Approval: Shannon A. Brennan Date: 03-13-08
Manager, National Spent Nuclear Fuel Program

I. PURPOSE AND SCOPE

This procedure directs testing performed to verify conformance with specified requirements, to confirm suitability of an item for its intended use, or to gather data or information to support engineering research.

This procedure applies to all testing that will be relied on to make key programmatic decisions or to protect the safety of personnel or the environment unless conducted in accordance with other National Spent Nuclear Fuel Program (NSNFP) procedures.

II. SUMMARY

This procedure directs the development of a test plan that prescribes the requirements, controls, and documentation for tests conducted within the NSNFP.

III. PROCEDURE

A. Prepare Test Plan

Assigned PSO Technical Staff

1. Request responsible technical lead to designate a qualified technical reviewer for a test plan and test results.

2. After consulting with organizations that will be participating in the tests and using the test results, perform the following:

   a. If not available within NSNFP, procure qualified testing services (i.e., equipment, facilities, certified inspection, nondestructive examination, and test [e.g., leak test] personnel) in accordance with NSNFP Procedure 4.02. Where data originates from the alternate use of suppliers without a documented QA Program, said data are unqualified, and if used as input produce unqualified output.

   b. Prepare a test plan according to (or ensure supplier test plan meets) the review and development criteria given in Attachment A

3. Obtain review and approval of the test plan according to NSNFP Procedure 6.01. Use Attachment A to determine minimum reviewers and review criteria for creating or revising tests plans.

B. Complete Tests

Assigned PSO Technical Staff

1. After ensuring prerequisites have been satisfied, perform tests according to the applicable test plan.
2. If any situation is encountered where work cannot be accomplished as described in the test plan or when accomplishment of such work would result in an undesirable situation, stop all work and do not resume until the plan is changed to reflect the correct work practices.
3. Document results in accordance with the applicable test plan.
4. If deficiencies are identified, disposition them in accordance with NSNFP Procedure 16.02.
5. Place completed test plan, including results, under NSNFP document control by processing according to NSNFP Procedure 6.01 as applicable.

IV. REFERENCES

None.

V. DEFINITIONS

Terms appearing in italics followed by the notation "see glossary" are defined in the NSNFP Documents Manual Introduction and Glossary.

VI. ATTACHMENTS

Attachment A, Development and Review Criteria for Test Plans

VII. QUALITY RECORDS

The following quality records generated as a result of this procedure require retention in accordance with the identified classification and NSNFP Procedure 17.01.

<u>Lifetime</u>

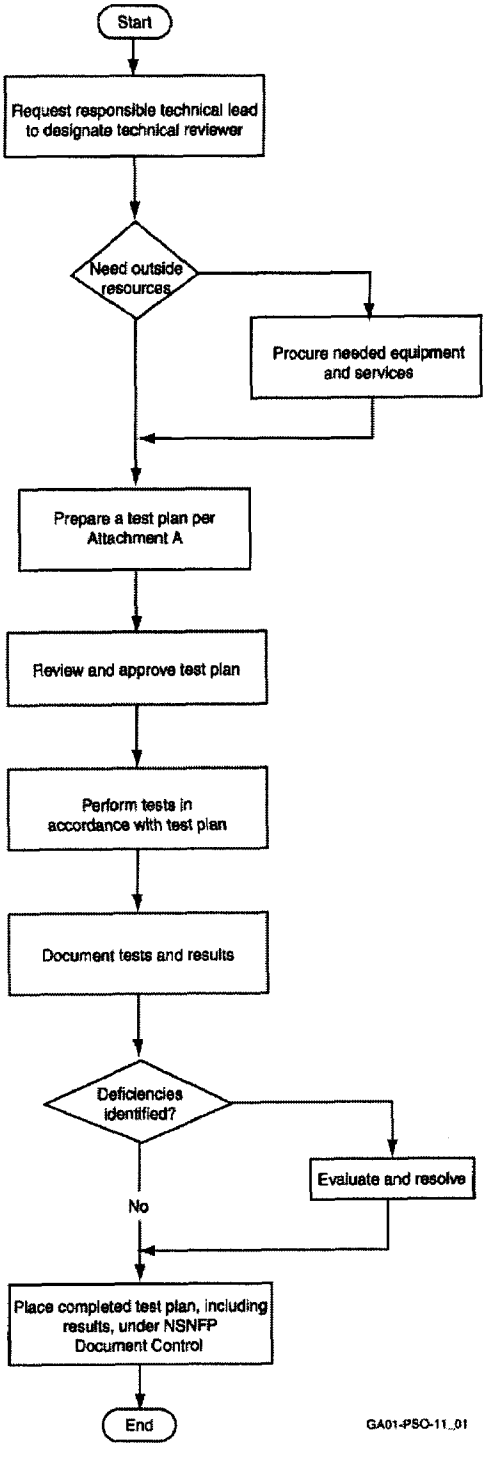
A. Test Plan

B. Test Results

<u>Nonpermanent</u>

None.

VIII. PROCEDURE FLOW DIAGRAM



Attachment A

Development and Review Criteria—Test Plans

Section	Criteria for Content	Reviewer
Background and Objectives	Purpose and objectives of the tests and the items to be tested are identified. Relevant background is given as to why specific tests are necessary and appropriate. The applicable Work Breakdown Structure title and number are referenced. Provisions are included for determining when testing is required. Specified test objectives address program needs.	Designated Technical Reviewer
Test Requirements	Applicable technical, quality, and regulatory requirements are cited and incorporated into the test plan, including the accuracy requirements of test equipment, when tests are required, and how test activities are performed. Test plans should provide for performing prototype, component, or feature qualification testing, including design verification testing, as early as possible before the installation would become irreversible.	Designated Technical Reviewer and NSNFP Quality Engineer
Test Methodology	Test methods described will effectively achieve test objectives and will demonstrate the adequacy or performance under conditions that simulate credible operational and environmental conditions. Testing is to be performed under conditions that simulate the full range and most adverse design conditions as determined by analyses. Operating modes and environmental conditions in which the item must perform satisfactorily shall be considered in determining the most adverse conditions. When tests are being performed on models or mockups, the basis for scaling and the applicable scaling laws are given. Potential sources of uncertainty and error are discussed and affected parameters are identified. Responsibilities and interfaces within organizations affected by the tests are described.	Designated Technical Reviewer
Test Equipment, Software, and Procured Services	Measuring and test equipment to be employed, including specific equipment identification numbers when available are specified. Equipment is of the proper type, range, accuracy, and tolerance to accomplish its intended test function. Any computer software that will be used is specified and controlled in accordance with NSNFP Procedure 19.01, Software Control. Equipment, facilities, services of qualified personnel, etc., that must be procured are specified. Where data originates from the alternate use of suppliers without a documented QA Program, said data are unqualified, and must be used and tracked accordingly.	Designated Technical Reviewer
Acceptance Criteria (applies	Test requirements and acceptance criteria, including precision and calibration, are specified based on requirements contained in applicable design or other pertinent technical documents, or sources such as data	NSNFP Quality Engineer

Attachment A

Section	Criteria for Content	Reviewer
differently to conformance testing vs. engineering research tests)	acquired from laboratory and field experiments, natural and man-made analog studies, or scientific observations not used in the original development of the model. Acceptance criteria are provided or approved by the organization responsible for the design of the item to be tested unless otherwise designated.	

Section	Criteria for Content	Reviewer
Procedure	Identifies any documents in addition to this test plan that will be used to control and direct the performance of tests. Information from recognized testing specifications such as ASTM standards, supplier manuals, or other relevant documents containing appropriate information is appropriately incorporated into this test plan by reference. Sufficient supplemental instructions are included to ensure referenced documents will be properly applied to accomplish the test objectives. For tests that involve a high degree of professional judgment, trial and error methods, or conditions that affect the tests, scientific notebooks are specified to record conditions, methods, equipment, computer programs, work performed, samples, results, etc., not adequately described in the plan. Prerequisites address - Required equipment and instrumentation including accuracy of instrument calibration. - Condition of test equipment and items to be tested. - Personnel qualifications—Inspection, Nondestructive Examination, and Test (e.g., leak test) personnel must be certified. NSNFP technical staff trained in accordance with NSNFP 2.04 or equivalent may perform other tasks in the planned test. - Environmental conditions and controls. - Provisions for data acquisition. Mandatory hold points and QA verifications are specified. Actions to be taken in the event of anticipated and unanticipated changes in test conditions are specified. A process for resolving discrepancies encountered during testing is provided. Sequential instructions for performing the tests are provided including: - Provisions for error analysis and control of uncertainty and error to within acceptable limits. - Necessary monitoring, types of observations, and methods to record data and results. - If samples are taken, provisions to track and document, as appropriate, sample possession from collection through final use and, if important, sample position and orientation relative to the commodity sampled.	Designated Technical Reviewer

Attachment A

Section	Criteria for Content	Reviewer
	For tests in operational facilities or for tests required to verify conformance with specified requirements or suitability of an item for its intended use, the test status must be indicated either on the item or in documentation traceable to the item in order to preclude inadvertent changes in facility operating status or by-passing of tests. When status indicators are used, the authority for applying, changing, or removing such indicators must be specified.	
Procedure (cont'd)	The lifetime of the test documentation and any nonpermanent QA records generated is specified.	Designated Technical Reviewer
Test documentation	Within the test plan, space is provided for documenting the test and recording necessary information. Spaces are available to record • The item or work product tested, date of test, names of the tester and reviewer, and data recorders • Verifications that prerequisites have been satisfied • Measuring and test equipment used including specific equipment identification numbers and most recent calibration dates • Any deviations from the test plan • Actions taken in connection with any nonconformances noted • Results and acceptability of test and name of reviewer • Any attachments with additional test data or information • Reviewer signature confirming that test results are properly documented, reasonable relative to expectations, and adequate to ensure reproducibility without recourse to the original investigator • Identification of the measuring and test equipment used during the test, including the identification number and the next calibration due date.	Designated Technical Reviewer