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DESIGN RECONSTITUTION PROGRAM PLAN AND PROCEDURES FOR K BASINS

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FOREWORD

This document establishes a systematic program to establish, organize, and document the design basis and design requirement information where existing design information is inadequate. The Design Reconstitution Program involves identifying and retrieving design information from identified source documents; evaluating, verifying, and validating the design information; resolving discrepancies; regenerating missing critical design information; and preparing and issuing a summary document of the design information. Upon completion, the design requirements shall be evaluated with the facility as-found configuration to verify the adequacy of appropriate design requirements with the as-found configuration and to document and resolve any discovered discrepancies. Once the design requirement (design analysis, calculation, design basis) comparison is made and discrepancies resolved (dispositioned, implemented, and incorporated as required), the as-found condition of a drawing then becomes an as-built drawing that is released into the engineering release system. This as-built drawing is then the accurate accounting of the field configuration that is consistent with the design requirements (recovered through the design reconstitution program) and is used with high confidence to make valid engineering, operational, and maintenance decisions.

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1.0 INTRODUCTION

1.1 PURPOSE

This document establishes a controlled methodology for identifying the structures, systems, and components (SSCs) and their associated design documentation (drawings and textual documents); and design basis and requirements information. This program plan verifies and validates acceptable design information (design bases and design requirements) that accurately supports the integrity of the design that is consistent with the physical configuration. This design reconstitution program plan also regenerates missing or inadequate design information identified as necessary to support K Basins.

1.2 SCOPE

This document applies to the K-Basins, its ancillary SSCs, and associated design information.

The design reconstitution program is exempt from metrication requirements, in accordance with the provisions established in DOE/RL-94-0070, "Hanford Metric Implementation Plan," Appendix C, items 4 and 5.

1.3 OBJECTIVE

The objective of design reconstitution is to retrieve, organize, evaluate, and capture existing design information, and to identify and prioritize non-existing design information with an awareness that some existing design information may be found to be inadequate. The results of these objectives are captured through the development of a Design Information Summary (DIS) and a methodology to reconstitute non-existing or inadequate design information and to disposition discrepancies, both in design documentation and the physical configuration of SSCs. Additional objectives include:

- Identifying the SSC scope (technical baseline) for K Basins.
- Providing verified source documentation that ensures consistency with the design basis and that generates or evaluates design modifications.
- Providing source documentation that can be used with the Safety Analysis Report (SAR) for performing safety reviews to ensure continued safe operation.
- Providing supplementary information to support various K Basins activities such as safety reviews, readiness reviews, operational readiness reviews, training, and facility upgrade programs.

1.4 DEFINITIONS

Design reconstitution definitions are provided in the glossary.

2.0 ROLES AND RESPONSIBILITIES

This section identifies organizational roles and responsibilities that are required to support the implementation of the design reconstitution process. These responsibilities may be both external and internal to K Basins.

2.1 WHC SITE

2.1.1 Operations and Maintenance Program Improvement of Transition Projects

Operations and Maintenance Program Improvement provides the WHC configuration management program; including design information validation and reconstitution methods, processes or procedures; that establishes a consistent and graded approach for all WHC-managed facilities, programs, projects, and subcontractor activities. Operations and Maintenance Program Improvement:

1. Develops, documents, and maintains the design reconstitution process.
2. Ensures new or revised design reconstitution requirements imposed through the DOE are appropriately integrated.
3. Develops the K Basins design reconstitution procedures, action plans, and associated documentation.
4. Ensures that the recording and reporting status for technical documents and associated changes are adequately addressed and maintained in appropriate procedures and databases.
5. Provides analytical services to assist in the verification, validation, or reconstitution of design information.

2.1.3 BCS Richland (BCSR)

BCSR manages record processing, distribution, storage, retrieval, and microfilming.

2.1.2 Quality Assurance

Quality Assurance establishes site quality issues that are related to the conduct of the design reconstitution effort with primary emphasis on the reconstitution of requirements and the validation of requirements with the physical configuration and:

1. Conducts periodic assessments of the program plan and its implementation.
2. Verifies that procedures are implemented in accordance with WHC policies.
3. Assists in the various reviews and technical teams.

2.2 K BASINS ENGINEERING

2.2.1 Cognizant Engineering Manager

As the design authority, the cognizant engineering manager ensures that the provisions of this program plan are implemented. The cognizant engineering manager:

1. Develops, implements, and controls the program plan to retrieve, verify, validate, or reconstitute design information or initiate required facility modifications.

2. Ensures that complete, accurate, and valid engineering documentation (drawings, text documents, and vendor information) is developed and maintained using the graded approach.
3. Maintains complete control of all K Basins engineering documentation.
4. Ensures cognizant engineering support in accordance with WHC-IP-1026, Engineering Practice Guidelines, EPG-1.0 and EPG-2.0.
5. Resolves or assigns responsibility for resolving design discrepancies.
6. Ensures that approvals and reviews are obtained for appropriate engineering documents.
7. Identifies and manages SSC technical boundaries and interfaces.
8. Ensures that change control procedures are used to maintain technical consistency among the requirements, the physical configuration, and the documentation.

2.2.2 Cognizant Engineer

In addition to the cognizant engineer duties identified in WHC-IP-1026, EPG-5.2, the K Basins cognizant engineer:

1. Identifies the SSCs and their interfaces and boundaries.
2. Where appropriate, assists in the identification of source documents and the extraction, verification, and validation of design information of systems under their cognizance.
3. Develops, releases, and maintains the DIS.
4. Dispositions deficiencies and discrepancies.

2.2.3 Maintenance

Maintenance assists in the identification and establishment of maintenance-related requirements and participates on the various technical teams.

2.2.4 Operations

Operations assists in the identification and establishment of operations-related requirements and participates on the various technical teams.

3.0 IMPLEMENTATION

3.1 SCOPE

The scope of the program plan is limited to those SSCs that constitute the total definition of the K Basins. Appendix A is a listing of systems and subsystems that define the K Basins. (The systems, subsystems, and major components shall be identified and documented on the K Basins System Identification form (Appendix B, Figure B-1), the K Basins Subsystem Identification form (Appendix B, Figure B-2), and the K Basins Major Component Identification form (Appendix B, Figure B-3.) Using the graded approach defined in paragraph 3.2 of this document and WHC-SD-SNF-CM-002, "Configuration Management Plan for K Basins," the systems and subsystems shall be categorized and ranked to establish the importance of the system in accomplishing the K Basins mission. This ranking assists in planning the program plan effort (schedule, cost, and required resources).

This program plan centers on the prioritization and development of DISs. These DISs are prepared for K Basins systems. The priorities of DISs are based on safety significance; facility modification requirements and schedules; impact on other DISs; and the specific needs of the operating, maintenance, and design organizations. Highest priority is given to those systems addressed by the SAR. Priorities are used to establish the order of DIS preparation, verification, and validation.

The availability and reliability of existing design information are fundamental in design reconstitution planning. The mission for the program plan is to provide or regenerate complete, accurate, and full documentation for K Basins existing design information by means of the DIS.

3.2 GRADED APPROACH

The graded approach establishes levels for the design information searches, regeneration, and documentation that are commensurate with facility factors including function, size, and complexity, potential hazards, operational status, and remaining life. The intent is to apply resources for the greatest benefits.

This program plan primarily uses safety-related graded approach for its application. When facility importance or other considerations (particularly remaining facility life time) call for an adjustment, the following adjustment strategies should be considered.

- Only the most important system and topical DISs to accomplish Operational Readiness Review objectives should be selected.
- The design basis should be provided only for safety requirements.
- The scope of searches should be reduced in favor of concentrating resources on document regeneration.
- The missing design basis should not be regenerated.
- Only essential DIS contents should be included.

3.3 PROGRAM PLAN DELIVERABLES

The deliverables from the design reconstitution program plan are DISs (see Appendix C for categories and content). The DIS documents the SSC scope technical baselines. Completed DISs provide technical support for engineering evaluations and studies, K Basins operations, and training.

3.4 PROCEDURES

Implementing procedures provide detailed instructions for carrying out program plan functions. Implementing procedures to control technical methods and interfaces are currently available for design control in WHC-CM-6-1, Standard Engineering Practices. These procedures ensure a consistent approach from source document identification through DIS issuance. They address and control responsibilities associated with document preparation, review and approval processes, and the long-term maintenance and control of completed documents.

3.5 INTERFACES

Programmatic and functional/physical interfaces that influence the design reconstitution process are identified. Control of these interfaces is required to ensure that changes at the interface boundaries are promptly identified, reviewed, and approved to minimize the impact.

3.5.1 Programmatic Interfaces

Programmatic interfaces are the design reconstitution interfaces that exist between K Basins and existing programs, projects, plans, and processes. For this design reconstitution program plan, the programmatic interfaces are with the following.

1. Spent Nuclear Fuel Project (SNFP) - The interface with the SNFP ensures that all SNFP requirements have been reviewed and addressed during the design information extraction, verification, and validation phases of the design reconstitution program. K Basins management reviews and approves all new SNFP requirements or changes to existing requirements that impact the K Basins before implementation or acceptance of such requirements.
2. K Basins Field Verification Program (FVP) - The primary purpose of the field verification program is to generate as-found drawings for K Basins systems, subsystems, and major components that are required to support the K Basins mission. This program plan interfaces with the DRP by generating accurate drawings that shall be validated against the appropriate verified design information (basis and requirements). Upon validation, the as-found drawings shall be revised as necessary and designated "as-built" drawings and shall be so identified by the appropriate stamp indication on the drawing.
3. Site programmatic change control process - This process interfaces with the design reconstitution program each time a requirement must be changed or a waiver to a requirement is granted that requires management approval outside of the K Basins management structure.

4. Unreviewed Safety Question - This design reconstitution program plan addresses discrepancies between requirements and the physical configuration that have safety implications.
5. Work Management - The Job Control System of Work Management interfaces with the design reconstitution program by ensuring that changes to the physical system are traceable back to the authorizing document (i.e., so that validation remains possible and accurate).
6. Operations and maintenance - Operations and maintenance interface with the design reconstitution by identifying specific operations and maintenance procedures and by ensuring that no changes to the physical configuration are made without the authorizing work management documentation.

3.5.2 Functional/Physical Interfaces

Functional/physical interfaces are identified for each DIS to define the scope of each DIS, ensure a seamless interface among DISs, and preclude duplication of information. These interfaces are identified with respect to entities that interface externally and internally to the DIS and are described as follows:

1. External - External interfaces or boundaries for particular SSCs or DIS topics (e.g., fire protection, building structures, fuel handling, etc.) are those entities that physically or functionally tie various DIS topics to each other. These interfaces are used to establish the functional/physical scope of each DIS.

NOTE: For simplification, the basis for this design reconstitution program plan is normally the system boundaries that are developed during the field verification program for drawing development and verification.

2. Internal - Within the boundaries of the external interface, specific functional and physical interfaces for each DIS are established to support interfacing systems or subsystems within the DIS topic. These interfaces are identified by textual description within the DIS.

3.6 TRAINING

As procedures and related design reconstitution processes are established, associated training shall be required to communicate objectives and expectations and to ensure effective implementation. The design reconstitution program training includes several levels of information on concepts, terminology, roles and responsibilities, and implementing procedures. These training levels include:

1. Initial awareness overview training
2. Follow-up training on functional and organizational implementation
3. Refresher training, as needed, for maintaining implementation review and change practices.

A record of indoctrination and training and a current copy of personnel qualifications for design reconstitution trained personnel shall be retained in Human Resources and/or Training. Verification and validation personnel shall have general knowledge on basic component types, system layouts, and standard symbols used at K Basins.

4.0 DESIGN RECONSTITUTION

The design reconstitution program validates known requirements and establishes, organizes, and reconstitutes design information where existing information is not adequate. Figure 1 provides an overview of the process.

The normal design process continues to generate new and revised design requirements and the design basis. These normal design activities also contribute to the "best available design information." Controls shall be in place to ensure that ongoing design process efforts and requirements validation efforts are coordinated.

Sources of technical information, known as design inputs, reside at the numerous site-wide information repositories. From technical documentation recovered from these repositories, pertinent design information is extracted, evaluated, and then used to develop DISs. DISs are structured documents that organize and consolidate design basis and design requirements information.

The following activities constitute a design reconstitution program:

- Identification and retrieval of source documents
- Identification and extraction of design information
- Evaluation of extracted design information
- Regeneration of missing or inadequate design information
- Design information verification
- Design information validation
- Design information comparison with physical configuration
- Discrepancy identification and resolution
- Preparation, release, and closeout of design information validation packages.

4.1 IDENTIFICATION AND RETRIEVAL OF SOURCE DOCUMENTS

Identification and retrieval of source documents involves identifying the document types and specific documents that may contain design information and locating and retrieving the documents.

4.1.1 Identification of Source Documents

This step identifies documents that may contain design information. Each document is linked to an SSC (NOTE: one document may be linked to more than one SSC at a time) or the SSC's parent document in accordance with the traceability requirement prescribed by the configuration management program defined in WHC-SD-SNF-CM-002. Traceability is managed under the auspices of the Configuration Management Plan for K Basins and implemented via a relational database. This traceability captures the relationship between SSCs, between SSCs and documents, and between documents.

Figure 1. Design Reconstitution Process Overview.

Appendix D identifies the types of documentation that may contain design information required to develop all DISs. These document types are not all inclusive and therefore may be augmented as necessary to include other necessary sources of design information. A technical review team assists in identifying the types of documentation or information that are required to support the applicable system, subsystem, and major components. In addition to the appropriate cognizant engineer, this team typically consists of a knowledgeable representative from the following organizations:

- K Basins Operations
- K Basins Maintenance
- K Basins Quality Assurance
- Operations and Maintenance Program Improvement of Transition Projects (with emphasis in the various disciplines required to verify or regenerate design information for mechanical, electrical, and chemical systems, as well as environmental compliance requirements).

The following actions describe the general process to be used for document identification.

<u>Actionee</u>	<u>Action</u>
Cognizant Engineer	1. Identifies the system, subsystem, and major components.
Technical Review Team	2. Identifies and documents the minimum documentation that is required to support the specific system, subsystem, or major component. Record results on the K Basins Required Documents form (Appendix B, Figure B-4).
	3. Identifies required support information (calculations, analysis, test results, etc.).
Cognizant Engineer	4. Identifies known documents and references. Record results on the K Basins Document Identification form (Appendix B, Figure B-5).
	NOTE: This list of documents consists of available drawings, reports, calculations, work packages, specifications, procedures, correspondence, and purchase requisitions.
	5. Identifies supplementary information that is retained if found during document searches. This supplementary information, although not design basis or design requirements information, such as spare parts or replacement parts lists; special tooling; or manufacturing/installation fixtures, etc., may be required to support the day-to-day operation and maintenance of an SSC.

Technical Review Team

6. Identifies documents or information that, although not specifically related to K Basins, may be useful in extracting and applying contained information to K Basins.

4.1.2 Retrieval of Source Documents

Personnel technically acquainted with the topics perform the document search. Searching shall use, but not be limited to, the Engineering Release System Database (ERSDB). Throughout the search, the document control organizations (Engineering Management Systems and BCSR) provide support in locating and retrieving the subject documents.

Three levels of search are employed and focused on information recovery. These levels of search are defined as follows.

1. Formal Review - The formal review of design documents is the first stage of identification and retrieval of existing design information. The scope for this review is limited to readily available, top-level design documents such as systems engineering functions and requirements, interim safety bases, SARs, interim safety equipment lists, technical safety requirements, system design descriptions, and other top-level synthesis and summary-type design documents.
2. Smart Search - The smart search identifies and retrieves those types of documents most likely to contain design requirements. It culminates in the identification of most of the retrievable design requirements as well as the design basis information contained in the associated source documents. The documents that are most likely to contain design requirements are the design output documents. These documents, including drawings, specifications, load lists, valve lists, operational setpoints, maintenance and test requirements, and construction and installation instructions, may be uncovered by surveying files at storage locations known to contain design documents. The locations can range from vendor files and warehouse storage to individual design engineer files. Available site storage areas are as follows:
 - Central Files (3706 and 3707D Building)
 - Records Holding Area (RHA, 712 Building)
 - Documentation and Records Services Vault (Federal Building, Room 358A)
 - Federal Records Center (Seattle, WA)
 - 400 Area Quality Assurance Vault (4702 Building).

Each potential source document is screened to determine if it contains design information and if a technical review is necessary to extract that information. Documents related to past missions and past configurations that are no longer valid, SSCs that are not included in the CM program, or other specific documents that do not actually provide design information are excluded. An independent review is conducted to verify that the exclusion of specific documents or document types from further review was warranted.

3. Comprehensive Search - The comprehensive search identifies and retrieves the remaining documents that might contain design information, including design analyses and calculations, DOE correspondence, and vendor correspondence, internal correspondence, meeting minutes, engineering procedures, engineering studies and reports, code conformance evaluations, and engineering forms and documentation used to implement designs and design changes.

The extent of the comprehensive search shall be limited. The comprehensive search team interviews and interacts with experienced engineering and operations personnel to locate and collect information, including information stored in desks and personal files. The team investigates referenced design documents for potential design basis information.

Documents containing information that is useful in support of day-to-day operations and maintenance of systems is retrieved and categorized for later review and use.

The following actions describe the general process to be used for document retrieval:

<u>Actionee</u>	<u>Action</u>
Cognizant Engineer	1. Performs a local search to determine if identified documents are available. If available, retrieve documents.
Technical Review Team	2. Forwards a list of document titles and numbers to the Configuration Documentation Work Station (CDWS) to determine if any are active and available.
CDWS	3. Compares the list with data in the ERSDB to determine if the documents are active and available. Returns the list to cognizant engineer with available documents noted.
Cognizant Engineer	4. Forwards a formal request to BCSR to obtain active copies of documents.
	5. Forwards a formal request to the local archive storage facilities to obtain inactive documents. Assumes that BCSR cannot obtain requested copies.
BCSR	6. Retrieves copies of requested documents and forwards them to the cognizant engineer.
Archive Custodian	7. Searches records to determine if requested documents are available.
	8. Forwards copies of available documents or and/or notification that documents are not available locally to the cognizant engineer.

Technical Review Team

9. If the required documents are not locally available, visit the Federal Records Center, Seattle, WA, to determine if the information resides at that location. If available, obtains copies or originals of the information.
10. Review additional available information at the Federal Records Center to determine if contains design information. Obtain copies or originals of the information.

4.2 IDENTIFICATION AND EXTRACTION OF DESIGN INFORMATION

The identification and extraction of design information is accomplished in stages, emphasizing the most important and most accessible information first and continuing until either all of the identified design bases and requirements information has been recovered, the document search has been exhausted, or continued searches are not cost effective compared to regenerating the required information. After the source documents are identified and retrieved, the source documents are reviewed to extract the relevant design requirements and design basis information (see Appendix E for examples). The cumulative result of these activities constitutes the "best available design information."

4.2.1 Identification of Design Information

Identification of design information from each source document includes both design requirements and design basis information. Extracted design information is identified as to the type of SSC, technical topic area, and whether it is a design requirement or design basis. The technical review and identification of design information from each source document shall be complete, so that the document does not have to be reconsidered during subsequent searches and reviews.

The following actions describe the general process to be used for design information identification:

<u>Actionee</u>	<u>Action</u>
Technical Review Team	<ol style="list-style-type: none">1. Reviews the candidate documents for embedded design information. Determines if the document is acceptable for use. This review process results in one of the following cases:<ol style="list-style-type: none">a. The candidate document is determined to be outside of the scope and therefore no further evaluation is required. This determination is documented on the K Basins Document Acceptability form (Appendix B, Figure B-6).

Technical Review Team
(cont.)

- b. The candidate document is determined to be within the scope but does not capture either pertinent information, is outdated, or is duplicate information; therefore, no further evaluation is required. This determination is documented on the K Basins Document Acceptability form (Appendix B, Figure B-6).
 - c. The candidate document is within the scope and captures pertinent design information of unknown validity. The discovered design information is then verified and validated as described in paragraphs 4.4 and 4.5. Design information that is declared verified and validated is then available for preparing the DIS. If verification and validation of design information is not accomplished then the design information that is missing, conflicting, or inadequate is considered for regeneration.
 2. Completes the K Basins Document Acceptability form (Appendix B, Figure B-6) to indicate document acceptability.
 3. Identifies design information that can be extracted immediately and verified.
 4. Identifies design information that resides within a document or several documents for extraction or concurrent verification and validation in accordance with paragraphs 4.2, 4.4, and 4.5 of this document. The result is recorded on the K Basins Design Information Extraction form (Appendix B, Figure B-7).
 5. Identifies supplementary information (see paragraph 4.1.1.1, item 5) that has been identified by the cognizant engineer as necessary to support the day-to-day operation and maintenance of an SSC.

4.2.2 Extraction of Design Information

After the source documents are reviewed and design information is identified, they are reviewed to extract the design information (examples of design information can be found in Appendix F). The documents are directed to the technical reviewers who have expertise in the systems and disciplines reviewed. If documents are sorted incorrectly, the technical reviewer relabels them and directs them to the appropriate reviewer. For each document reviewed, the technical reviewer identifies and differentiates design requirements and design basis information.

Two methods to extract pertinent design information from candidate documents may be used. Method 1 extracts and evaluates pertinent design input information during the recovery of source documents process. Method 2 extracts pertinent information in parallel with the preparation of the DIS and then evaluates pertinent information as an integral part of the verification and validation of the complete DIS.

The following actions describe the general process to be used for design information extraction:

<u>Actionee</u>	<u>Action</u>
METHOD 1	
Technical Review Team	<ol style="list-style-type: none">1. Identifies information that shall be verified as it is discovered. The extracted design information is identified and summarized in the K Basins Design Information Extraction form (Appendix B, Figure B-7).2. Verifies design information in accordance with paragraph 4.4 of this document.3. Identifies, extracts, and catalogs supplementary information (see paragraph 4.1.1.1, item 5) for future use.
METHOD 2	
Technical Review Team	<ol style="list-style-type: none">1. Collects all extracted design information for inclusion in the system DIS. The extracted design information is identified and summarized in the K Basins Design Information Extraction form (Appendix B, Figure B-7).2. Upon completion of the DIS, verifies the design information in accordance with paragraph 4.4 of this document.3. Identifies, extracts, and catalogs supplementary information (see paragraph 4.1.1.1, item 5) for future use.

4.3 REGENERATION OF DESIGN INFORMATION

Regeneration of the design requirements begins before regeneration of the design basis to provide a complete and accurate set of design requirements as promptly as possible. Regeneration of design requirements is a high priority because the physical configuration is established by, and is consistent with, the requirements. The processes for design requirements and design basis regeneration shall be similar.

Regeneration of design requirements may begin after the evaluation of design requirements and proceed in parallel with the completion of the comprehensive search. Regeneration of design basis information shall be initiated after the comprehensive search and the evaluation of design basis information to identify missing information. Design basis regeneration is not needed for initial issuance, but it may occur in parallel with the preparation of the initial DISs.

K Basins cognizant engineering considers the missing design requirements for a given system or topic, determines which requirements are critical, and prioritizes the associated regeneration activities as follows:

1. First priority - Missing information that is critical to safety.
2. Second priority - Missing information that is necessary for facility design or operations (e.g., set-point data).
3. Third priority - Missing information that is not critical and has little added value to the overall operation of the facility. During the implementation and conduct of the program plan, low priority items shall be periodically reviewed to determine if their priority should be changed.

Supplementary information (see paragraph 4.1.1.1, item 5) shall be identified, prioritized (using the above priorities), and regenerated as required.

Two additional options exist to assist in prioritizing the remaining regeneration activities: (1) prioritize by requirement-type safety requirements, followed by environmental requirements, and so on; or (2) prioritize by grade (importance) of the SSCs involved. If option 2 is indicated, missing design requirements of every type would be regenerated first for the most important SSCs (i.e., safety and then environmental SSCs). Other possible criteria to establish priority include modification history, plans for modification, and design.

4.3.1 Regeneration Methods

The method of design information regeneration is based on the availability of information, the importance of the SSCs, feasibility of regenerating the information, and available time and resources. The regeneration of design information can be accomplished via the following methods:

- Reanalysis. This approach is basically equivalent to redesign; it applies the design process to determine design requirements. Although the most technically acceptable method for regenerating missing requirements, it is typically the least cost-effective. This approach shall be used for the most important missing design requirements.
- Experience. This approach gathers and documents information from the experience of knowledgeable engineering and operations personnel. Their memory is a valuable (and frequently undocumented) source of information, and that information could be lost through attrition, transfers, retirement, and death. This activity starts promptly to prevent any further loss of knowledge.
- Reenacting. This approach attempts to repeat the original design process to decide which design outputs or portions of the equipment specifications are essential and which are optional. A combination of the first two approaches, this method may not go as far as reanalysis, but does carefully consider the likely design inputs, constraints, analysis and calculations, and outputs. After reanalysis, this is the most technically acceptable method.

- Testing. This approach tests equipment to determine its current functionality and accepts the results as design requirements after a technical evaluation by the engineering organization. Testing might be the only practical method for showing that system performance remains adequate.
- Comparison. This approach uses design information that exists from other facilities with systems or components having similar functions.

4.3.2 Process

The following actions describe the general process to be used for regeneration of design information:

<u>Actionee</u>	<u>Action</u>
Technical Review Team	1. Categorizes design information requiring regeneration.
Cognizant Engineer	2. Prioritizes required design information.
Cognizant Engineer and regeneration team	3. Determines the method of regeneration.
	4. Determines if other site systems, subsystems, or major components are similar in design and function to those at K Basins. If obtained, reviews this information to determine if it can be used to extract information or be modified for use at K Basins.
	5. Regenerates design information based on the chosen regeneration methods.
	6. Documents results in the appropriate DIS including technical basis for decisions made (may reference results and basis for decisions if released in a supporting document).

4.4 DESIGN INFORMATION VERIFICATION

When the extraction or regeneration process is complete, pertinent design input information is verified to ensure that the information extraction or regeneration process was conducted correctly, completely, and accurately and that no design information was overlooked. Verification shall be performed by a technical verification team that consists of individuals that were not on the team that extracted or regenerated the design information. Typically, this team consists of knowledgeable representatives from the following organizations:

- K Basins Engineering
- K Basins Operations
- K Basins Maintenance
- K Basins Quality Assurance

- Operations and Maintenance Program Improvement (emphasizing the various disciplines required to verify or regenerate design information for mechanical, electrical, and chemical systems as well as environmental compliance requirements).

During verification, any pertinent design information determined to be inadequate, conflicting, or missing is dispositioned in accordance with paragraph 4.6. A final check is made to verify that the information contained in each DIS has been accurately translated and transcribed during the preparation process. This verification ensures that any remaining open items are identified correctly and completely. Verification checklists shall be used to promote consistency, identify areas for review, provide stimuli for additional questions, and document the verification. Independent reviewers shall have sufficient technical background and experience to provide an objective, credible verification of the DIS information.

The following actions describe the general process to be used for design information verification:

<u>Actionee</u>	<u>Action</u>
Technical Verification Team	<ol style="list-style-type: none">1. Ensures the design information was extracted completely and accurately from the source documents.2. Evaluates extracted or regenerated design information to identify any missing design requirements or design basis information.3. Ranks missing information in order of importance to determine where and how the use of resources shall be applied when regeneration is required.

4.5 DESIGN INFORMATION VALIDATION

Extracted or regenerated and verified information shall be technically validated to ensure that it is reasonable, and that the analytical methods and technical assumptions used in the design process are valid and appropriate. DISs shall be validated through field inspection (walkdowns) to ensure that design requirements are properly reflected in the physical configuration and in the associated facility documentation. The information shall be examined against the facility physical configuration to establish a one-for-one correlation and to expose any incompleteness in the retrieved design information. Design basis information shall be correlated with the design requirements and where it is incomplete or nonexistent, the inadequate basis information shall be noted. In addition, technical assumptions, constraints, and analysis techniques that were used in the original design and subsequent modifications are validated to be appropriate for this facility and its current physical configuration.

1. Existing open items and discrepancies shall be resolved before field validation.
2. Critical calculations and analyses shall be validated by performing them independently and by different methods. Priority shall be given to equipment that supports accident prevention and mitigation and to those design documents for which the accuracy of the original calculations and analyses is suspect.

3. The validation of K Basins systems shall be conducted in accordance with WHC-CM-6-1, EP-4.1 "Design Verification Requirements."
4. Technical validation shall be performed by a technical validation team that consists of technically competent individuals familiar with the facility design and the design process. The same individuals involved in extraction and verification may perform the technical validation; however, the validation activity shall be clearly separated from the extraction and verification activities (the verification team and validation team shall not be the same for a single system). Typically, this team consists of knowledgeable representatives from the following organizations:
 - K Basins Engineering
 - K Basins Operations
 - K Basins Maintenance
 - K Basins Quality Assurance
 - Operations and Maintenance Program Improvement (emphasizing the various disciplines required to verify or regenerate design information for mechanical, electrical, and chemical systems as well as environmental compliance requirements).

A technical management review independently assesses (in accordance with WHC-CM-6-1, EP-4.1) the previous technical validation efforts and determines whether additional technical validation activities are needed (changes are performed in accordance with WHC-CM-6-1, EP-2.2). It also determines whether any design information is missing and identifies the missing design information. Missing and inaccurate design information are candidates for regeneration. The review process shall be procedurally established, considering any lessons learned from the initial technical reviews employed during various stages of the program plan.

4.6 DISCREPANCY IDENTIFICATION AND RESOLUTION

Uncertain, conflicting, inadequate, or missing design information discovered during the development process is either identified as an open item or declared a regeneration item. The open items shall be dispositioned and tracked to completion and closeout, including documentation of their resolution. The validity of items shall be confirmed; if an open item is not valid, it shall be closed. Open items may be identified at any point in the design reconstitution process. Open items with safety significance shall be identified as discrepancies and promptly referred to the Unresolved Safety Question (USQ) program to determine if any immediate action is necessary. Non-safety-related open items shall be identified as deficiencies. Each open item shall be evaluated and disposed in a manner that supports the program plan deliverables and schedule. If more than one open item exists, the order of resolution shall be based on the importance and potential impact of the open item.

For this program plan, it is assumed that all SSCs satisfy operability requirements unless, and until, there is confirmed information to the contrary. The presumption of operability is based on the fact that K Basins continues to operate based on engineering experience and judgment and after numerous facility reviews have been conducted, though sufficient information is not available to fully document the facility. Under the presumption of operability, the information necessary to make a clear confirmation of operability shall be obtained or developed expeditiously. The presumption of operability shall not be used for dispositioning a documented discrepancy. If a discrepancy clearly affects the safety of the K Basins operations, action to place the facility in a safe condition shall be taken.

The following actions describe the general process to be used for discrepancy identification:

<u>Actionee</u>	<u>Action</u>
Technical Team	<ol style="list-style-type: none">1. Identifies discrepancies, deficiencies, or regeneration items.2. Documents findings on the K Basins Discrepancy Identification and Resolution form (Appendix B, Figure B-8 and Figure B-9 for continuation, if necessary).3. Provides recommended action.
K Basins Configuration Management	<ol style="list-style-type: none">4. Assigns the discrepancy identification and resolution number and logs input.5. Copies the K Basins Discrepancy Identification and Resolution form (Appendix B, Figure B-8) and forwards the original to the cognizant engineer.
Cognizant Engineer	<ol style="list-style-type: none">6. Reviews and disposes the K Basins Discrepancy Identification and Resolution form (Appendix B, Figure B-8).7. Validates the resolution or develops a new resolution.8. Signs the K Basins Discrepancy Identification and Resolution form and forwards to the cognizant engineer's manager for review.
Cognizant Engineer's Manager	<ol style="list-style-type: none">9. Reviews the K Basins Discrepancy Identification and Resolution. If the disposition is acceptable, signs and forwards the original to K Basins Configuration Management. If disposition is not acceptable, the K Basins Discrepancy Identification and Resolution form is returned to the cognizant engineer for further action.
Cognizant Engineer and Manager	<ol style="list-style-type: none">10. Initiates an Engineering Change Notice (ECN) if the disposition changes design requirements or ensures the preparation of a work request if the Job Control System modifies the physical configuration.

NOTE: If the disposition requires approval outside the K Basins management structure, a Change Request is developed in accordance with WHC-CM-2-5, Management Control System, and forwarded to the appropriate authorizing organization.

4.7 PREPARATION AND RELEASE OF DESIGN INFORMATION SUMMARIES

To minimize the amount of information duplication and to maximize the useability of each DIS, all DISs shall be developed and released as a System Design Description. The required minimum contents of the DISs are identified in Appendix C. The DISs shall be initially issued when the "best available design information" is identified and, if possible, technically validated. This initial version shall also contain available technically validated design basis information and shall identify open items to be resolved. The DISs shall be revised and reissued when the design basis has been reconstituted (including regeneration of missing critical design basis) and the field validation has been completed. The DISs shall be prepared and released as supporting documents in accordance with WHC-CM-6-1, EP-1.12, "Supporting Document Requirements," and are considered facility life-time quality records.

5.0 REFERENCES

DOE-STD-1073-93, "Guide for Operational Configuration Management Program."

WHC-CM-2-5, Management Control System.

WHC-CM-3-5, Document Control and Records Management Manual.

WHC-CM-6-1, Standard Engineering Practices.

EP-1.10, "Engineering TBDs/HOLDs Requirements."

EP-1.12, "Supporting Document Requirements."

EP-2.2, "Engineering Document Change Control Requirements."

WHC-IP-1026, Engineering Practice Guidelines.

EPG-1.0, "Engineering Process."

EPG-1.12, "Supporting Documents."

EPG-2.0, "Engineering System Design Control."

EPG-5.2, "Typical Cognizant Engineer Responsibilities."

WHC-SD-SNF-CM-002, Configuration Management Plan for K Basins.

6.0 BIBLIOGRAPHY

DOE 4700.1, "Project Management System."

DOE 5480.5, "Safety of Nuclear Facilities."

DOE 5480.21, "Unreviewed Safety Questions."

DOE 5480.22, "Technical Safety Requirements."

DOE 5700.6C, "Quality Assurance."

DOE 6430.1A, "General Design Criteria."

RLID 5000.12, "Hanford Site Management System."

RLIP 4700.1A, "Project Management System."

Hanford Plant Standards, Standard Design Criteria, SDC-1.3, "Preparation and Control of Engineering and Fabrication Drawings."

WHC-CM-1, Company Policies and Charters.

WHC-CM-1-3, Management Requirements and Procedures.

WHC-CM-1-8, Work Management.

WHC-CM-3-10, Software Practices.

WHC-CM-4-2, Quality Assurance Manual.

WHC-CM-4-3, Industrial Safety Manual.

WHC-CM-4-9, Radiological Design.

WHC-CM-4-29, Nuclear Criticality Safety Manual.

WHC-CM-4-46, Nonreactor Facility Safety Analysis Manual.

WHC-CM-6-2, Project Management.

WHC-CM-7-5, Environmental Compliance.

NE F 1-2T, "Preparation of Plant and System Design Description Documents."

APPENDIX A**K BASINS SYSTEMS AND SUBSYSTEMS IDENTIFICATION**

- Radiation Protection - Installed detectors, PIOPS, portal monitors, portable radiation monitoring equipment, 183 Lab, annunciators, and security system interface.
- Environmental Protection/Waste Handling - Effluent stream monitoring, air monitoring, process ventilation, basin exhausters, drains/outfalls, instrumentation, annunciators, waste pads, and burial boxes.
- Fire Protection - Life Safety - Emergency lighting.
- Basin Water - Chillers, ion exchange modules, ion exchange columns, recirculation pumps, skimmer pumps, sand filters, canister filters, and instrumentation.
- Structures - Building structures, roofs, roof drains, cranes, and hoists.
- Water Supply and Distribution - River pumps and motors, raw water, filtered water, potable water, demineralized water, instrumentation, pumps, and annunciators.
- Basin Instrumentation - Level, pH, temperature, C/D sumps, basin water sampling, annunciation, telephone, LAN, PAX, sirens, and CCTV.
- Infrastructure - Heating, ventilation, and air conditioning, boilers, sanitary drains, septic, trailers, parking lots, compressed air.
- Water Treatment - Chemical Systems - Chlorine system, alum system, separan system, chlorine detection, 183 water sampling, instrumentation, and annunciators.
- Fuel Handling - encapsulation equipment, sludge removal equipment, canisters, casks, fuel racks, railcar controls, and chute doors.
- Electrical - AC and DC.

APPENDIX B

FORMS

Figure B-1. K Basins System Identification.

Page ____ of ____

[illegible]

APPENDIX B

FORMS (Continued)

Figure B-2. K Basins Subsystem Identification.

Page ____ of ____

[illegible]

APPENDIX B

FORMS (Continued)

Figure B-3. K Basins Major Component Identification.

Page ____ of ____

[illegible]

APPENDIX B

FORMS (Continued)

Figure B-4. K Basins Required Documents.

Page ____ of ____

[illegible]

APPENDIX B

FORMS (Continued)

Figure B-5. K Basins Document Identification.

Page ____ of ____

[illegible]

FORMS (Continued)

Figure B-6. K Basins Document Acceptability.

Page ____ of ____

[illegible]

APPENDIX B

FORMS (Continued)

Figure B-7. K Basins Design Information Extraction.

Page ____ of ____

[illegible]

APPENDIX B

FORMS (Continued)

Figure B-8. K Basins Discrepancy Identification and Resolution.

DIR No.: _____

Sheet 1 of _____

1.	SYSTEM:		
2.	SUB-SYSTEM:		
3.	COMPONENT:		
4.	DOCUMENT NUMBER:		
5.	REQUIREMENT NUMBER OR LOCATION:		
6.	TYPE OF DISCREPANCY: ☐ Uncertain ☐ Conflicting ☐ Inadequate ☐ Missing ☐ Safety Significance		
7.	PRIORITY: ☐ 1 = Critical, 2 = High, 3 = Medium, 4 = Low		
8.	DESCRIPTION OF DISCREPANCY: ☐ See Attached		
9.	RECOMMENDED ACTION: ☐ See Attached		
10.	ORIGINATOR:		
11.	POSITION: ☐ Accept-As-Is ☐ Reject Discrepancy ☐ Change Requirement ☐ Change Configuration		
	COMMENTS: ☐ See Attached		
12.	POSITION APPROVAL:		
	_____ Cognizant engineer	Date: _____	Phone No. _____
	_____ Cognizant engineer's manager	Date: _____	Phone No. _____
13.	CLOSED BY:	Date: _____	Phone No. _____
14.	VALIDATED BY:	Date: _____	Phone No. _____

Sheet ____ of ____

[illegible]

APPENDIX B

FORMS (Continued)

Figure B-9. K Basins Discrepancy Identification and Resolution
Continuation Sheet. (continued)

DIR No.: _____

☐ Description	☐ Recommendation	☐ Disposition	Comments
<p>1. The report contains several typographical errors, including "The" and "The" in the first paragraph, "The" in the second paragraph, and "The" in the third paragraph. These errors should be corrected to improve the readability of the report.</p> <p>2. The report contains several grammatical errors, including "The" and "The" in the first paragraph, "The" in the second paragraph, and "The" in the third paragraph. These errors should be corrected to improve the readability of the report.</p> <p>3. The report contains several punctuation errors, including "The" and "The" in the first paragraph, "The" in the second paragraph, and "The" in the third paragraph. These errors should be corrected to improve the readability of the report.</p> <p>4. The report contains several formatting errors, including "The" and "The" in the first paragraph, "The" in the second paragraph, and "The" in the third paragraph. These errors should be corrected to improve the readability of the report.</p> <p>5. The report contains several content errors, including "The" and "The" in the first paragraph, "The" in the second paragraph, and "The" in the third paragraph. These errors should be corrected to improve the readability of the report.</p>			

Sheet ____ of ____

APPENDIX C

CONTENT OF DESIGN INFORMATION SUMMARIES

This appendix presents the recommended content that is used in preparing K Basins DISs. This format contains basic information and necessary details to prepare a comprehensive DIS. Component-level design considerations are separated from system-level design considerations. Certain topics (such as operations, maintenance, and testing requirements) are separated from other design considerations to provide focused attention for the end users. This format may be modified to adequately describe a particular system.

1.0 SYSTEM SUMMARY DESCRIPTION

1. System Description - Discuss the system purpose and configuration. Include a general discussion of system location and boundaries (with drawings) and a general narrative of functional and operational requirements for the various system modes and operating conditions.
2. System Boundaries - Include a detailed discussion of system boundaries. Reference the location or listing of complete scope of system SSCs.
3. System Interfaces - List interfacing systems that are necessary for the subject system to perform its function. Describe functional requirements necessary from support systems; including electrical distribution systems; compressed air systems; heating, ventilation, and air conditioning (HVAC) systems; service water systems; etc.
4. System Classification - Discuss the applicable system grade (safety classification or mission essential). Identify principal functions or requirements that established the system grade, as well as the basis for any other applicable system classifications used at the facility, such as quality classification, seismic classification, etc.

2.0 FUNCTION AND DESIGN REQUIREMENTS

2.1 FUNCTIONS

State the individual functions of the system concisely and specifically, preferably in itemized format. This subsection should be less than one page in length.

2.2 SYSTEM DESIGN REQUIREMENTS

2.2.1 Functional and Performance Requirements

List functional and performance requirements or a narrative description of the system process requirements, including, but not limited to, the following:

- System flows, pressures, heat loads, thermal power ratings, operating temperatures, etc.

APPENDIX C.**CONTENT OF DESIGN INFORMATION SUMMARIES (Continued)**

- Special system design considerations such as net positive suction head requirements.
- Facility transients and/or off-normal conditions the system supports and how the availability of the system is ensured.
- A brief description of environmental limitations on system operation, such as normal radiation fields and possible post-accident conditions.
- Key instrumentation and control requirements to provide remote shutdown capability and enable local monitoring of process or operating activities.
- System performance characteristics under various normal and infrequent operating modes and off-normal operating conditions such as system head-flow characteristic curves, system hydraulic profile, and electrical performance curves.

2.2.2 Operability Requirements

Identify concisely and completely the operability requirements (what the process requirements are for the system), as well as the SSCs necessary to satisfy these requirements. Specify the auxiliary and support systems required for operability.

2.2.3 System Setpoints

List system setpoints with references to the design basis.

2.2.4 System Instrumentation and Alarms

Describe instrumentation and controls and alarm capabilities that are required to ensure that proper function and performance of the system.

2.2.5 System Interlocks

Provide information on interlocks with interfacing systems, the logic at the interlock, and reference to logic diagram and bases of interlock.

2.2.6 Maintenance Requirements

Include items such as access and space requirements for contact (hands-on) maintenance, shielding requirements and maximum allowable radiation levels in various areas for maintenance, and other specific provisions for maintenance.

APPENDIX C**CONTENT OF DESIGN INFORMATION SUMMARIES (Continued)****2.2.7 External Hazards**

Discuss the applicability of certain external hazards to the system, such as environmental qualification requirements, seismic requirements, fire protection requirements, and hazards protection requirements (including flood protection, high wind protection, lightning protection, etc.).

2.2.8 Structural Requirements

Discuss the requirements for seismic, wind, thermal, water, and any other static and dynamic load condition (including accidents), stress, shock, and reaction forces. Discuss equipment foundations and major components (e.g., tanks, pumps, heat exchangers, ducts, and duct supports).

2.2.9 Inspection Requirements

Include items such as required access provisions and periodic inspection requirements for vessels and piping, monitoring instrumentation for specific components, etc.

2.2.10 Designer Option

Describe those aspects of the system or subsystem where specific reference or linkage to a documented requirement does not exist. Discuss systems and subsystems that, although not required to meet the system or facility mission, continue to operate and be maintained.

2.3 SYSTEM DESIGN BASIS

The design basis information for a system is presented in the following sections.

1. Authorization basis - Describe those aspects of the design basis relied on by DOE to authorize operation. The authorization basis is described in documents such as the facility SAR and other safety analyses, hazard classification documents, technical safety requirements, DOE-issued safety evaluation reports, and facility-specific commitments made to satisfy DOE Orders or policies. Discuss the applicable accident scenarios that require the system to operate and the design inputs that need to be met. List any commitments to DOE.
2. Design inputs - List important design inputs, emphasizing codes and standards. Identify the original bases codes and standards (including year and addenda) adopted that specifically apply. List applicable DOE Orders, rules, and standards. Identify any exceptions to requirements that are reflected in the design. List the applicable codes and standards and a reference to the commitment to DOE. Identify whether the codes are optional or required (committed). Provide any exceptions to, or interpretations of, these requirements that are applicable to the current facility design. Identify quality assurance requirements.

APPENDIX C

CONTENT OF DESIGN INFORMATION SUMMARIES (Continued)

3. Design constraints - List and/or reference applicable system design constraints, including design procedures, methods, and guidelines.
4. Special material or system chemistry considerations. Discuss any special materials used in the system or components and the basis for material selection. Stipulate any materials that are prohibited from use in the components/systems. Define any special system chemistry considerations.
5. Design analysis and calculations - List and/or reference applicable system design analysis and calculations.
6. Undocumented components - Identify those components and their specific aspects that cannot be referenced or linked to a documented requirement. Discuss those components that, although not required to meet the system or facility function or mission, continue to operate and be maintained.

2.4 COMPONENT REQUIREMENTS AND BASIS

Identify major system components and important classes of components within the system, such as motor-operated valves. Provide component-level design requirements such as capacity, reliability, limits, and settings. Include component information such as seismic qualification and equipment environmental qualification if not in a separate document. Include or reference component design basis. Discussion includes the following:

- A description of each major component.
- Required functions.
- Design basis.
- A discussion of operating modes and the role of the component in the system.
- A discussion of how the installed component configuration satisfies the system design basis.

3.0 DESIGN DESCRIPTION

Include a summary description and a detailed description of the system and its components, the system arrangement, and the system performance characteristics. Include sufficient depth to show how the design satisfies the system functions and design requirements. Those items normally included in this section are described in more detail than in the following subsections.

APPENDIX C

CONTENT OF DESIGN INFORMATION SUMMARIES (Continued)

3.1 SUMMARY

Give a brief general description of the system and its configuration. Describe the relationship of the system to the entire facility, including plot plans, if appropriate.

3.2 DETAILED SYSTEM DESCRIPTION

Include a detailed discussion of the system design. Completely describe the system flow paths for its various operating modes to clearly show how the system functions and how it satisfies the design requirements. In this description, include the operating and design data, and reference the system process and instrument drawing and other drawings needed for effective design descriptions. Include specific design features and sizing parameters in the text or by tabulations and drawings.

3.3 SYSTEM PERFORMANCE CHARACTERISTICS

Provide the system performance characteristics under the various normal and infrequent operating modes and off-normal operating conditions.

3.4 SYSTEM ARRANGEMENT

Describe the system arrangement and reference the system drawings included. Describe the system piping arrangement and the location of operating stations.

3.5 COMPONENT DESIGN DESCRIPTIONS

Describe the individual system components. Identify the design parameters and the principal design features of each component and describe component operation. Include simplified outline drawings of the components in the text for improved understanding of the component design and operation. Include detailed component drawings in the list of references. Include component data sheets or reference an appendix for detailed information, such as valve, piping, and instrument lists, etc.

Identify alignment, tolerances, and stackup of system components important to the system design in this section. Include analyses and drawings that show how the system design satisfies these dimensional interfaces as a reference or appendix to the system design description.

3.6 INSTRUMENTATION AND CONTROL

Describe the system instrumentation, controls, and interlocks. Define the instrumentation associated with operation of the system, including the type, range, accuracy, setpoint, and location of sensor and instrument readout, with appropriate reference to the process and instrument drawing. Clearly identify instrumentation readout and control location (e.g., in the Control Room, or at specified local control stations). Provide instrument and control component performance

APPENDIX C

CONTENT OF DESIGN INFORMATION SUMMARIES (Continued)

information when it aids in understanding the system design, operation, and maintenance. Reference the instrumentation list that itemizes the instrument sensing elements, type, range, setpoint, whether indicating control or alarm, and readout location.

3.7 SYSTEM INTERFACES

Identify and describe the system interfaces with other systems. These interfaces impose functional and physical requirements on each of these associated systems, and identification in the system design description facilitates control of these system interfaces. Indicate how the system design satisfies the system interfaces that impose functional requirements on the subject system. When appropriate, include listings of system interfaces from system design descriptions in an appendix.

3.8 SYSTEM LIMITATIONS, SETPOINTS, AND PRECAUTIONS

List system limitations, setpoints, and precautions that provide a better understanding of system operation, response to casualties, and maintenance, which are described in later sections of the system design description. In the operating limits section, include in summary form, the high and low limits for all controlled variables. Include the dead band and overshoot for both manual and automatic control. Identify appropriate limits such as relief valve settings, maximum liquid level, etc. Provide the setpoints or nominal settings for automatic and manual controls for all anticipated operating modes.

Provide precautions to be observed by operations and maintenance personnel. Include design precautions such as interlocks and alarms. Define the system status checks needed for changing setpoints. Where appropriate, include detailed tabular listings in an appendix and reference this section.

4.0 OPERATION

Describe specific operational requirements established in the design process, such as acceptable operating modes, required operating ranges and limits, special operational actions to be taken in the event of component failures or unusual operating conditions (such as severe weather), special system interlocks requirements, and key operational considerations for equipment and personnel protection.

4.1 OPERATION

Include subsections covering outlines of all system operating procedures. Include sufficient detail to confirm that the design provides for the required modes of system operation, and to provide a basis for the preparation of detailed operating procedures. There should be a direct relationship between the individual operating procedure outlines in the system design description and the corresponding detailed operating procedures.

APPENDIX C

CONTENT OF DESIGN INFORMATION SUMMARIES (Continued)

In each operating procedure outline in the system design description, include sufficient detail to clearly identify the individual flow paths used, the instruments used to control these operations, and the proper sequence of steps to accomplish the operations. Identify the operating stations where the procedures are performed.

4.2 CASUALTY EVENTS AND RECOVERY PROCEDURES

Identify the possible casualty events that could affect the system and the protection provided against those casualties by the system design. Outline the system design features and recovery procedures that mitigate the consequences of the casualties and restore the system and plant to a known, confirmed safe condition.

4.2.1 Casualty Events

List any abnormal system or plant condition that could result in the following effect or action:

- Affects the safety, integrity, or proper functional operation of the system or plant
- Could produce system or plant degradation or affect personnel safety
- Requires action to restore the system or plant to a known, confirmed safe condition or to mitigate the consequences of the casualty event.

4.2.2 Design Features to Mitigate Effects of Casualty Events

Outline briefly the design features that provide protection and mitigate the effects of the casualty events. Identify the instrumentation that discloses the casualty event and its location. Where appropriate, provide the resultant system performance characteristics and parameters under the casualty conditions.

4.2.3 Recovery Procedures

Outline the recovery procedures performed by plant operating personnel to restore the system or plant to a known, safe condition, prevent propagation of and mitigate the effects of a casualty event, and ensure personnel safety. State the specific instrument indications and/or alarms that signal the casualty event, and outline the applicable recovery procedure.

Specify any follow-up and diagnostic action necessary to identify the cause of the casualty and the required permanent corrective action.

APPENDIX C**CONTENT OF DESIGN INFORMATION SUMMARIES (Continued)****5.0 MAINTENANCE**

Describe specific maintenance requirements established in the design process, such as periodic maintenance requirements, acceptable maintenance practices, preapproved part replacements, and maintenance ranges (e.g., switch setting ranges, torque ranges, etc.).

5.1 MAINTENANCE

Define the maintenance philosophy; outline the procedure for corrective maintenance, preventive maintenance, inspection and surveillance; and identify the interfacing systems needed to support maintenance operations.

Outline the procedures for placing the system in a condition suitable for corrective maintenance or replacement of the individual system components. Identify those special tools and equipment needed to permit performance of the maintenance operation, maintain system cleanliness, and maintain other specified conditions on the system and plant during the maintenance period.

Outline individual corrective maintenance procedures for each component of the system. Provide procedures in tabular form if more convenient. Include an outline of preventive maintenance procedures for the system and each component in the system.

5.2 INSPECTION

Define the conditions for performing inspection of the system during operation or shutdown. Identify the system design features to accomplish the required inspections. Identify specific equipment and access needed for the inspections.

5.3 SURVEILLANCE

Identify the necessary instrumentation for surveillance of the system and its components during the lifetime of the plant.

6.0 TESTING

Discuss inspection and testing. List or reference these requirements and the procedures that implement the specific inspection and testing requirements.

APPENDIX C

CONTENT OF DESIGN INFORMATION SUMMARIES (Continued)

7.0 OPTIONAL INFORMATION

In addition to the other sections described, the following provides information that may be useful in understanding the existing configuration and evaluating proposed changes. The users and uses of the facility DISs may influence the selection and content of these sections. These sections are optional.

1. Design Margin. The design margin is the difference between the specified design requirement and the minimum requirement that could be developed from the design basis. This section could be presented as a table that shows the specified design requirement compared to the possible design requirement if the margin was removed. It could be invaluable when evaluating operability concerns. In addition, this section could be a key input to the preparation of USQ safety reviews, since this information addresses the impact of changes on the margin of safety. However, this can be a difficult section to develop in that system sensitivity analyses, which would enable identifying component margins, may not have been performed. It is important not to identify the margin that was added for calculational uncertainty as a usable design margin. Identifying and documenting margins when specific design basis information is being developed or as subsequent analyses are performed could be a valuable reference.
2. Summary of Critical Calculations. Provide a summary of the most important system calculations, along with basic assumptions, calculational methods, relationship to other calculations, and general conclusions of calculations.
3. Postulated Failures. Describe failure modes considered in the system design. Include passive failures, such as pipe breaks, and active failures, such as failure of a valve to close or a pump to start on demand. Where necessary, discuss the impacts of a postulated support system failure (such as a valve repositioning or a loss of compressed air). Facility events may lead to special tests or analyses that can be used as inputs to this section.
4. Response to Transients. Describe the specific response of the system for facility transients and accidents.
5. Testing and Testability Requirements. Describe testing requirements established by design engineering and unique system testing requirements that resulted in special system design features.

APPENDIX C

CONTENT OF DESIGN INFORMATION SUMMARIES (Continued)

7.0 APPENDIXES

Include drawing lists, operating procedures, maintenance procedures, surveillance and inspection procedures, and vendor information files.

8.0 REFERENCES

APPENDIX D

TYPES OF SOURCE DOCUMENTS

The following subsections list and describe the typical types of government, industry, and Hanford-originated documents believed to contain design information. The actual types of documents to be recovered are identified in WHC-SD-SNF-CM-002, "Configuration Management Plan for K Basins," as selected by the K Basins design authority.

1. Government and Industry Codes and Standards - All applicable government and industry regulations, codes, standards, and directives in effect during the five decades of K Basins evolution are information sources.
2. Safety Analysis Documents - Typical safety analyses documents are:
 - Interim safety basis
 - Accelerated safety basis
 - Safety analysis report
 - Safety evaluation reports
 - Hazard analysis reports.
3. Operational Safety Documents - Typical operational safety documents within the scope are:
 - Technical safety requirements/operational safety requirements
 - Operational safety directives
 - Safety assessments
 - Environmental assessments.
4. Equipment Lists - Typical equipment lists within the scope are:
 - Safety envelope reference lists
 - Safety equipment lists
 - Spares multiple unit lists
 - Interface control lists
 - Master equipment lists.
5. Functional Design Criteria - Functional design criteria are technical documents prepared before the definitive design for new SSCs or changes made to SSCs. Many of the K Basins primary and ancillary systems pre-date the issue of government orders that currently require the preparation of functional design criteria. Therefore, functional design criteria were only prepared for some of the most recently installed SSCs. Furthermore, it is uncertain that functional design criteria for all SSCs are available or were ever formally issued. Typically, functional design criteria are expected to include the following categories of information:
 - General requirements
 - Facilities requirements and criteria
 - Structures requirements and criteria

APPENDIX D**TYPES OF SOURCE DOCUMENTS (Continued)**

- Systems requirements and criteria
 - Configuration requirements
 - Utilities requirements
 - Instrumentation requirements
 - Design loads and demands including natural phenomena
 - Safety requirements
 - Applicable regulations, codes, and standards.
6. Design Requirements - These documents define the principal design requirements for K Basins necessary to accomplish the mission statement, consistent with the design approach that has been adopted, and in sufficient detail to permit the definition and allocation of requirements for the K Basins SSCs.
7. System Design Descriptions - System design descriptions provide K Basins systems design functions, requirements, and purpose and discuss how these requirements are satisfied by the design. Requirements defined by the system design descriptions are allocated from the K Basins design requirements and design descriptions documents.
8. Specifications - Equipment or hardware specifications provide the detailed descriptions of engineered components required to procure an item. Facility specifications are the detailed descriptions for site definition, construction, and installation interfaces or access spaces. This includes the following types:
- Equipment specification
 - Operating specification
 - Construction specification
 - Procurement specification
 - Test procedures/specification
 - Process specification.
9. Technical Reports - Various technical reports provide analyses records of the results of tasks performed to analyze, evaluate, or assess the functional and physical characteristics of an SSC. These reports may be originated by the engineering, design agents (subcontractors), or other K Basins participants. Typical categories for this type of information source are:
- Seismic/stress analysis
 - Stress/design report
 - Calculations.

APPENDIX D

TYPES OF SOURCE DOCUMENTS (Continued)

10. Drawings - Drawings typically consist of the following types.

- a. Architect-Engineer (A-E) Drawings - These drawings are construction-type drawings (and specifications) required to define, operate, and manage the K Basins.
- b. System Drawings - These drawings are required to define the end-to-end configuration of systems installed in the facility. System drawings show pieces of equipment installed and connected, and are necessary for a complete understanding of system operation and maintenance requirements.
- c. Equipment Drawings - These drawings (and specifications) are required to define, procure, modify, install, and test specific items that, when assembled, make up the systems installed and connected to constitute the K Basins.
- d. Interface Drawings - These drawings control the configuration of items that share an interface. These drawings are consulted in conjunction with other interface control documentation that govern or capture the attributes of a common boundary or interface.

Interfaces management is accomplished via the identification and creation of interface control documents for interfaces or common boundaries between systems, parts, processes, etc. It is anticipated that a configured item list is generated and maintained by the configuration management database.

e. Other Drawings.

- Piping and instrument drawings (P&ID) drawings
- Instrument and Equipment Flow Diagram (IEFD) drawings
- Electric circuit
- Instrumentation.

11. Calibration, Operation, and Maintenance Manuals - Calibration, operation, and maintenance manuals, and the process control manual capture the functional and physical requirements developed by the design organizations during design efforts. In addition, documents such as instrument loop diagrams, logic diagrams, and termination lists were developed. These documents are imposed on K Basins operators as system requirements or constraints, or as mandatory operation and maintenance parameters, setpoints, and limits.

APPENDIX D**TYPES OF SOURCE DOCUMENTS (Continued)**

12. Vendor Information - Vendor information consists of shop and fabrication drawings, specification sheets, processes, procedures, acceptance testing, inspection reports, operating and maintenance instructions, user's manuals, training materials, warranties, and spare parts recommendations. Also, any other vendor originated information identified as a deliverable by the procurement contract is considered vendor information.
13. Procedures, Processes, and Standards - Fabrication, installation, process, acceptance, test, and operation and maintenance information sources typically reside in the following types of documents:
 - Engineering procedures
 - Installation procedures
 - Calibration procedures
 - Operating instructions
 - Operating procedures
 - Maintenance procedures.
14. Engineering Change Notice - This form is used to document, approve, and control changes to an engineering document.
15. Nonconformances - Waivers and deviations are typically considered under the general category of nonconformances. Waivers are deviations from approved specifications or drawings that are identified before hardware manufacturing or software coding. Deviations are initiated to accept an item during manufacture, fabrication, assembly, installation, testings, or inspection that departs from specifications or drawings.
16. Quality Assurance and Quality Control Documents - Inspection reports, assessment reports, audit reports, and applicable quality assurance documents are information sources.
17. Other Documentation - This category includes information sources (e.g., operations log books, process test reports, internal and external correspondence, memos, commitments, personal files, databases, etc.) not captured by any of the above types but are required to ensure technical baseline control. Other documentation would also include data that does not rigidly fit into design basis documentation (e.g., fuel storage basin water sampling, air sampling, photographic characterization, and data collection summaries).

APPENDIX E

EXAMPLES OF REQUIREMENTS

1. Structure Level Design

- Design Requirement: Lateral load resisting system elements must be designed to withstand 100 mph wind pressures.

Design Basis: The lateral load resisting system provides stability to the structure under wind loading. A 100-mph wind velocity was selected according to ANSI A58.1 based on a review of the geographical location of the structure.

2. System Level Design

- Design Requirement: Emergency cooling system flow of 500 gpm must reach the reactor vessel within 25 seconds after initiation signal.

Design Basis: The facility transient analysis assumes 500 gpm with a 25-second delay to mitigate a small break loss-of-coolant accident. The actual engineering analysis provides a design margin for uncertainties by using 450 gpm with a 35-second delay.

- Design Requirement: Emergency electrical system must provide 1000 Kw within 60 seconds of initiation.

Design Basis: The nuclear safety electrical loads total 900 Kw. Cumulative additions to this electrical load lists are tracked. The facility transient analysis identifies that no more than 60 seconds elapse until emergency power is restored; the analysis assumes 85 seconds.

- Design Requirement: System water chemistry must be maintained with dissolved oxygen between 500 and 1500 parts per billion.

Design Basis: Dissolved oxygen above 500 parts per billion is enough to keep nitrates stable. Dissolved oxygen below 1500 parts per billion minimizes corrosion of stainless steel or leeching of spent nuclear fuel.

3. Component Level Design

- Design Requirement: Motor operated valve XYZ must open in 10 seconds at 1 psid and 80 percent of rated voltage.

Design Basis: 10 seconds is desired to meet the system response time requirement of emergency cooling system injection within 25 seconds at design basis conditions.

APPENDIX E**EXAMPLES OF REQUIREMENTS (Continued)**

- Design Requirement: Relief valve ABC pressure setting of 165 psig and flow rate of 1 gpm.

Design Basis: Parameters must meet ASME Section III, Section 7000 code requirements. Per code, pressure equals piping design pressure. Flow rate must be sufficient to prevent a pressure greater than 110 percent of the design pressure caused by thermal expansion and leakage through isolation valves.

- Design Requirement: Miniflow bypass valve PQR must open in 4 seconds.

Design Basis: 4 seconds is the desired opening time. The valve is designed to open as fast as practicable to minimize the time that the pump operates deadheaded. Valve and bypass piping are specified as 4 inches to pass pump miniflow requirement. Experience has demonstrated that vendors can supply fast opening valves with stem stroke rates of 1 inch per second. Hence, a 4-second stroke time for this 4-inch valve was selected. The engineering analysis indicates that up to 8 seconds is acceptable (i.e., 4 seconds of design margin is built into the design requirement).

APPENDIX F**TYPES OF DESIGN INFORMATION**

- Specific functional requirements
 - Interfacing systems/functions
 - Safety/quality class
 - Load purpose/function
 - Load sequence
 - Interlocks/protection requirements
 - Operator interface requirements
 - Bypass indications
 - Post-event accessibility
 - System support requirements
- Specific survivability requirements
 - Normal service environment
 - Loss of HVAC
 - Site hazards (seismic, tornado, missile, flood, freeze, lightning)
 - Transients
 - Fire/Safe shutdown
 - Vibration
- Specific performance requirements
 - System flow requirements
 - Preferred failure modes
 - Reliability/availability goals
 - System/component impedance
 - Load duty cycle
 - Load electrical characteristics
 - Transient response
 - Testability
 - Separation/independence/diversity requirements
 - Redundancy requirements
- Specific standards
 - American Society of Mechanical Engineers (ASME)
 - American National Standards Institute (ANSI)
 - American Society of Civil Engineers (ASCE)
 - Institute of Electrical and Electronics Engineers (IEEE)
 - American Concrete Institute (ACI)
 - American Institute of Steel Construction (AISC)
 - Hydraulics Institute (HI)
 - Instrument Society of America (ISA)
 - Standards from DOE Orders, commitments, etc.
 - Applicable NRC standards (10 CFR, Standard Review Plan, Regulatory Guides)

APPENDIX F**TYPES OF DESIGN INFORMATION (Continued)**

- Specific regulatory requirements
 - DOE rules
 - DOE orders
 - DOE safety guides
 - Washington Administrative Code
 - Environmental Protection Agency
 - National Pollutant Discharge Elimination System
- DOE correspondence and commitments
 - DOE safety evaluation reports
 - Facility safety analysis reports

Design Constraints

- Engineering standard practice guidance, procedures, instructions
 - Design process methodology
 - Setpoint methodology
 - Design discipline methodologies
 - Architect Engineer/Vendor guides and standards
- Computer codes used for design or design analysis (including user manuals)
- General Regulatory Requirements
 - DOE 4700.1
 - DOE 6430.1A
 - General Design Criteria
 - Safety Classification
- General Codes and Standards
 - American Society of Mechanical Engineers (ASME)
 - American National Standards Institute (ANSI)
 - American Society of Civil Engineers (ASCE)
 - Institute of Electrical and Electronics Engineers (IEEE)
 - American Concrete Institute (ACI)
 - American Institute of Steel Construction (AISC)
 - Hydraulics Institute (HI)
 - Instrument Society of America (ISA)
 - Applicable NRC standards (Standard Review Plan, Regulatory Guides)

APPENDIX F**TYPES OF DESIGN INFORMATION (Continued)**

- Quality Assurance Requirements
 - DOE 5700.6C
 - ANSI NQA-1
 - ANSI N.45.2.11

Design Analysis and Calculations

- Engineering forms, evaluations, and documents used to implement designs and design changes
- Calculations or analyses that verify that the design inputs and constraints are met
 - Component classification evaluations
 - Load sequencing and electrical supply sizing calculations
 - Setpoint calculations and methodologies
 - Equipment sizing calculations
 - Motor-operated valve calculations, analyses, or test results that establish switch settings/tolerances
- Design baseline analysis and calculations to establish effects of postulated accidents:
 - Transient analysis
 - Site Hazards analysis
 - Seismic site specific criteria
 - Flooding site specific criteria
 - Ultimate heat sink analysis
 - Loss of spent fuel cooling analysis
- Instrument and electrical
 - Power and instrument cable sizing
 - System voltage profiles
 - System short circuit analysis
 - Diesel generator performance
 - Bus transfer analysis
 - System protection and coordination analysis
 - Battery sizing
 - Instrument accuracy calculations
 - Instrument Setpoint calculations
 - Current loop response time calculations
 - Electrical separation analysis
 - Raceway fill and loading
 - Failure modes and effects analysis
 - Thermal form evaluation

APPENDIX F**TYPES OF DESIGN INFORMATION (Continued)**

- Surge withstand capability
- Set point tolerance
- Calibration and scaling calculations
- Lightning protection analyses
- Emergency lighting calculations
- Motor starting calculations
- Station blackout analysis
- Offsite/onsite independence
- Operator response time calculations

- Nuclear
 - Tornado loadings and external missiles
 - External flooding analysis
 - Pipe break effects
 - Equipment environmental qualification
 - Radiation source term identification
 - Radioactivity transport analysis
 - Post accident conditions
 - Offsite dose analysis
 - Onsite personnel dose analysis
 - Heat load determination analysis
 - HVAC failure modes and effects analysis
 - HVAC Instrumentation setpoints
 - HVAC design analysis
 - Pipe flow hydrodynamic loads analysis
 - Piping network dynamic flow analysis
 - Valve operability analysis
 - ASME Code of record calculations
 - Computer code validations and certifications
 - Thermal analysis of components, supports, and structures
 - Component minimum wall thickness calculations

- Civil
 - Concrete structures analysis
 - Steel structures analysis
 - Civil structure dynamic/earthquake analysis
 - Dynamic/stress analysis of substructures
 - Tornado analysis of structures
 - Building roof analysis
 - Weld evaluations
 - Block wall evaluations

APPENDIX F**TYPES OF DESIGN INFORMATION (Continued)**

- Component seismic/structural qualification
 - Pipe rupture restraints
 - Bolt anchorage analysis
 - Probable maximum flood analysis
 - Platform steel, cranes, monorails, doors, ladders
 - Heavy loads analysis
 - Floor loading analysis
 - Piping analysis
 - Generically qualified piping and supports
 - Rigorously analyzed piping and supports
 - Seismic analysis of electrical conduit
 - Instrument line analysis
 - Supports analysis (pipe, duct, conduit, instrumentation, etc.)
 - Foundation analysis
 - Seismic Category 2/Category 1 evaluation
 - Differential building settlement
 - Buried piping
 - Supplemental steel, building steel load tracking program
 - Equipment anchorage qualification
 - Anchor bolt load capacities
-
- Mechanical
 - Piping minimum wall thickness
 - Pump minimum positive suction
 - Pump total system head
 - Valve pressure drops (Cv)
 - Tank nozzle/branch line reinforcement
 - Heat transfer analysis
 - Pump/system performance analysis
 - Pressure/vacuum relief valve sizing
 - Sump capacity
 - Cooling water flow rates
 - Equipment performance calculations
 - Corrosion/erosion allowances
 - Tank sizing and wall thickness calculations
 - Pipe sizing/flow analysis
 - System design/operating pressures and temperatures
 - Pump brake horsepower requirements
 - Valve actuation and check valve closure times
 - Vibration data
 - Thermal expansion data
 - Design cycles for equipment and systems
 - System resistance

APPENDIX F**TYPES OF DESIGN INFORMATION (Continued)**

- Identification and consideration of vendor information
 - Vendor equipment allowable loads
 - Vendor equipment functional, seismic, and environmental qualification
 - Vendor equipment installation and maintenance requirement
 - Vendor standard component load capacities
 - Pressure ratings
- Correspondence, meeting minutes, and other documents pertaining to design evaluations and considerations

Design Output Documents

- System descriptions, modifications descriptions
- Specifications
 - Component
 - Material
 - Design
 - Installation
 - Procurement
 - Piping classification list
 - Valve mark number list
- Facility component lists
 - Valve lists
 - Equipment lists
 - Electrical load lists
 - Setpoint lists
 - Fuse and breakers lists
 - Instrument and controls
 - Environmental qualification
- SAR changes
- Safety evaluations and technical review checklists/results
 - Technical review checklists
 - USQ safety evaluations and checklists

APPENDIX F**TYPES OF DESIGN INFORMATION (Continued)**

- Process software (or firmware) requirements specifications
- Instrument and control setpoints (document)
- Mechanical outputs
 - Basic flow diagrams
 - Heat balance diagrams
 - P&IDs
 - Layout and arrangement
 - HVAC (area drawings)
 - Plumbing (area drawings)
 - Isometric drawings
 - Equipment location drawings
 - Typical support detail for field routed pipe
 - Design cycles for equipment and systems
- Electrical outputs
 - One line diagrams
 - Elementary diagrams
 - Wiring diagrams
 - Equipment requirements and arrangements
 - Diesel generator load sequencing
 - Logic for electrical system
 - Fire and safety
 - Grounding
 - Conduit and tray
 - Communication and lighting
 - Underground conduit
 - Breaker coordination
- Control systems outputs
 - Field locations and arrangement
 - Logic diagrams
 - Loop diagrams
 - Panel and console diagrams
 - User's guides
- Pipe support (hanger and support design)

APPENDIX F

TYPES OF DESIGN INFORMATION (Continued)

- Operational requirements
 - Operator action requirements
 - Normal operating parameters
 - Environmental requirements
 - Support system requirements
- Maintenance requirements preventive maintenance vendor requirements
- Testing requirements
 - Post-modification testing
 - Surveillance testing
 - In-service inspection and testing
- Construction and installation specifications
 - Inspection requirements

GLOSSARY

Authorization Basis. Those aspects of the facility design basis relied on by DOE to authorize operation. These aspects are considered to be important to the safety of facility operations. The authorization basis is described in documents such as the facility SAR and other safety analyses, hazard classification documents, the Technical Safety Requirements, DOE-issued safety evaluation reports, and facility-specific commitments made to satisfy DOE Orders or policies. The authorization basis is an important subset of the design basis.

Comprehensive Search. A process through which a broad spectrum of documents that may contain design information are identified, retrieved, and evaluated. Key steps involve locating and screening documents that may contain design information and reviewing those documents to extract design information.

Concealed Component. A component that is hidden from view, or for which visual observation is not possible because of safety or physical constraints.

Design Authority. The organization responsible for establishing the design requirements and ensuring that design output documents appropriately and accurately reflect the design basis. The Design Authority is responsible for design control and ultimate technical adequacy of the engineering design process. These responsibilities are applicable whether the process is conducted fully in-house, partially contracted to outside organizations, or fully contracted to outside organizations.

Design Documents. Those documents that define either the design requirements or the design basis of the facility. Design documents include design specifications, design change packages, design drawings, design analysis, setpoint calculations, summary design documents, correspondence with DOE that provides design commitments, and other documents that define the facility design.

Design Information. The combination of design requirements and design basis information associated with the design process, consisting of design inputs, design constraints, design analysis and calculations, and design outputs.

Design Information Summary. A summary design document, organized by system or topical area, that provides both the associated design requirements and their design basis.

Design Reconstitution. An adjunct program to the configuration management program that accomplishes the one-time effort identifying, retrieving, extracting, evaluating, verifying, validating, and regenerating missing critical design requirements and basis. Design reconstitution encompasses the following functions: developing associated program plans and procedures; identifying and retrieving design information from identified source documents; evaluating, verifying, and validating the design information; resolving discrepancies; regenerating missing critical design information; and preparing and issuing Design Information Summaries.

Design Requirements. Those engineering requirements reflected in design output documents (such as drawings and specifications) that define the functions, capabilities, capacities, physical sizes and dimensions, limits and setpoints, etc., specified by design engineering for an SSC. The design requirements provide the results of the design process.

GLOSSARY (Continued)

Discrepancy. A difference between what is shown on the drawing when compared to what is actually required.

Discrepancy Data Sheet (DDS). A form that is used to describe a condition in which the system configuration differs from the requirements.

Document. Recorded information that describes, specifies, reports, certifies, requires, or provides data or results. For the configuration management program, this includes paper copies (procedures, manuals, records, etc.), electronic media (such as word processor files and computer databases), and any other source(s) of information used to design or operate the facility or make sound technical decisions. It includes both current or working documents and historical records. See also "Facility Documents" and "Design Documents."

Facility Type and Technical Characteristics. Those considerations related to the particular technical nature of the facility and its design and operating characteristics. These include the facility process and functions, operating conditions, and the nature of hazards involved.

Formal Review. A process through which design information is identified and retrieved from top-level, summary-type design documents such as the SAR, technical safety requirements, and system design descriptions.

Open Item. A validated situation involving apparent contradictions from different source documents, concerns, unanswered technical questions, or cases of missing, undocumented, or inaccurate information.

Smart Search. A process through which that set of documents that are most likely to contain design requirements are identified, retrieved and evaluated. Key steps involve locating of the source documents most likely to contain design requirements, screening them for applicability, and reviewing them to extract design information.

Technical Validation. For the design reconstitution program, the process of providing reasonable assurance that the retrieved design information is reasonable, applicable, and technically appropriate. This includes determining the appropriateness of analytical methods and technical assumptions.

Topical Areas. Those topics that involve or affect multiple SSCs in a facility. Examples include seismic qualification, fire protection, safe shutdown, environmental qualification, electrical separation, and nuclear criticality.

Validation Package. A quality record that documents the elements of the validation process.

Verification. For the design reconstitution program, the process of checking that the retrieved design information has been completely and accurately translated from the source documents.