Technical Reviews

Approved by

SPPC, 2/18/10

1.0 Purpose

The purpose of this procedure is to provide direction and requirements for performing technical reviews.

2.0 Scope

The following technical reviews are defined within this procedure.

- Design Check
- Design Verification
- Design Authority Technical Review
- Formal Design Review
- Technology Development Review

The signature of the reviewing engineer, with the proper documentation, signifies completion of the defined requirements.

Many site procedures require an engineer to perform technical reviews:

- For technical reviews other than the five listed above (e.g., operations procedures, work orders), the review criteria and review comment handling process is used as specified in the procedure governing the document's origination(e.g., 2S-1.1, 1Y-8.20).
- For calculations, use this procedure in conjunction with E7, 2.31. This includes calculations that support Preliminary Documented Safety Analysis/Documented Safety Analysis (PDSA/DSAs), technical baseline documents, engineering decisions, analysis, research and development.

The provisions of this procedure apply to the Performing Entities at the Savannah River Site (SRS), and to subcontractors performing work for any member of the Performing Entities when required by contract or applicable law.

3.0 Terms and Definitions

The following terms are introduced in this procedure. Refer to the E7 Glossary for the definition of additional terms.

Design Authority Technical Review – a technical review performed by the facility/project Design Authority to assure technical acceptability of documents prior to their approval. The review determines if the modification (as documented) will be acceptable to the facility (e.g.,

Will the modification impact the facility's Safety Basis? Are there additional facility impacts?).

Design Check – a technical review performed to assure technical accuracy and completeness of design and analysis documents prior to approval. A Design Check is normally performed by a peer (who was not directly involved in the preparation of the document being reviewed) of the document originator.

Design Verification – a technical review performed to assure the technical accuracy and completeness of design and analysis documents to ensure they are correct and satisfactory prior to approval, either by document review, qualification testing, alternative calculation, or operational testing. The Design Verification philosophy is the same as the Design Check but assures the technical accuracy of the design at an increased level of rigor, breadth, and depth.

Formal Design Review – a technical review performed to assure the design at a specific stage of a modification/project is sufficient to perform the task scope, and to assure that the required technical work commensurate with the design phase has been accomplished.

Qualification Testing – Testing performed in lieu of analytical methods to demonstrate conformance with technical requirements. This may include activities such as component seismic testing, environmental qualification testing, load testing, proof-of-principle or simulation of design demonstrations. It does not include on site acceptance testing.

Technical Review – a deliberate, thoughtful assessment process by which engineers, who meet defined criteria, evaluate documents prior to approval to assure the documents meet technical requirements.

Technology Review – an independent assessment of the technology development activities supporting modifications to assure they have been accomplished commensurate with the phase of the design being reviewed.

Technical Accuracy – a document accurately incorporates and fulfills the originating technical input requirements, and meets the relevant requirements of all applicable regulatory and industry codes and standards. Design Checks and Design Verifications are technical reviews performed to assure technical accuracy of design documents.

Technical Acceptability –a document is acceptable to the affected facility and complies with the approved design and safety envelope as defined in the documented safety analysis, as determined by a comprehensive assessment of five main areas: facility system acceptability, facility safety basis, facility impacts, facility system interfaces, and additional review by Technical Agencies. A Design Authority Technical Review is performed to assure technical acceptability.

4.0 Responsibilities

4.1 Originator/Responsible Engineer/Design Team/Development Team

- identifying and obtaining the required technical reviews for documents

4.2 Verifier/Checker

- assuring the technical accuracy and completeness of documents

4.3 Design Authority

- assuring the technical acceptability of documents

4.4 Formal Design Review Board

- assuring the design is sufficient to perform the project task scope at a specific stage of a project
- assuring the technical work activities and outputs, appropriate for the design phase being reviewed, have been adequately accomplished and documented.

4.5 Technology Review Committee

- assuring the activities of a Technology Development Plan have been adequately conducted for the project stage being reviewed

4.6 Chief Engineer

- appointing the Formal Design Review Board Chairperson
- approving project continuation memos after Formal Design Review Board Technical Reviews

4.7 SRNL Director

- appointing the Technology Review Committee Chairperson and members

5.0 General

5.1 Design Check

The philosophy behind a Design Check is that all work benefits from a good review. This is best accomplished by having a competent, capable, experienced peer perform a review to assure technical accuracy. A Design Check is required for Production Support (PS) and General Services (GS) design output documents.

5.1.1 The checker assures the technical accuracy and completeness of the document by performing the Design Check actions:

- a mathematical sample or check, if appropriate
- a review for correct use of technical input, including quality requirements*
- a check for appropriate use of methods, computer programs, etc.
- a review of the approach/methodology used and reasonableness of the output
- an administrative check (page numbers, etc.).

* Determination of quality requirements is the responsibility of the document originator; the checker reviews to assure the appropriate quality requirements were selected and correctly implemented. Manual E7, Procedure 2.25, Attachment 8.6, Determination of Quality Requirements, identifies potential quality requirements/management controls along with applicable reference documents.

The checker uses a tailored approach, based on the dollar value and relative impact (scope, risk, and functional class) to determine the level of detail for review, up to and including all the requirements of a Design Verification (Reference Section 5.2).

5.1.2 A checker must meet the following criteria to perform a Design Check:

- Did not participate in the development of the portion of the document being checked (e.g., sufficiently independent of the document preparation)
- Is knowledgeable in the area of the design or analysis for which they review.
- Is capable of performing similar design or analysis activities.
- Has security clearance for access to sufficient information to perform the Design Check.

5.1.3 The document originator's Manager may perform the Design Check provided the manager meets the requirements of step 5.1.2 and did not:

- Specify a singular approach.
- Rule out certain design or analysis considerations.
- Establish inputs to the design or analysis documents being verified.

5.1.4 The Design Authority may perform the Design Check provided the Design Authority meets the requirements of step 5.1.2.

5.1.5 The checker documents satisfactory completion of the Design Check by signing or initialing the document.

5.2 Design Verification

The Design Verification philosophy is the same as the Design Check but assures the technical accuracy and completeness at an increased level of rigor, breadth, and depth. The verifier bases the extent of the review upon the importance to safety, the complexity, the degree of standardization, the state of the art, and similarity with previously proven designs or analyses. Design Verification is required for Safety Significant (SS) and Safety Class (SC) documents.

There are four acceptable methods of Design Verification:

- Document review
- Qualification testing
- Alternate calculations
- Operational testing for developmental, prototypical or experimental designs.

The design organization responsible for performing the design verification shall identify, and document the particular design verification method(s) used.

For all four methods of Design Verification, the verifier is required to have the same qualifications listed in Section 5.1.2 for a check reviewer.

5.2.1 Design Verification by Document Review

The verifier assures the technical accuracy of the document by performing administrative and mathematical checks as appropriate, and by evaluating the modification against the following questions:

a. Were the inputs correctly selected and identified?

b. Are the assumptions made in the performance of the design or analytical activity adequately described and reasonable?

c. When necessary, are the assumptions identified for subsequent re-verification when the detailed design activities are completed?

d. Were appropriate design or analytical methods and computer programs used?

e. Were the design or analytical inputs correctly incorporated into the design, analysis or evaluation?

f. Have engineering actions, required to support risk handling strategies, been verified?

g. Is the design output reasonable compared to the design or analytical inputs?

h. Are the necessary design inputs for interfacing organizations specified in the design documents or in supporting procedures or instructions?

i. Have suitable materials, parts, processes, and inspection and testing criteria been specified?

j. Have existing and potential workplace hazards been identified, evaluated, and controls incorporated for the risk to worker injury or illness?

k. Was a review conducted to confirm that there are no interferences with other ongoing or planned modifications?

l. Have engineering judgments been identified, technically justified, and supported?

m. Have design optimization strategies been considered/met (e.g., appropriate tailoring of requirements, design attributes, and operating strategies)?

5.2.1.1 Verifiers must meet the criteria listed in 5.1.2 for the portions of the design or analysis that they review. Multiple verifiers may be required to cover multi-discipline documents. Examples of verifiers that should be considered are provided in the Technical Agency Contacts list on the Conduct of Engineering web page.

5.2.1.2 When revisions are made to previously verified documents, Design Verification is required for the revisions, including evaluation of the effects of the revisions on the overall design or Documented Safety Analysis (DSA).

5.2.1.3 The satisfactory completion of Design Verification by document review may be documented by a signature on the design change document for the modification. A Design Verification Report (OSR 19-196) may also be used. For Design Verification

Reports, obtain a number and submit to document control in accordance with Procedure 1.20, Manual E7.

5.2.2 Design Verification by Qualification Testing

When Qualification Testing is used for Design Verification, such testing shall be performed using test procedures that include qualification test requirements and acceptance criteria identified by Technical Agency (ies). Tests / test procedures shall demonstrate the adequacy of SSC performance under conditions that meet or exceed assumptions and technical requirements expected to be experienced by the SSC. The Technical Agency shall consider operating modes and environmental conditions in which the SSC must perform satisfactorily.

Qualification Testing performed to satisfy Design Verification must be controlled in accordance with Manual 1Q, QAP 11-1, Test Control, which provides the requirements and responsibilities for preparing and approving test procedures, and for planning, performing, and documenting tests.

If Qualification Testing indicates that a modification to an SSC is necessary to obtain acceptable performance, then the modification shall be documented in accordance with the requirements of Manual E7, and the SSC modified and retested or otherwise verified to ensure satisfactory performance.

Where Qualification Testing is intended to verify only specific design features, the other features of the design shall be verified by other means.

When Qualification Testing is being performed on models or mockups, scaling laws shall be established and verified. The results of model test work shall be subject to error analysis, where applicable, prior to use in the final design.

Design Verification by Qualification Testing done by Site personnel is documented on a Design Verification Report (OSR 19-196) and includes the qualification test procedure(s), test results, engineering evaluation, and subsequent retests, as required.

Design Verification by Qualification Testing done by Vendors or off-Site sources is documented in a manner equivalent to a Design Verification Report (OSR 19-196) and includes the qualification test procedure(s), test results, engineering evaluation, and subsequent retests, as required.

5.2.3 Design Verification by Alternate Calculations

When alternate calculations are used for Design Verification, the alternate calculations are prepared and documented and a reference number is assigned to the documented analysis in accordance with Procedure 2.31, Manual E7. Alternate calculations are calculations or analyses that are made with alternate methods to verify correctness of the original calculations or analyses. The appropriateness of assumptions, input data used, and the computer programs or other calculation methods used shall also be verified. Sample or short calculations used as part of the independent document review process are not covered by this section.

5.2.4 Design Verification by Operational Testing for Developmental, Prototypical, or Experimental Designs

The design of SSCs that are developmental, prototypical, or experimental may be complex, nonstandard, advance state of the art, or based on unproven technology. In such cases, operational testing may be required to achieve adequate Design Verification. The portion(s) of the design to be verified using operational testing are identified using the above criteria. The extent of the verification is defined and documented on a Design Verification Report (OSR 19-196), and the report number is noted on the reviewed document.

Where operational testing is intended to verify only specific design features, the other features of the design shall be verified by other means.

When operational testing is being performed on models or mockups, scaling laws shall be established and verified. The results of model test work shall be subject to error analysis, where applicable, prior to use in the final design.

5.3 Design Authority Technical Review (DATR)

The DATR philosophy differs from the Design Check and Design Verification. While a Design Check and Design Verification assure technical accuracy, the DATR assures technical acceptability by answering the question "Is this technically acceptable to put in this specific facility?"

Notes: 1. The Design Authority technical reviewer does not have to be independent of the development of design documents to perform the DATR (because the DATR is for technical acceptability, not technical accuracy).

2. If the Design Authority technical reviewer is independent of the development of design documents, then the reviewer can perform both the verifier/checker function and the DATR function.

3. In addition to applying to changes to operating facilities, the DATR is applicable to designs/modifications for future new nuclear facilities made during the evolving Project/Construction phases before turnover to Operations. The following procedure steps addressing review for impacts to and compatibility with existing systems and facilities is to be applied to SSCs within the Project's scope.

5.3.1 Design Authority Technical Reviewer Responsibilities

The Design Authority technical reviewer is responsible to assure the design being reviewed is compatible with the existing system and the facility infrastructure. The Design Authority technical reviewer fulfills this responsibility by accomplishing two activities:

- Comprehensively assessing the design being reviewed by using the detailed list of considerations in Attachment 8.1 to identify and document any items that are not compatible with the existing system and the facility infrastructure. This assessment includes five subject areas, briefly described in sections 5.3.1.1 - 5.3.1.5.

- Initiating corrective actions, and following-up as necessary, to address all items that are identified by the review as not being compatible with the existing system and the facility infrastructure.

5.3.1.1 Facility Impacts Review

The Design Authority technical reviewer, with input from Operations and applicable Technical Agencies, ensures that all impacts to the facility have been identified and the proper corrective change documents have been initiated and/or scheduled (e.g. operating and maintenance procedures, Fire Hazard Analysis, EPHA, training, spare parts, calculations, permits, etc.).

If a CHAP Screen (OSR 14-398) has not been completed, and the activity is for a new process or for a modification to a process, Design Authority completes a CHAP Screen and includes the completed form with the DATR Report or with the modification document (FCR, DCF, DCP, MT). If a CHAP Screen has been completed, Design Authority reviews the Screen and makes changes if necessary.

5.3.1.2 Technical Agency Reviews

The Design Authority technical reviewer is responsible for identifying if review and/or approval is needed by Technical Agencies to assure technical acceptability and for obtaining that approval. When a Technical Agency Identification Checklist (TAIC) (OSR 19-329) is involved (e.g. projects, see section 5.2, procedure 2.05, Manual E7), the Design Authority reviews the TAIC to verify that the appropriate Technical Agencies have reviewed to assure technical acceptability and/or approved the document. When a TAIC is not involved (e.g. DMM), the Design Authority selects the Technical Agencies (if any) to assure technical acceptability in specific topics where their expertise is needed. (Reference the Technical Agency Contact List.)

5.3.1.3 Facility Safety Basis Review

- For nuclear facilities and their supporting facilities, the Design Authority technical reviewer ensures the proposed activity is within the safety envelope of the facility DSA by implementing the USQ process in accordance with procedure 1.05, Manual 11Q. Other related responsibilities include impacts to a facility Linking Document Database (LDD), Safety Basis Change Requests, etc.

- For Projects with an approved Preliminary Documented Safety Analysis (PDSA), the Design Authority technical reviewer ensures the proposed design/document change is reviewed against the approved PDSA in accordance with procedure 1.14, Manual 11Q.

- If not in a nuclear facility or supporting facility, the Design Authority technical reviewer determines if the modification impacts a nuclear or safety support facility and ensures the USQ process is implemented for those facilities (example: movement of a fire station that impacts time for fire trucks to get to a nuclear facility, etc.).

- For Radiological and Chemical facilities, the Design Authority ensures the safety basis represented in the facility Auditable Safety Analysis (ASA) is maintained. If necessary, the Design Authority performs a Management of Safety Basis (MSB) screening in accordance with Procedure 1.07, Manual 11Q.

5.3.1.4 Facility System Acceptability Review

The Design Authority is the system expert and knowledgeable of the facility. The Design Authority technical reviewer is responsible for reviewing for system acceptability and compatibility with the facility. The Design Authority technical reviewer accomplishes this by answering questions, such as: "Considering the operating environment (e.g. normal, harsh, available space), does the equipment arrangement and spacing requirements provide adequate accessibility for maintenance, inspection, removal or replacement?."

5.3.1.5 Facility System Interface Review

The Design Authority technical reviewer identifies whether FOSC has been established for the associated nuclear facility. If so, then FOSC review and approval is obtained if required in accordance with Manual 1B, MRP 4.19 (The actual FOSC review is performed after the DATR is complete). The Design Authority technical reviewer is responsible for identifying system interfaces and obtaining review/approval by other Design Authority Engineers as needed for those interfaces (Compressed Air System, Electrical Power, etc.).

5.3.2 DATR Documentation

5.3.2.1 A DATR Report OSR 19-258 is required for SSCs functionally classified SC, SS, and PS in Nuclear Facilities or their Safety Support Facilities (SRNS-RP-2008-00086-M&O, FA00; SRR-RP-2009-00558-000) in the following cases. Exceptions are noted in Steps 5.3.2.2 and 5.3.2.3.

- Permanent Modifications (Procedure 2.05, Modification Traveler, Procedure 2.37, Design Change Form, Procedure 2.38, Design Change Package)
- Temporary Modifications (Procedure 2.06, Temporary Modification Control)
- Other activities as determined by the Project/Facility Engineering Manager

The Design Authority technical reviewer determines the need for and obtains an Authorized Derivative Classifier/Reviewing Official (ADC/RO) review for the DATR report in accordance with Manual 7Q, Section 4.

5.3.2.2 In the following cases, when a DATR is required of the Design Authority, the signature of the Design Authority technical reviewer represents that all responsibilities of a DATR are complete and a separate Report is optional. The Design Authority technical reviewer signature on the modification activity document verifies that all potential impacts have been addressed and that the work is valid. This applies to all other documents requiring a DATR not listed in 5.3.2.1 or 5.3.2.3 such as:

- GS engineering documents (including permanent and temporary modifications)

- PS engineering documents for commercial industrial modifications within a nuclear facility or their safety support facilities
- Modifications to facilities operating with permits issued by the state of South Carolina or the EPA
- Modifications of Level A and B software that are used to support Safety Basis documents

Note: When the DATR Report is not required, all impacts found as a result of the review are documented on the Modification Traveler form, associated design output document, or other applicable site or division level document/forms.

5.3.2.3 When revising a document that has been previously reviewed, the Design Authority technical reviewer has two options:

- If the Design Authority technical reviewer determines the previous DATR Report adequately addresses the current change and a USQ process qualified individual and a USQ qualified reviewer determines the previous USQ meets the conditions specified in Procedure 1.05, Manual 11Q, for prior-use exclusions, then the previous DATR Report can be applied. A DATR Summary Sheet (OSR 19-282) must be completed to document acceptability of the previous reviews and the USQ qualified signatures. The DATR Summary Sheet is referenced in the document under review.

- If the Design Authority technical reviewer determines additional review is required, then they perform a new DATR.

5.3.3 Design Authority Technical Reviewer Qualifications

Qualifications for Design Authority Engineers are specified in Procedure 1.10, Manual E7. Design Authority managers designate Design Authority Engineers to perform technical reviews based on their judgment of meeting Design Authority qualifications.

5.4 Formal Design Review

5.4.1 The Formal Design Review philosophy is to provide a formal, independent, rigorous assessment of a project to ensure the design is sufficient to proceed to the next phase without adversely affecting cost or schedule. While the Design Checking, Design Verification, and DATR processes evaluate the technical accuracy and acceptability of the individual design documents, the Formal Design Review process is an evaluation of the overall design effort to help ensure:

- requirements are complete and sufficiently mature for the stage of the modification.
- design outputs align with input requirements.
- design optimization principals have appropriately been considered.
- key process and operational issues are identified and being adequately addressed.
- Safety, Health, Environment and S&S analyses are provided.
- Nuclear and criticality safety, other technical risks, issues and assumptions are identified and being adequately addressed.

The decision to conduct a Formal Design Review, and the point within the design that it is performed, is determined by the Project/Modification Manager or Project Owner in accordance with the criteria defined in Attachment 8.2, procedure 2.05, Manual E7. The Formal Design Review is scheduled and integrated to align with other Project Reviews as described in procedure 2.18, Manual E11 and Manual E7-1.

5.4.2 Chief Engineer appoints a Formal Design Review Chairperson with input from the Project/Modification Manager and Project Owner. A copy of the appointment is transmitted to the Site Chief Engineer. The qualifications for a Chairperson are:

- Senior Engineer/Scientist, at a minimum
- Knowledgeable of the Formal Design Review process
- Prior experience as a Board member
- Preferably a member of the Design Authority organization

Additional Formal Design Review participants (e.g., Coordinator, Board members, etc.) are identified by the Chairperson. It is imperative that the board include the right personnel to ensure that all risk management issues, such as technical risks, cost and schedule, are identified. Refer to WSRC-IM-98-00036, Formal Design Review Methodology Manual, for additional guidance in selecting participants.

5.4.3 Conduct Formal Design Review using guidance provided in WSRC-IM-98-00036.

5.4.4 Document Formal Design Review results through issuance of a Formal Design Review Report in accordance with Procedure 1.20, Manual E7, approved by the Project Owner and Project/Modification Manager. Refer to WSRC-IM-98-00036 for a report template.

5.4.5 Upon completion of the Formal Design Review Report, the task input/output documents under review may be issued for use (next design stage, construction, procurement, etc.) when the Formal Design Review Closure Memo is approved and issued. To issue the task documents earlier, an exception is documented as follows:

5.4.5.1 The Project/Modification Manager documents the risk and justification in a project continuation memo to the Formal Design Review Chairperson.
5.4.5.2 The project continuation memo is approved by the sponsoring Chief Engineer.
5.4.5.3 The project continuation memo is attached to the Closure Memo when issued.

The Closure Memo, with attached project continuation memo if applicable, is transmitted, at a minimum, to the Project Owner, Project/Modification Manager, Design Authority, Design Team Lead, applicable Technical Agency Managers, Chief Engineer, and Site Chief Engineer. Typical Closure Memo content is provided in WSRC-IM-98-00036.

5.5 Technology Review

The philosophy of a Technology Review is to provide an independent assessment of the Technology Development activities supporting modifications and is not intended to be a redesign, or a Design Check, or a Design Verification, or change in scope to the modification

under review. The methodology of the Technology Review is to evaluate the technology development activities required to be performed in accordance with the project Technology Development Plan, using the SRNL L1, Procedure Manual, Section 7.0 Technical Work Control as a reference, to determine whether they have been adequately accomplished to support the phase of the modification or project being reviewed.

5.5.1 The SRNL Director appoints the Technical Review Committee Chairperson based on the Development Program Manager's recommendation. The qualifications of the Chairperson include:

- Senior Engineer/Scientist, at a minimum, and is recognized as a Subject Matter Expert in the technology for the subject modification.
- Knowledgeable of the Technology Review process.
- Prior experience as a Committee member.

5.5.2 The SRNL Director appoints the Technology Review Committee members based on input from the Business Unit Engineering organization sponsoring the modification, the Projects, Design & Construction (PD&C) Design Services Manager, and the Technical Development Program Manager. Committees are typically:

- Limited to as few members as practical.
- Representatives from technical disciplines related to the subject modification. These three (3) to five (5) representatives may include engineering (Mechanical, Electrical, Civil, etc.), construction, operations, maintenance, quality, or others as shown on the TAIC (OSR 19-329) or external consultants as necessary. Not all disciplines are needed on every Committee. The SRNL Director will determine the optimal make-up of the Committee.
- A total of two (2) to three (3) representatives from the Design Authority (engineering, operations, or maintenance) and Project Team.

Note: It is imperative that the board include the right personnel to ensure that all risk management issues, such as technical risks, cost and schedule, are identified.

Board members shall:

- Be sufficiently independent of the modification under review to provide an impartial review (have not been involved in the creation or review of the Technology Development materials under review).

- Have demonstrated technical expertise in a specific area relevant to the modification being reviewed or have technical experience on similar designs/plant modifications in order to assess the technical adequacy of the task documents and compliance of the task output documents with the task input documents.

5.5.3 The Technology Review is conducted using the SRNL L1, Procedures Manual, Section 7.0 Technical Work Control as a reference. During the Technology Review, communication between the Technology Review Committee and the Development Team is encouraged, especially communication which clarifies the content of the Technology Review Data Package and the Technology Review comments.

5.5.4 The issues and actions identified by the Technology Reviews shall serve as input into the Project Risk Analysis performed in accordance with Procedure 2.62, Manual E11.

5.5.5 The Technology Review Committee documents the Technology Review as follows:

5.5.5.1 A Technology Review Report is issued from the Technology Review Committee Chairperson to the SRNL Director, Development Program Manager, sponsoring Business Unit Engineering organization, and Project Manager in accordance with Procedure 1.20, Manual E7.

5.5.5.2 After reviewing the Technology Review Report, the SRNL Director, with concurrence from the Development Program Manager, Business Unit Engineering organization, and Project Manager, issues a letter to the Project Manager, with a copy transmitted to the Site Chief Engineer, indicating acceptance of the Technology Review and recommending a path forward.

5.5.6 The modification under review may not proceed to the next design stage until the Technology Review Report is issued. An exception is allowed with approval if processed as follows:

5.5.6.1 The Development Program Manager and Project Manager document the risk and justification for not issuing the Technology Review Report in a project continuation memo.

5.5.6.2 The sponsoring Chief Engineer approves the project continuation memo, with concurrence from the SRNL Director.

5.5.6.3 A copy of this memo is sent to the Design Authority, Technical Agency Manager, Project Manager, Design Team Leader, Development Program Manager and Site Chief Engineer.

5.5.6.4 The project continuation memo is attached to the Technology Review Report when issued.

6.0 Records

Design Verification Reports, DATR Reports, CHAP Screens, Formal Design Review Reports, and Technology Review Reports are QA records and are maintained in accordance with Procedure 3.31, Manual 1B, and QAP 17-1, Manual 1Q.

7.0 References

7.1 Conduct of Engineering and Technical Support Manual E7
Procedure 1.10, Engineering Program R2A2
Procedure 1.20, Engineering Document Numbering System
Procedure 2.05, Modification Traveler
Procedure 2.06, Temporary Modification Control

Procedure 2.25, Functional Classifications
Procedure 2.31, Engineering Calculations
Procedure 2.37, Design Change Form
Procedure 2.38, Design Change Package

7.2 Conduct of Project Management and Control Manual E11
Procedure 1.01, Project Management and Control Systems Description
Procedure 2.18, Project Reviews
Procedure 2.62, Project Risk and Opportunity Analysis

7.3 Management Requirements and Procedures Manual 1B
Procedure 3.31, Records Management
Procedure 4.19, Requirements for Facility Operations Safety Committees

7.4 Quality Assurance Manual 1Q
QAP 3-1, Design Control
QAP 11-1, Test Control
QAP 17-1, Quality Assurance Records Management

7.5 Security Manual 7Q
Section 4, Information Security

7.6 Employee Safety Manual 8Q
Procedure 32, Hazardous Energy Control (Lockout/Tagout)

7.7 Facility Safety Document Manual 11Q
Procedure 1.05, Nuclear Safety Unreviewed Safety Questions
Procedure 1.07, Management of Safety Basis Change Process
Procedure 1.12, Major Modification Determination
Procedure 1.14, Preliminary Documented Safety Basis Configuration Management

7.8 Conduct of Operations Manual 2S
Procedure 1.1, Procedure Administration
Glossary

7.9 Conduct of Maintenance Manual 1Y
Procedure 8.20, Work Control

7.10 SRNS-RP-2008-00086-M&O, FA00, S/RID Nuclear and Radiological Facilities List

7.11 WSRC-IM-98-00036, Formal Design Review Methodology Manual

7.12 SRNL L1, Procedure Manual, Section 7.0 Technical Work Control

7.13 Design Input and Technical Review Guide G-DCC-G-00001

7.14 Technical Agency Contacts

7.15 WSRC-IM-99-00021, Instrumentation and Setpoint Uncertainty Analysis Methodology Manual

7.16 SRR-RP-2009-00558-000, Facility List

Forms

OSR 19-196, Design Verification Report
OSR 19-258, DATR Report
OSR 19-282, DATR Report Summary Sheet
OSR 19-329, TAIC

8.0 Attachments

8.1 Design Authority Technical Review Considerations

Attachment 8.1
Design Authority Technical Review Considerations
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(Reference Design Input and Technical Review Guide, G-DCC-G-00001.)

Section 2.1 – Facility Impacts

NOTE: This is a typical list of impacts to consider and is not intended to be all-inclusive. The DAE may remove or add items as appropriate for facility specific needs.

Document Type Requiring Change	Document Title and Number	Document Change Request/ Tracking No.	Completion Code
Accountability Plan			
Safety Basis Change Request Packages			
Authorization Commitment Matrix			
Calculations E7, Procedure 2.31			
Chemical Inventory			
Commitment Documents			
Computer Hardware & Software			
Computer Software Config. Items			
Consolidated Hazards Analysis (CHA) (OSR 14-398)			
Design Descriptions SDD/FDD			
Drawings (essential drawings require incorporation or waiver)			
Emergency Preparedness Hazards Assessment (EPHA)			
Environmental and Regulatory Permits			
Fire Hazard Analysis Report			
Functional Classification Document			
Functional Acceptance Criteria			
Installed Temporary Modifications			
Instrument Index			
Interface Control Documents			
Interlocks			
IPI Databases			
Labeling			
Linking Document Databases			
LCO Tracking Database			
Maintenance Briefings			
Maintenance Procedures			
Master Equipment Lists /Equipment Records			
Nuclear Criticality Safety Evaluations			
Operations Shift Briefs			
Other (Procurement Specs, Turnback Docs, etc)			
PLC software			
Power Services Utilization Permit			
Pre-operational PHR			
Pressure vessel, rupture/ relief valve verification records			
Preventative Maintenance Record			
Procedures (Operations, Test, Maintenance, Admin, etc.)			
Process Change Evaluation *			
Process Interface Description			
Process Requirements			

* Identify impacts to (1) chemistry flow path or configuration, (2) processing parameters such as temperature, flow rates, pressure, (3) initial conditions assumed by the operating procedures, (4) cold runs being conducted or cold run solution being processed, (5) chemical or radiological inventories, concentrations, or isotopics. Refer to area procedures for additional impact reviews (e.g., 1E7 Procedure E-107, WSRC-IM-2003-00018 Guide CBUE.07).

Attachment 8.1 (cont'd)
Design Authority Technical Review Considerations
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Document Type Requiring Change	Document Title and Number	Document Change Request/ Tracking No.	Completion Code
Procurement Specifications PSUP and Regulatory Permits Scaling / Set Point Documents Spare Parts Documents (e.g. Data Sheet Requisitions) Status Board Templates Structural Integrity Database Structural Integrity Datasheet Surveillance Sheet System Alignment Checklists Technical Baseline Document List Training (Formal Maintenance Training, Formal Operations Training) Surveillance Tracking datasheet Transfer Line Pressure Test Database (H & F Areas) Transfer Route Diagram Uncertainty Calculations (WSRC-IM-99-00021) Vendor Technical Manuals/VPF/BPFs Waste Acceptance Items/ Document (S-Area) Waste Stream Characterization			

Section 2.2 – Technical Agency Reviews

1. If a TAIC has been completed, have all the required reviews/approvals been completed? Are any additional reviews by Technical Agencies needed?

2. If a TAIC was not required:

   Consider carefully the following technical areas to determine if the applicable technical agency review/approval is required.

   a. Radiological Technology – click to see checklist.

   b. Industrial Hygiene – click to see checklist.

   c. Area Fire Protection – click to see checklist.

   d. Area Pressure Protection Coordinator – click to see checklist.

   e. Area Safeguard, Security, & Emergency Preparedness Engineer – click to see checklist.

   f. Area NEPA Coordinator – click to see checklist.

   g. National Historic Preservation Act (NHPA) Organization – click to see checklist.

   h. Nuclear & Criticality Safety Engineering

   i. Other Technical Agencies to consider for review/approval – see Part B of TAIC (OSR 19-329)

Attachment 8.1 (cont'd)
Design Authority Technical Review Considerations
(page 3 of 3)

Section 2.3 – Safety Basis Review

1. If in a nuclear or safety support facility, is the USQ complete? Reference USQ number. (Note: For Projects designing nuclear facilities without a final approved DSA, the USQ process is replaced by the Preliminary Documented Safety Analysis Configuration Management process (11Q, 1.14), and results stated in Section 2.4.)
2. If not in a nuclear or safety support facility, is the modification such that it would impact a nuclear or safety support facility and need a USQ? If so, reference USQ number. (e.g. movement of a fire station that impacts time for fire trucks to get to a nuclear facility, etc.)
3. If the facility has an Auditable Safety Analysis (ASA), does a Management of Safety Basis (MSB) screening need to be prepared?
4. If a Safety Basis Strategy has been developed for this project, are the actions complete to date for this stage of the project?
5. Any Safety Basis Change Request needed? Have they been initiated? (list in impacts section)
6. If the facility has a Linking Document Database – have the necessary changes been initiated. (list in impacts section)
7. Is there an impact to a Safety Analysis Report for Packaging (SARP)?

Section 2.4 – System Acceptability Review

NOTE: The originator and checker/verifier are responsible for the technical accuracy of the document; however, the Design Authority always has the authority to review and comment on technical accuracy, if appropriate.

As the Design Authority is the system expert, review for acceptability to the system. Some considerations are:

1. Does the design output comply with the required system's regulatory and performance requirements?
2. Does the design output include consideration for the system's unique physical or material properties?
3. Considering the operating environment (e.g. normal, harsh, available space), does the equipment arrangement and spacing requirements provide adequate accessibility for maintenance, inspection, removal or replacement?
4. Is sufficient detail provided to clarify construction, installation, and inspection methods and requirements?
5. Have adequate post-modification testing requirements been established, especially for state of the art applications?
6. Does the modification adequately address unique materials requirements for harsh operating environments?
7. Has the modification included provisions to perform tests required to verify performance requirements and calculated values?
8. Does the modification include evaluation and selection for waste minimization and ALARA?
9. Have all the drawings necessary to operate the facility that were affected by the modification been identified, modified and/or created?
10. Does the design provide adequate provision for equipment lock-out/isolation?
11. Has the design appropriately considered design optimization strategies (e.g., appropriate tailoring of requirements, design attributes, and operating strategies?)

Section 2.5 – System Interface Review

1. Is FOSC Review required?
2. Is the modification compatible with interfacing equipment, systems, facilities, computers, and personnel? (electric power, public address, alarms, compressed air, domestic water, etc.)
3. Do any other Design Authority Engineers need to review for system interfaces?