SNS-OPM 9.A-3
RAD Procedure for Design of New or Changes to Existing Systems, Structures, Components or Software

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SNS-OPM Editor

SNS-OPM 9.A-3
RAD Procedure for Design of New or Changes to Existing Systems, Structures, Components or Software

1. Purpose

This procedure provides a graded process for the review, authorization, and implementation of design of new, or changes to, existing SNS Systems, Structures, and Components (SSCs). Since the introduction of new, or changes to, SSCs is a change to the installed SNS configuration, as defined in 800000000-CMT10002, NScD Policy on Configuration Management, any effort resulting in new or modified SSCs will be treated as a change and managed through this procedure.

Design change of SNS SSCs shall be conducted in accordance with the Graded Approach described in this procedure.

For SNS facility design changes, SNS Site Work Control, 108000000-PR0061 and SNS-OPM 3.A-8.1 "Configuration Management Procedure for the Following Credited Engineered Controls: PPS, TBAC, SBDPMS and TPS" procedures ensure the configuration control aspects of changes to specific CEC designs and installations.

1.1 Scope

This procedure delineates the process for authorizing design changes to Research Accelerator Division (RAD) equipment.

2. Responsibilities

2.1 All RAD personnel shall follow this procedure for Design Changes.

3. Prerequisites

3.1 None.

4. Precautions

4.1 None.

5. Procedure – Design Change Authorization Process

The process begins with an identified need and concept for improving the performance or reliability of an SSC. Attachments A provides a flowchart depicting the flow and milestones of the design change process described herein. The detailed process steps for implementing the standard Design Change are described below.

The possibility exists that an emergent event could occur which causes an interruption of beam delivery that requires an expedited re-design or modification to a SSC to resume operations. Or, a change or modification to existing equipment is required that only affects a subset of the total number of installed items. In this case, a Field Engineering Change (FEC) can be utilized in accordance with 802000000-PCD10006, "Procedure on Field Engineering Changes at the Spallation Neutron Source". The FEC process results in released and approved engineering documentation that carries the same weight as a Design Change Notice (DCN).

5.1 Identification of a Design Change Need

5.1.1 Anyone has the possibility of recognizing a potential change to a SSC that would enhance its performance, reliability or maintainability.

5.1.2 This potential change should be communicated to the individual's respective management.

5.2 Management Review of Suggested Design Change

5.2.1 The Requesting/Initiating Organization shall perform an initial review of the suggested design change. Things to be considered are:

- What is the feasibility of the suggested design change?
- Would the change enhance performance, reliability, or maintainability?
- Are resources available to perform the change and install the modification?
- Is the change worth doing at this time?

5.2.2 Requesting Organization Management shall decide whether to proceed with the design change. The process may be placed on hold pending additional funding or a better opportunity to implement the change. If the decision is to proceed, the request is communicated to the appropriate Design Organization.

5.3 Conceptualization of the Design Change

If the Requesting and Design Organizations decide to proceed with the design change, the Design Change Request (DCR) process for existing SSCs will begin. If the change is sufficiently large in scope, a document should also be created to formally define the requirements for the change.

5.3.1 The design organization shall be responsible for assigning a unique identifier to the DCR using the ORNL Engineering Document Management System (EDRM). An image of the DCR and a link to the document is in Attachment C.

5.3.2 The design organization Group Leader shall assign the request to the appropriate responsible design engineer. The design engineer should be the one responsible for following the change from conception through implementation and closeout.

a. The design engineer will meet with the individual originally making the suggested change to fully understand the background of the request and to consider the possible conceptual options.
b. The design engineer shall identify all affected SSCs, interfaces, and requirements necessary to implement a design solution that addresses the need identified in the initial request.
c. The design engineer shall develop a basic design concept that addresses the technical and operational requirements of the initiator's request. Note that this concept may not be the same as that proposed by the change initiator.
d. The design engineer shall develop a preliminary, rough estimate of the cost and schedule associated with implementation of the design concept.
e. The DCR shall include a description of the design concept along with a rough order of magnitude cost estimate.

5.3.3 If the SSC originally was developed and certified by a Professional Engineer (PE) and the Requesting Organization wants to maintain that certification, then the services of an appropriate PE need to be incorporated into the team. PEs are required to be directly involved with design projects to affix their certification to the applicable design change documents.

5.4 Selection of the Grade

5.4.1 The Design Change requires selection of the Grade to provide a guide for the level of review and approval required for the change (see Attachment B) based on an assessment of the following:

- The technical risk of the intended change.
- The cost associated with implementation of the change.

- The complexity of the change, e.g., whether the change involves multiple disciplines or organizations, whether a potential Unreviewed Safety Issue (USI) exists.
- Specific hazards (e.g., radiological, pressure, cryogenic, electrical) inherent in the change.

5.5 Decision to Proceed

5.5.1 The completed DCR shall be reviewed by the design organization Section Head for a formal Decision to Proceed. The Section Head shall involve stakeholders, as needed, to fully assess the request with consideration given to the following criteria:

a. The criticality of the intended change.
b. Technical merit of the requested change.
c. Adequate definition of the scope and requirements needed to implement the change.
d. Projected cost to implement the change.
e. Sufficiency of time and resources available to implement the change by the required need date.

5.5.2 The Decision to Proceed shall be granted by Section Head approval (signature) of the DCR. The approved DCR shall be entered into EDRM, along with distribution/notification to all affected organizations.

5.5.3 If the DCR is not approved, the design organization shall be responsible for communicating to the initiating organization the reasons for disapproval. A DCR that is not approved may be either:

a. Placed on hold.
b. Canceled.
c. The held or cancelled DCR shall be entered into the EDRM system with distribution to all affected organizations.

5.6 Change Process Flow

5.6.1 Attachment A is the flowchart for the standard Design Change process and shows the specifics of the Standard Design Review process.

5.6.2 The selection of the Grade for the change defines the appropriate level of reviews required and the approval authority for design documentation. The more critical the SSC and the more complex the design change, the higher the level of review and approval are necessary to authorize its implementation. This process is shown on the flowchart. Note that changes to Credited Engineered Controls and Mission Critical SSCs (as defined in the NScD Policy on Configuration Management) will always be a Grade 1 change.

5.7 Conceptual Design Phase

5.7.1 The objective of the Conceptual Design phase is to evaluate the technical feasibility of the design solution and to develop and refine design concepts. The concepts do not need to be fully optimized solutions, but should have enough detail to demonstrate that the conceptual design has the potential to meet the defined requirements with additional design and analysis effort. The conceptual design phase is also the appropriate time to explore different technical options or to investigate similar technologies for applicability. Often there will be several concepts or options capable of meeting the requirements. During this phase the detailed scope of the change and the design requirements should be finalized. Concurrence/approval with the change initiator should be solicited to ensure the scope and requirements accurately reflect the request and will result in an acceptable design solution.

5.7.2 Screening for Potential Unreviewed Safety Issues

5.7.2.1 As part of the conceptual design phase process, the change shall undergo USI Identification as described in SNS OPM 2.B-10. USI Identification shall be performed by a qualified USI Identifier. USI Identification is not required for Grade 5 or 6 changes.

5.7.2.2 If the USI Identification concludes that a USI does not exist, then the qualified USI Identifier will sign the appropriate block on the Design Change Notice (DCN) form. See step 5.13 for DCN preparation.

5.7.2.3 If the USI Identification concluded that a USI potentially exists, then complete the USI Identification and Recognition form and proceed with the USI Process as defined in SNS OPM 2.B-10. Retain the completed USI Identification and Recognition form in the design change package and proceed with the design change process.

5.8 Conceptual Design Review (CDR)

Depending on the complexity of the design, a formal CDR may or may not be required. For simple designs where the chosen design concept appears to adequately meet the defined requirements with minimal technical or operational risk, an informal method of providing status to the end user is appropriate. This informal method can be via email, etc., as appropriate for the nature of the change. If the complexity of the design mandates a formal CDR, the review should be held in person (or virtually) and should have a reasonably diverse group of reviewers with expertise in the type of SSCs represented by the presented concept. Additional subject matter experts should be involved for those aspects such as fire safety, industrial safety, waste handling, hoisting and rigging, etc. as appropriate to the concept.

The goal of the conceptual design review is to identify all the significant technical

challenges and issues, to present the design concepts to interdisciplinary technical reviewers (including the change initiator) to solicit feedback and demonstrate how the concepts have the potential to meet the design requirements. Records of the review (i.e. presentation with conclusions, recommendations, and action items as applicable) shall be captured and filed in EDRM.

5.9 Preliminary Design Phase

Following the selection of a suitable design concept, the Preliminary Design phase can commence. The preliminary design should further the design concept to develop a workable solution that meets all defined requirements. At the completion of this phase, the design should be at approximately the 30-50% level of completion. The preliminary design effort should include (as a minimum):

- CAD model development
- Interface identification and verification
- Controls/utility requirements
- Optimization analyses
- Preliminary procurement/fabrication/installatation planning

5.10 Preliminary Design Review (PDR)

5.10.1 Conduct a preliminary design review to present the preliminary design solution to interdisciplinary technical reviewers (including the change initiator) to demonstrate how the preliminary design solution has the capability to meet all defined requirements. Additionally, the review should address recommendations and action items from the CDR. Records of the review (i.e. presentation with conclusions, recommendations, and action items as applicable) shall be captured and filed in EDRM. To facilitate the productiveness of the review, the PDR should include:

5.10.1.1 A summary of the purpose of the design
5.10.1.2 A review of the requirements
5.10.1.3 A detailed description of how the design will meet the requirements
5.10.1.4 A review of analyses supporting the design
5.10.1.5 A review of action items received at the CDR, if applicable
5.10.1.6 A review of the cost and schedule elements of the design

5.11 Final Design Phase

5.11.1 The final design effort should consist primarily of taking the preliminary design and moving it to completion. Optimization or minor changes to the design can occur as the result of analytical or operational realities, but the basic design solution should be maintained. The completion of the design at the end of this phase should be at a minimum of 90%. The final design should include the following, as required:

5.11.1.1 Drawings, specifications, and procedures that fully define the design.
5.11.1.2 Supporting analyses to validate the design.
5.11.1.3 Equipment specifications, test plans, and acceptance plans required to facilitate procurement, fabrication, and implementation of the design.
5.11.1.4 Completion of the USI Process as defined in SNS OPM 2.B-10 if the USI Identification concluded that a potential USI existed (see step 5.7.2.3).

5.12 Final Design Review (FDR)

5.12.1 The final design review should contain the optimized solution for technical issues and with design documentation ready for release to modify the SSC with a high degree of confidence that it will meet all defined requirements and perform its intended function. The chair of the Accelerator Configuration Control Committee (ACCC) shall be notified of the FDR (for Grades 1 through 4, as applicable) to attend the review and to assess whether the change will require a formal ACCC review.

5.12.2 At the Final Design Review the final design solution is presented to interdisciplinary technical reviewers (including the change initiator) to obtain a consensus that the final design meets all requirements and that the design has been adequately documented. Records of the review (i.e. presentation with conclusions, recommendations, and action items as applicable) shall be captured and filed in EDRM. The format for the final design review should include the following elements:

- Review of design requirements.
- Review of the details of the final design.
- Review of supporting analyses and other documents that validate the design.
- Review of action items from previous reviews.
- Review of changes to planning (e.g., test plans, spares plans, maintenance and obsolescence plans).
- Review of procurement/fabrication planning.

5.13 Creation of the Design Change Notice

5.13.1 Following successful completion of an FDR, a Design Change Notice (DCN) shall be created to document the design change. The DCN shall reference the original DCR and shall be assigned a unique identifier from the EDRM system. An image of the DCN and a link to the document is in Attachment D.

5.13.1.1 The DCN shall include the following as a minimum:

- Reason for the change.
- Basic description of the change.
- New documents created and existing documents affected. All documentation created or revised shall be listed on the DCN by drawing/document number, including revision level.
- Identification of impacts to Credited Engineered Controls (CECs), Accelerator Safety Envelope (ASE), etc.

5.13.1.2 If USI Recognition concluded that a USI does not exist, then insert the document number for the completed USI Identification and Recognition form in the blank provided on the DCN. Retain the completed USI Identification and Recognition form in the design change package.

5.13.1.3 If the USI Evaluation was required, then insert the document number for the completed Reviewed Safety Issue (RSI) Documentation form in the blank provided on the DCN. Retain the completed RSI Documentation form in the design package.

5.13.2 Following the final design review, all documentation shall be reviewed and approved as required by the graded approach. All documentation should reference the DCN number and must be filed in EDRM.

5.14 Design Change Approval

The approval of the design shall be documented by review and approval of the DCN. The scope of review and approval of the DCN should be commensurate with the graded approach determination. The DCN shall be signed by appropriate representatives of both the Requesting and Design Organizations with approval of the DCN signified by Design Change Approver (DCA) signature. The approved DCN must then be filed in EDRM.

5.15 Design Change Records

The principal documentation associated with the design change approval is the DCN, Attachment D. This form references the originating DCR and lists the engineering documentation created which defines design solution. It identifies if there are Credited Engineered Controls or Accelerator Safety Envelope implications or if a PE certified SSC is impacted. It also contains the approval signatures of stakeholders and the PE, if required.

5.16 Design Change Implementation

5.16.1 Implementation begins with the fabrication/procurement/work planning steps, which generally include the preparation of the fabrication, procurement, or other purchasing documents.

a. Prepare appropriate fabrication, procurement, and purchasing documents.
b. Compile all design documents prepared in the design phase.
c. Provide procurement resources with documentation.
d. Request bids/quotes, etc., as appropriate.
e. Evaluate bids.
f. Award contract for fabrication/procurement.
g. Make or order components; begin purchases; award subcontracts; or in general take steps to start turning drawings and specifications into tangible objects or system installations.
h. Acquire the necessary material and resources to perform the work. This step can involve a procurement solicitation process to obtain outside vendors or contractors to provide the material, equipment, and labor to complete the task.
i. Provide oversight of the fabrication or procurement activities (e.g., generate nonconformance reports, deviation requests, nonconformance resolutions, receipt inspections, vendor submittals, etc.).

5.16.2 Tracking the SSC: Prior to Pre-Installation Testing, changes in equipment shall be recorded in the SNS Maintenance Management System (INFOR-EAM) and changed software shall be loaded into the appropriate software repository.

5.16.3 Pre-Installation Testing: An appropriate test plan must accompany each Design Change. The test plan shall be executed by a combination of the System Engineer, the Operations Engineer and others who they deem necessary. After the successful execution of the test plan, the plan shall be signed off by the System Engineer and the Operations Engineer. Test results shall be uploaded to EDRM.

5.17 **ACCC Review**

Design changes that have the potential to affect neutron production, safety, or machine protection functions, an ACCC review shall be held. Reference the ACCC Charter, 800000000-PLC10000 for additional information. Grade 1 changes always require an ACCC review. Grade 2 changes may require an ACCC review based on the potential impacts of the change. Generally, Grade 3 through 6 changes do not require an ACCC review. Contact the ACCC Chairman for guidance on the need for a formal ACCC review. The location in the timeline for the ACCC review is shown on the flowchart in Attachment A, however, as a minimum the design change must have had a Final Design Review and must have an approved DCN.

The ACCC review should include the following elements:

- Stated purpose of the review
- Background of the reason for the change
- Details of the design solution to be implemented
- Discussion of the design reviews completed with status of actions/recommendations
- Status of all change documentation
- Overview of testing results, as applicable
- Details of procurement and installation planning
- Details of operational and maintenance requirements for the change
- Discussuon of the risks and concerns associated with implementing the change

5.18 Installation and Acceptance Testing

5.18.1 Installation: Once the Pre-Installation tests have been successfully completed and reviewed the change may be installed. Changes requiring an ACCC review must receive approval from the SNS Operations Manager prior to installation. Installation proceeds under the supervision of the Operations Engineer. At this time, the Operations Engineer assumes responsibility for operating the SSC.

5.18.2 Acceptance, release for use and Final Documentation: At the end of the Implementation process, the SSC is Accepted and turned over to the proper organization. This final step includes completion of the SSC's documentation.

5.19 Closeout Phase

5.19.1 The design change process is not complete until all closeout activities have been completed. It is imperative that the closeout capture key data collected during the design and implementation phases. These data are necessary for safe and reliable operation, maintenance, and future modification of the changed systems. These data serve as a historical record and reference for guiding similar design change activities in the future. Therefore, lessons learned should be included in the closeout documentation. The requirements for closeout completion are listed in the following sections.

5.20 Perform Closeout Activities

5.20.1 Revise design documentation as necessary to indicate the final design. Affected documents may include requirements (if they changed during the course of the process), specifications, drawings, fabrication and installation procedures, and test procedures.

5.20.2 Gather all procurement and fabrication data for retention. These may include vendor proposals, purchase orders, invoices, quality assurance documents, deviation reports, nonconformance reports, material certifications,

photographs, and vendor test procedures and results.

5.20.3 Document all as-built deviations from the design.

5.20.4 Document significant lessons learned during the Design and Implementation phases. Specific attention should be focused on those lessons related to personnel safety and technical performance of the changed or affected systems.

5.20.5 Close work packages used in the Implementation Phase.

5.20.6 Finalize operating manuals, service and troubleshooting manuals, and any other documentation that will guide operation and maintenance of the changed SSCs. Revise existing manuals as needed. Ensure that all the above-mentioned data are archived in the document control center for future reference.

5.21 **Closeout Approval and Completion**

5.21.1 The responsible design engineer shall ensure that all closeout activities are complete. Closeout criteria shall be documented. It is recommended that a checklist be used for documenting closeout criteria.

5.21.2 The responsible engineer shall inform their Section Head of closeout completion by means of a revision to the original DCN. This revision shall list all additional documentation created, revised, or received during the implementation phase.

5.21.3 The Section Head shall confirm that closeout is complete and sign the revised DCN indicating closeout approval.

5.21.4 Closeout documentation shall be filed along with the design change process documentation in the EDRM.

6. Documentation

6.1 For equipment, the normal documentation of a design change is a set of drawings that fully detail the change in design of the SSC. The DCN number should be referenced in the drawing revision blocks and maintained in the design files for the equipment.

6.2 Software changes shall be self-documented in the body of the software itself.

NOTE:
Changes to the approved design can also occur through the Supplier Deviation Request (SDR) process and the Nonconformance Reporting (NCR) process. Both processes have their own approval systems established by formal procedures. Deviation Request changes may be desired to be incorporated into the design of the SSC. Non-conformances should not be incorporated. These changes need to be made a part of the design documentation to ensure that the "As Built" configuration is known as a basis for future SSC design changes.

6.3 RECORDS

- Final Design Package
- Nonconformance Reports
- Design Change Request
- Design Change Notice
- Conceptual Design Review documentation
- Preliminary Design Review documentation
- Final Design Review documentation
- Design Closeout documentation

7. References

7.1 NScD-ENG-PR-001 Engineering Design Change Process in the Neutron Sciences Directorate
https://edrm.ornl.gov/federaldox/#/irl/0902f41f805133c3?dataSourceId=ORNL_PRD&versionLabel=CURRENT

7.2 SBMS Subject Area – System Engineering (For Guidance)
https://sbms.ornl.gov/sbms/SBMSearch/SubjArea/syseng/syseng_sa.cfm

7.3 SBMS Subject Area – Engineering Design
https://sbms.ornl.gov/sbms/SBMSearch/SubjArea/design/sa.cfm

7.4 SNS-QA-P01 "SNS Quality Assurance Manual"
https://edrm.ornl.gov/federaldox/#/irl/0902f41f80273824?dataSourceId=ORNL_PRD&versionLabel=CURRENT

7.5 SNS-OPM 2.B-10 "Unreviewed Safety Issue Process"
https://ns-staff.ornl.gov/operations/SNS-OPM/02-B-10.pdf

7.6 SNS-NTD-ENG-PC-0002, Policy on Drawing Preparation
https://edrm.ornl.gov/federaldox/#/irl/0902f41f80099fd0?dataSourceId=ORNL_PRD&versionLabel=CURRENT

7.7 SNS-NTD-ENG-PC-0003, Policy on Nonconformances and Deviations

https://edrm.ornl.gov/federaldox/#/irl/0902f41f8036fff6?dataSourceId=ORNL_PRD&versionLabel=CURRENT

7.8 SNS-NTD-ENG-PC-0004, Policy on Design and Analysis Calculation Preparation
https://edrm.ornl.gov/federaldox/#/irl/0902f41f804b8741?dataSourceId=ORNL_PRD&versionLabel=CURRENT

7.9 SNS-NTD-ENG-PC-0005, Policy on As-Built and Redline Drawings
https://edrm.ornl.gov/federaldox/#/irl/0902f41f8036fef9?dataSourceId=ORNL_PRD&versionLabel=CURRENT

7.10 802000000-PCD10004, Guide to the Graded Approach
https://edrm.ornl.gov/federaldox/#/irl/0902f41f80568dc7?dataSourceId=ORNL_PRD&versionLabel=CURRENT

7.11 800000000-PCD10003, ACCC Review Process Guide
https://edrm.ornl.gov/federaldox/#/irl/0902f41f80553e56?dataSourceId=ORNL_PRD&versionLabel=CURRENT

7.12 Useful Review Templates

- CDR Presentation Template
  https://edrm.ornl.gov/federaldox/#/irl/0902f41f80562a94?dataSourceId=ORNL_PRD&versionLabel=CURRENT
- PDR Presentation Template
  https://edrm.ornl.gov/federaldox/#/irl/0902f41f80562aa5?dataSourceId=ORNL_PRD&versionLabel=CURRENT
- FDR Presentation Template
  https://edrm.ornl.gov/federaldox/#/irl/0902f41f80562aac?dataSourceId=ORNL_PRD&versionLabel=CURRENT
- ACCC Review Presentation Template
  https://edrm.ornl.gov/federaldox/#/irl/0902f41f80559515?dataSourceId=ORNL_PRD&versionLabel=CURRENT

8. Attachments

8.1 Attachment A - Design Change Process Flow Chart

8.2 Attachemnt B - Graded Approach – Reviews and Approvals

8.3 Attachment C - Design Change Request Form
https://ns-staff.ornl.gov/operations/SNS-OPM/09-A-03-D.pdf

8.4 Attachment D - Design Change Notice Form

https://ns-staff.ornl.gov/operations/SNS-OPM/09-A-03-E.docx

9. Revision History

- Revision 02 – August 26, 2015 - Procedure now specific only to the Research Accelerator Division, and not to the entire Neutron Scattering Division.

- Revision 03 – July 22, 2016 - Additions from new procedure NScD-ENG-PR-001 **Engineering Design Change Process in the Neutron Sciences Directorate.**

- Revision 04 – April 4, 2017 - Procedure revised so that the design of new SSCSs will be treated as a change and managed through this procedure.

- Revision 04.1 – April 17, 2017 - Minor revisions – updated pictures, links, format, and changed revision number in document footer to 4.1.

- Rev. 5 July 10, 2018 - Updated links, format, and changed revision number in document footer to 5. Added links for the references in Section 7 References. Added links to attachments in Section 8 Attachments. Removed "George Dodson" from Contacts on page 1. The "Design Change Request Form", "Design Change Notice Form", and "Design Criteria Document(DCD) Template" along with their links and pictures have been updated.

    - SNS-OPM-ATT 9.A-3.a. Rev. 1 June 4, 2018 - Triennial review. Fixed spelling errors.

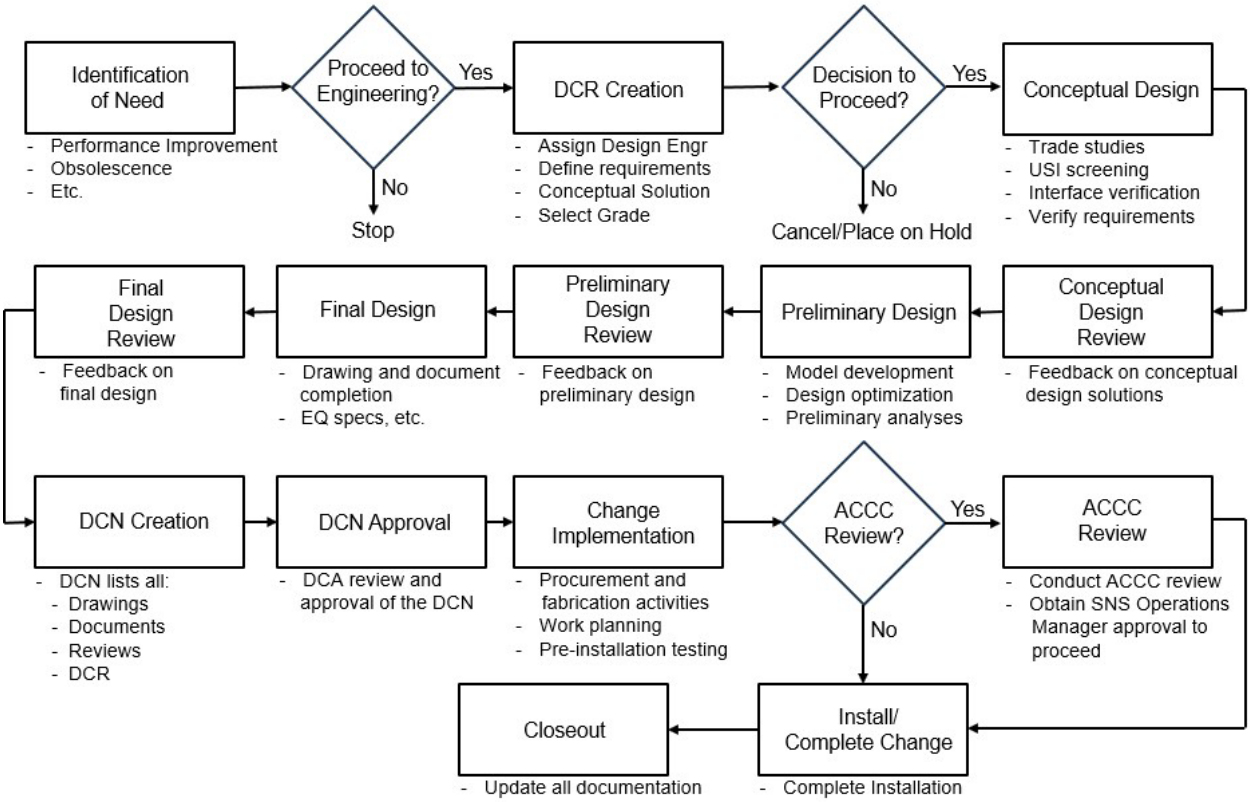
- Rev. 6 – April 17, 2024 – Numerous minor revisions – globally clarified process and terminology, revised titles and roles to reflect organizational changes, revised the Graded Approach, revised the DCR form, updated hyperlinks and added references in Section 7.

    - SNS-OPM-ATT 9.A-3.a. Rev. 1 April 17, 2024 – Canceled
    - SNS-OPM-ATT 9.A-3.D. Rev. x April 17, 2024 -
    - SNS-OPM-ATT 9.A-3.E. Rev. x April 17, 2024 -
    - SNS-OPM-ATT 9.A-3.F. Rev. x April 17, 2024 -

- Rev. 7 – September 30, 2024 – Numerous minor revisions – clarified process and terminology, added reference to Field Engineering Change processs, revised the Graded Approach, added clarification on Design Change Approver (DCA) role, revised the DCN form, deleted the Design Criteria Document, updated hyperlinks and added references in Section 7.

- Rev. 8 – January 24,2025 – Numerous minor revisions – clarified process and terminology, added steps to integrate the new USI process, revised the DCN form.

Attachment A
Process Flowchart



Attachment B
Graded Approach – Reviews and Approvals

Grade	Guidelines	Design Reviews Required	Drawing/Document Approvals Required
1 (High)	High cost (>$1M) Affects CEC/ASE or USI High consequence High technical risk	Formal CDR, PDR and FDR	Design Engineer Technical Reviewer (1) CEC System Engineer (2) Reviewers as needed (3) Design Change Approver (4)
2 (Medium)	Moderate cost ($500k-$1M) Moderate consequences Moderate technical risk	Formal FDR Informal CDR and PDR	Design Engineer Technical Reviewer Reviewers as needed Design Change Approver
3 (Low)	Low cost (<$500k) Low consequences Low technical risk	Informal FDR CDR and PDR are optional	Design Engineer Technical Reviewer Design Change Approver
4 (Expedited)	Schedule constraints require immediate attention	Informal reviews as dictated by the complexity/risk	To be defined by Responsible Design Engineer Design Change Approver
5 (Documentation)	"Documentation only" changes that do not affect design configuration	No reviews required	Design Engineer Technical Reviewer Design Change Approver
6 (Test Hardware/ Tooling)	Test/development hardware or tooling not intended for installation into configuration-controlled systems	Informal FDR as dictated by the complexity/risk	Design Engineer Technical Reviewer Design Change Approver

Notes:

1. The Technical Reviewer shall be a person who reviews the drawings for both the design and producibility, and reviews the documentation/analyses for technical accuracy.
2. CEC System Engineer approval required only if a Credided Engineered Control is impacted by the change.
3. Additional reviewers and Subject Matter Experts as required by the nature of the change.
4. The Design Change Approver signature is required on the DCN only.

Attachment C Link to Design Change Request Form

Page 1 of 1

Research Accelerator Division
Design Change Request

Subject / Title

The following section is to be prepared by the request initiator and requires approval from the initiating organization group management.

Reserving a Document Number in EDRM: https://edrm.ornl.gov/federaldocs/#/d/0902f41f801da6c9?dataSourceId=ORNL_PRD&versionLabel=CURRENT

Change Request Number:	Parent DCR/DCN Number:	RAD Priority Project Identifier (if known):	RAD Global Priority Impact Score (if known):
New/Standalone Project? ☐ Yes ☐ No	Change to Existing System? ☐ Yes ☐ No	Affected System(s)	Credited Engineering Control? ☐ Yes ☐ No

Requested Change: (attach additional information as required)

Initiating Organization:	Requested Implementation/Installation Date:	
Request Initiated by/Date:	Contact Telephone Number:	Contact Email Address:
Initiating Organization Group Leader/Date:	Contact Telephone Number:	Contact Email Address:

The following section is to be completed by a responsible engineer and requires approval from the design organization management.

Conceptual Solution Summary: (attach additional information as required)

Affected Organizations and Stakeholders:

☐ Electrical/RF	☐ Accelerator Cooling	☐ Target Support/ Remote handling
☐ Beam Instrumentation	☐ Ion Source	☐ Technical Component Utilities
☐ Central Utilities	☐ Site Services	☐ Vacuum
☐ Controls	☐ SRF/Cryogenic Systems	☐ Accelerator Operations
☐ Accelerator Physics	☐ Control Systems	☐ Data Acquisition
☐ EHS&Q	☐ Facilities Management	☐ Mechanical Systems
☐ Instrument Operations	☐ Radiological Control	☐ Other

Project Grade: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6

Other Affected Organizations:

Proposed Deliverables:

☐ Calculations/Analysis	☐ Customer Review
☐ DCD	☐ Conceptual Review
☐ DCN (enter below)	☐ Preliminary Review
☐ CAD Models	☐ Final Review
☐ Drawing Package	☐ ACCC Review
☐ Procurement	☐ Technical Review(s)
☐ Installation	☐ Committee Reviews
☐ Models/Simulation	☐ USI Evaluation
☐ Procedures	☐ Other (describe below)
☐ Training	

Budgeting and Charges:

- ☐ IWP:
- ☐ Labor:
- ☐ AIP:
- ☐ LDRD:
- ☐ Other:

Other Deliverables:

DCN Number: https://snsapp1.sns.ornl.gov/prod/docu.sns_id_res.reserve_div_doc_id_pg?ntype=1

Notes on Cost Estimate (basis, other sources, exemptions):

Responsible Engineer or Task Leader/Date:	Contact Telephone Number:	Contact Email Address:

The final section is to be prepared by the design organization group leader. The request initiator, the initiating organization group leader, & responsible engineer should receive copies.

Design Organization Disposition:

☐ Proceed with Project ☐ Place on Hold ☐ Other (see comments below)

Design Organization Group Leader/Date:	Contact Telephone Number:	Contact Email Address:
Design Organization Section Head/Date:		

Comments:

Revision 1 04/18/2024

Attachment D Link to Design Change Notice Form

Research Accelerator Division
Design Change Notice

DCN Number:

SNS Document Numbering System: https://edrm.ornl.gov/federaldox/#/irl/0902f41f803dafe9?dataSourceId=ORNL_PRD&versionLabel=CURRENT

System	Title of Change	DCR Number:	Grade

Reason for Change Enter a description of the problem the change is solving.

PE Certification Required? ☐ Yes ☐ No

Affects a Credited Engineered Control? ☐ Yes ☐ No

USI Procedure Steps (check highest applicable block)

☐ USI Identification — *Signature of Qualified USI Identifier (if checked)*

☐ USI Recognition — *Document Number (if checked)*

☐ USI Evaluation — *Document Number (if checked)*

Description of Change

Affected Items add rows as necessary

Document/Drawing Number	Rev	Document/Drawing Title	CEC
			Y/N

Role	Name	Signature/Date
Responsible Engineer		
System Engineer		
Group Leader		
Section Head		
Operating Engineer		
SME		
Other		
Design Change Approver		

Comments

Form OPM 9.A-3.D Feb 2025