preparation of a Contractor's Quality Program Plan, is provided to assist contractors in the preparation of the Quality Program Plan as required by NPC 200-2, Quality Provisions for Space System Contractors. The use of this guideline will assure a contractor that he has considered all of the required quality program provisions in his Plan. Comments and questions concerning this publication should be referred to the Apollo Program Office, Reliability and Quality Assurance, NASA, Washington, D. C. 20546



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I. INTRODUCTION

Contractors who have NPC 200-2, Quality Provisions for Space System Contractors, delineated as the contractual quality assurance requirements document are required to prepare, maintain, and submit a Quality Program Plan. This Plan is a documented description of the contractor's program for implementing the quality provisions of the contract.

The final Quality Program Plan may be developed in three stages:

- a. A preliminary plan meeting the requirements set forth by the quality assurance provisions of the Request for Proposal.
- b. A preliminary plan meeting the requirements of NPC 200-2, paragraph 3.1.1, to be submitted after contract award.
- c. The final Quality Program Plan resulting from further detailing and expansion of the preliminary plan to meet the requirements of NPC 200-2 and/or any other contractual quality provisions.

This guideline is provided to assist the contractor in the preparation of the final Quality Program Plan. Some of the paragraphs contained in this guideline will also be of assistance as appropriate in the preparation of the contractor's post-award preliminary plan.

The numbered paragraphs of Section II of this guideline provide an outline with a brief description of the quality assurance elements that must be included in the Quality Program Plan to meet the requirements of NPC 200-2. The numbers in parentheses following the paragraph titles are the referenced paragraphs of NPC 200-2 defining the specific requirements. Contractual additions, deletions, or changes to the requirements of NPC 200-2 (See Section II, paragraph 4) must be reflected in the Plan.

All applicable implementing procedures that are available at the time of preparation of the Plan should be referenced by title and number in the appropriate paragraphs and attached to the Plan to provide a complete package of information. For those requirements where implementing procedures are not available, the procedures should be referenced and notation made as to future submission to the cognizant NASA installation.

To ensure full consideration of the provisions of NPC 200-2, it is suggested that the format as outlined in this guideline be followed in the preparation of the Plan.

II. QUALITY PROGRAM PLAN CONTENT

1. Title Page

- a. Title of document.
- b. Contractor's name and address.
- c. Equipment or article under contract.
- d. Contract number or Purchase Order number.
- e. Date of document.
- f. Name and title of person responsible for document.
- g. Signature or other indication of management approval.

2. Table of Contents

3. Revision Index

4. Introduction (1.2)

An introduction to the Quality Program Plan including any contractual additions, deletions, or changes in the provisions of NPC 200-2.

5. Organization Chart (3.1.1 and 3.2)

A chart or charts of the contractor's organization having cognizance over the contract. This should show the relationship of the quality assurance organization with respect to the entire organization. It should be emphasized that the person responsible for directing the quality program has direct access to top management.

Details of this chart or a separate chart, if desired, should show the specific segments of the quality assurance organization, their functions and responsibilities, and indicate participation in other contractor functions such as engineering, purchasing, reliability, etc.

6. Flow Chart (3.1.1)

A flow chart showing specific quality operations starting at contract award and continuing through delivery of the articles, i.e., Design Review Participation, Purchase Order Review, Inspection and Test Operations, etc.

7. Quality Program Documentation (2.2 and Appendix B)

A listing of the required documents to be submitted to NASA with the schedule of submittal and type of submittal (Approval, Review, or Information). This may be a milestone chart showing submittals as events with relation to other events of the program.

8. Change Control (2.3)

A description of the system for the control of all documents affecting the quality program, providing for incorporation of changes thereto, distribution to the proper points, correct usage, and removal of obsolete documents to ensure that articles are manufactured, inspected, and tested to latest applicable drawings and specifications. This should include provision for retention of inspection records that indicate incorporation of changes and define points of effectivity of changes, and for physical identification of changed articles.

9. Drawing and Specification Review (4.2)

A description of the program for the design review of drawings, specifications, and technical documents to establish the characteristics which determine quality and reliability of the system and provide criteria to judge conformance to these characteristics. This should include the participating organizational elements with their specific responsibilities, and the output documents and distribution.

10. Qualification Tests (4.3)

A description of the qualification testing program for all parts and levels of assembly, including requalification and maintenance of qualification status lists. For those contracts having NPC 250-1 invoked as the reliability requirement document, it should be shown that this program is compatible with, and part of the overall parts and materials program as defined in Section 3.9 of NPC 250-1.

11. Establishment and Maintenance of Identification (4.4, 5.7, 7.5.2)

A description of the contractor methods for:

- a. Identification of materials, processes, and design parameters in design documentation to indicate their relationship and means of associating measured results with particular articles.
- b. Identification by part number.
- c. Determining which articles are to be controlled by serialization, lot numbering, or date coding, or none.
- d. Application of serialization, lot numbering, or date coding of articles, and the record keeping of this information.
- e. Incoming material identification.
- f. Fabricated material identification.

12. Selection of Procurement Sources (5.2)

A description of the system used to evaluate and select sources for procurement showing the use of previous quality records and capability surveys.

13. Procurement Documents (5.3)

A description of the provisions to be included in procurement documents and the requirements for the review of procurement documents by the quality organization.

14. Incoming Materials Control

A description of the contractor program for control of incoming materials covering:

- a. Source inspection. (5.5)
- b. Incoming inspection. (5.6)
- c. Special handling and environments. (5.6)
- d. Contractor-supplier coordination of test equipment and correlation of test procedures. (5.10)
- e. Supplier rating and preferred source lists. (5.9)

15. Control of Government Furnished Property (GFP) (Section 6)

A description of the program for control of Government furnished property, including defective GFP.

16. Inspection and Test Planning (7.2) (7.3)

A description of the inspection and test planning function including an outline of the general plan with a flow chart showing graphically the relative location of all inspection and test operations through the manufacturing process including end-item tests. Included in the plan should be reference to documented acceptance criteria to determine conformance of all articles to the specification, and reference to the selection and preparation of workmanship standards to meet the quality requirements of the contract with provisions for the control of these standards (7.3.3).

17. In-Process Test and Inspection (7.3.1, 7.3.2, 7.4.1)

A description of the test and inspection operations depicted in the flow chart with reference to applicable procedures.

18. End-Item Tests and Final Inspection (7.4.2)

A description of the End-Item Test Plan and proposed test and inspection procedures for implementing the Plan. This should include the level of effort intended for end-item testing, a description of new facilities that would be required for end-item testing, and a time-phased schedule showing the development of the Plan and specific procedures in relation to hardware events, and submittal schedule of the procedures.

19. Control of Production Tooling (7.5.1)

A description of the program for control of production tooling, jigs, fixtures, etc., which control dimensions, contours, or location of fabrication operation to ensure accuracy and repeatability during use.

20. Material Control (7.5.2)

A description of the system for the control of fabrication material including identification, protection, marking, and removal of nonconforming articles. Provisions should be shown for the control of articles having definite characteristics of quality degradation with age or use.

21. Cleanliness Control (7.5.3)

A description of the controls for maintaining the required cleanliness of fabrication and test areas (clean rooms, etc.). Include a description of these areas and their specified environments.

22. Process Control (7.5.4, 7.5.4.1, 7.5.4.2)

A description of the program for control of special fabrication processes, special inspection processes, the use of special process control procedures, and the maintenance of special environments. The special processes and special inspection processes included in this program should be identified.

23. Process Certification (7.5.4.3)

A description of the program for certification of special processes, machines, and equipment including a listing of the specific processes and equipment that require certification with the methods for certification. The applicable specifications and standards should be referenced.

24. Nonconforming Material (Section 8)

A description of the entire program for control of nonconforming material including:

- a. Definition of nonconforming material.
- b. Identification
- c. Reporting.
- d. Segregation facilities.
- e. Preliminary review and disposition.
- f. Material Review Board.
- g. Subcontractor MRB.

25. Inspection, Measuring, and Test Equipment (Section 9)

A description of the program for control of all inspection, measuring, and test equipment including tools, jigs, and fixtures used for measurement.

The following items should be described:

- a. Calibration program including responsibilities for calibration, determination of frequency of calibration, and generation of calibration procedures. (9.2)
- b. Calibration standards and facilities. (9.3)
- c. Equipment evaluation program. (9.4)
- d. Maintenance and control. (9.5)
- e. Reference to applicable procedures. (9.6)
- f. Maintenance of records. (9.7)

26. Inspection Stamp System (Section 10)

A description of the inspection stamp, decal, or seal system which clearly identifies the inspection status of articles at all points in the manufacturing process. The identification modes should be shown as being different from Government agency identification and providing traceability to the individual performing tests or inspections.

27. Preservation, Packaging, Handling, Storage, and Shipping (Section 11)

A description of the procedure for preservation, packaging, handling, storage, and shipping to provide the necessary protection to all articles throughout the scope of the contract to prevent damage, loss, deterioration degradation, and substitution and to ensure completeness and proper identification.

28. Statistical Analysis and Sampling Plans (Section 12)

A description of the statistical techniques and the sampling plans that will be used for the required control of quality, including the types of items and the degree of application where sampling plans will be used. Sampling plans specified in the contract should be identified. Alternate plans should be described and provision for NASA approval should be indicated.

29. Personnel Training (13.1)

A description of the program for training specific personnel who have an effect on the quality of the article. The jobs that require specifically trained personnel, the kinds of training to be given to them, and the responsibility for determining need and developing curricula should be included in this description.

30. Certification of Personnel (13.2)

A description of the program for certification of certain fabrication and inspection personnel, certification recording, and recertification requirements. The specific jobs that require certified personnel should be listed and the methods used for the certification and recertification of these personnel should be defined.

31. Data Reporting (14.1, 14.2)

A description of the program for the collection, analysis, and distribution of all trouble, failure, and quality data resulting from testing, inspecting, and usage of the article showing responsibilities for implementation.

This description should define all forms and documents associated with data collection including a description of their use.

32. Corrective Action (5.8 and 14.3)

A description of the program for the feedback of information on all troubles malfunctions, deficiencies, and failures with the associated follow-up and corrective action.

33. Quality Audit (Section 15)

A description of the program for auditing the adequacy of quality program procedures, inspections, tests, process controls, and process and personnel certification. This should include responsibilities for initiation and implementation of audits, generation and distribution of reports, and corrective action procedures.