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I. PURPOSE AND SCOPE

This procedure provides instruction for preparation, use, and control of design inputs and outputs. It applies to NSNFP personnel when creating or changing internal design documentation for structures, systems, and components relied on for achieving program objectives or ensuring the safety of personnel or the environment or when reviewing or controlling externally developed design documentation or design services for the same.

II. SUMMARY

The NSNFP PSO performs preliminary and conceptual design activities intended to guide repository design and licensing to accommodate DOE SNF or HLW. This procedure directs the preparation of design input and interface documents to specify design objectives and requirements to control these design activities.

III. PROCEDURE

A. Procuring Design Services

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1. If design services are obtained outside the NSNFP, procure design services in accordance with NSNFP Procedure 4.02 and GO TO Step III.D.

B. Preparing or Revising Design Input and Interface Document

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1. For new design projects or when revising an existing design input and interface document, prepare an appropriate design input and interface document according to NSNFP Procedure 3.04, Engineering Documentation.

2. If modifying existing design documentation controlled by the NSNFP, process a document action change request in accordance with NSNFP Procedure 6.01. Changes or *deviations* (see glossary) from specified quality assurance and technical standards, including the reasons for the change or deviation, shall be identified, evaluated, approved, documented, and controlled.

3. Identify assumptions and indicate those that must be verified as the design proceeds.

4. Design drawings, including as-built drawings, must be developed and controlled as attachments to NSNFP documents described in procedure NSNFP 3.04.

5. Computer programs may be utilized for design analysis without individual verification of the program for each application, provided:

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a. The computer program has been verified to show that it produces correct solutions for the encoded mathematical model within defined limits for each parameter employed.

b. The encoded mathematical model has been shown to produce a valid solution to the physical problem associated with the particular application

6. Where changes to previously verified computer programs are made, verification shall be required for the change, including evaluation of the effects of these changes to steps III.B.4.a. and III.B.4.b.

C. Design

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1. Complete design activities to achieve design objectives according to design input and interface documents and applicable NSNFP procedures.

D. Design Verification

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1. The dimensional accuracy and completeness of design drawings and specifications shall be checked and documented.

2. Request responsible technical lead to specify if additional design verification is needed.

3. If additional verification is necessary, perform the following:

Note: The extent of design verification required is a function of the importance of the design, its complexity, the degree of standardization, state of the art, and similarity with previously proven designs.

a. Request responsible technical lead to

(1) Select and document justification for design verification method selected.

(2) Designate qualified personnel to perform design verification.

b. For design verification using alternate calculations, use NSNFP Procedure 3.03, Engineering Analyses, to review and check the appropriateness of the assumptions, inputs, and calculations by using personnel and analytical techniques different from those employed in the original analysis.

c. For design verification using qualification testing, perform tests according to NSNFP Procedure 11.01, Testing. Testing shall demonstrate the adequacy of system, structure, or component performance under conditions that simulate the full range, including the

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most adverse anticipated design conditions as determined by analysis. Operating modes and environmental conditions in which the item must perform satisfactorily shall be considered in deteminingdetermining the most adverse conditions.

E. Design Outputs

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1. For other than supplier-provided designs, document design outputs, including the results of design verification, in accordance with NSNFP Procedure 3.03, Engineering Analysis, and NSNFP Procedure 3.04, Engineering Documentation.

2. If customer objectives and requirements are not satisfied, repeat this procedure.

3. Release design for procurement, fabrication, and other uses as needed.

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

None.

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.

Lifetime

None.

Nonpermanent

None.

VIII. PROCEDURE FLOW DIAGRAM