



## Guide

**Guide Number: SNS-QA-G02**

**Date: May 3, 2002**

**Revision: 0**

**Title: Software Development Quality Assurance Guide**

---

Copies: This document is available on the [SNS web site](#). If you are working with a copy, you should periodically verify that it is the current revision number.

---

### Purpose

To define an acceptable process for meeting Quality Assurance (QA) requirements for developing or acquiring software, or equipment containing software, associated with the Spallation Neutron Source (SNS). This guide implements part of the SNS Quality Assurance Plan, SNS-QA-P01; Criterion 5, Work Processes; Criterion 6, Design; and Criterion 7, Procurement.

### Scope

This guide is to be used for the development or acquisition of software (including hardware with embedded software) that is either designed for SNS; is a modified commercial off-the-shelf product (COTS); requires testing or inspection, such as those in industry recognized standards for software; is part of an identified safety significant or safety class structure, system, or component (see reference 5).

### Responsibilities

#### Task Leader

- Identifies a need for the software and obtains funding authority for it.
- Grades the QA Level of the software using Table 1 of reference 1, assisted by the QAR.
- Writes a requirements document to guide the developer(s), in which the thoroughness of inspection and testing, qualifications of developers, independence of reviewers and testers, and detail of documentation is consistent with reference 1 for the QA Level.
- Writes an Acceptance Criteria Listing for the Software using reference 2.

#### Lead Developer

- Drafts a software development plan covering: who is assigned, what is to be developed, when (schedule), and how (development tools and software languages).
- Writes a description of the software design as a text document and/or flowchart, for each independent module.
- Generates the software code.
- Writes test plans and has them reviewed, or requests that they be written by independent testers.
- Makes necessary changes in response to reviews, inspections, and test results.
- Obtains approval for use.
- Develops user training materials as needed.
- Completes the documentation for users and for archives, in accordance with Reference 4.
- Turns software over to users and software maintenance staff.

#### Reviewers and Testers

- Review software development plans for feasibility and completeness, and suggest alternatives where needed.
- Review the design documents or flowcharts.
- Inspects the source code in detail.
- Review or write test plans as requested.
- Execute tests in accordance with approved plans, and provide documented results.

#### QA Representative or Software QA Advisor

- Assists in grading the QA level of the software.
- Assists in development of, and approves, the acceptance criteria listed in the ACL.



- Monitors the reviews and the inspection processes for compliance and effectiveness.
- Monitors the testing and correction processes for compliance and effectiveness.
- Approves the ACL when completed.

## Process

Follow the process flowchart in Appendix A.

## Records

The records generated by following this guide may include:

- Quality Grade Determination
- Software Requirements
- Software Development Plan (for in-house development)
- Procurement Specification and/or Statement of Work (for subcontracted development)
- Acceptance Criteria Listing
- Software Descriptions (for in-house development)
- Source Code Listings
- Code Inspection Reports (for in-house development)
- Test Plans
- Test Plan Review Reports
- Records of Corrections and Retests
- User Training Documentation
- Maintenance Documentation
- Signed copy of the flowchart in Appendix A, with marks and notes or clarifying addenda to explain how the process worked in the specific case.

## References

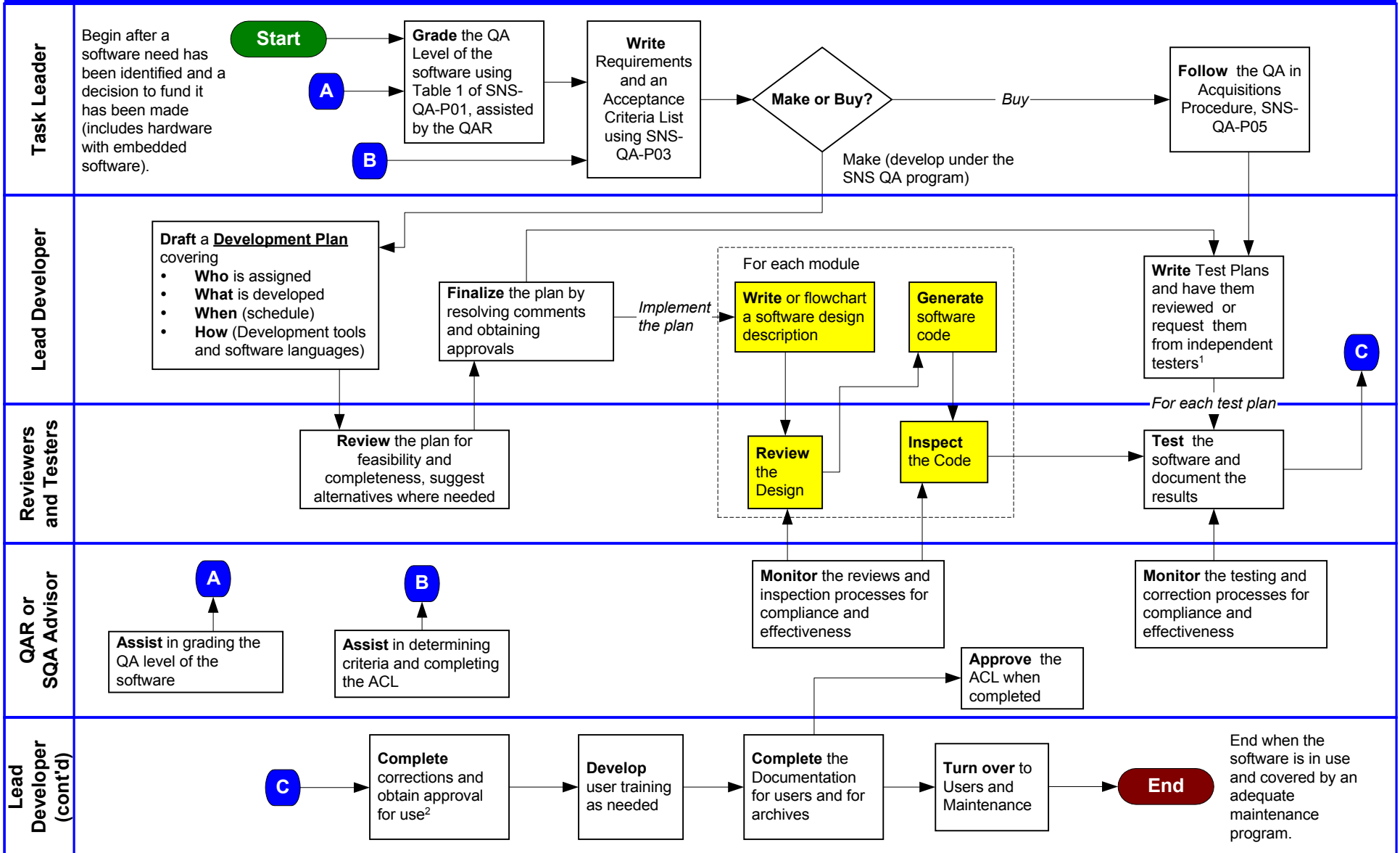
1. [SNS-QA-P01, SNS Quality Assurance Plan](#)
2. [SNS-QA-P03, Procedure for Acceptance Criteria Listings](#)
3. [SNS-QA-P05, Quality Assurance in Acquisitions](#)
4. [SNS-IO-P01, Creation, Distribution, and Management of Spallation Neutron Source Records](#)
5. [Spallation Neutron Source Functional Classification Policy](#)

## Appendix

A. Software Development QA Flowchart

**APPROVED BY:** \_\_\_\_\_ M.H. Skonicki \_\_\_\_\_ (original filed in DCC)  
SNS Quality Assurance Manager

# Appendix A, Software Development QA Flowchart



**General**

- Maintain configuration control at all times, so the correct version is used for each step.
- Make backups systematically to prevent loss of valuable work as it is done.
- For purchased hardware with embedded software, follow the "Buy" path in the make-or-buy tree. Use internal SNS people in the roles of lead developer and tester.

<sup>1</sup>Checking results of software calculations vs hand calculations may be part of testing  
<sup>2</sup>For external sources, normally the necessary corrections are made by the supplier.

**Record of Use (Optional)**

This procedure was followed to produce the following:

---

Document or Item ID                      Signature                      Date