Ownership matrix	**RPP-27195**

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1.0 PURPOSE AND SCOPE

(7.1.3, 7.1.4)

This procedure defines the requirements, responsibilities, and processes for technical reviews of technical documents before release. Technical reviews ensure technical documents, engineering documents, design documents, and designs therein are complete, correct, and comply with all requirements.

This procedure also defines in-process technical reviews for documents and designs in development. In-process technical reviews help to reduce the time, effort, and rework resulting from final technical reviews.

Other procedures are used to develop technical documents before technical reviews occur, primarily:

- TFC-ENG-DESIGN-C-25
- TFC-ENG-DESIGN-C-09.

Technical reviews are accomplished by:

- Determining the Design Type
- Identifying technical reviewers
- Determining the extent and type of technical reviews
- Documenting and resolving review comments.

The following types of technical reviews and their procedures are:

- For technical reviews:
  - Checking (TFC-ENG-DESIGN-P-54)
  - Design Verification (TFC-ENG-DESIGN-P-17).
- For monitoring the status of in-process designs:
  - Project design review (TFC-ENG-DESIGN-D-17.1).

Guidance for this procedure is provided by TFC-ENG-DESIGN-D-52.1.

In this procedure, the terms “reviewer” and “approver” are considered identical. Exceptions to this are identified by the term “Review Only.”

Documented approval (i.e., signature) by the reviewer signifies the document, or a portion of the document, satisfies the requirements within the reviewer’s area of knowledge, expertise, or responsibility.

2.0 IMPLEMENTATION

This procedure is effective on the date shown in the header.

3.0 RESPONSIBILITIES

3.1 Originator

The originator initiates and ensures the required technical reviews are completed.

3.2 Checker

The checker ensures documents are accurate and complete.

3.3 Design Authority

The Design Authority ensures documents are technically acceptable, and ensures appropriate technical reviewers have been identified.

3.4 Engineering Discipline Lead

The Engineering Discipline Lead (EDL) ensures:

- Designs incorporate and comply with required engineering related laws, contract terms, codes, standards, and methodologies
- Design input documents (e.g., modification travelers, specifications) identify correct design inputs and requirements
- Selected design output documents correctly implement design inputs and requirements.

3.5 Interdisciplinary Reviewer

The interdisciplinary reviewer ensures relevant technical content is acceptable with respect to their area of expertise, knowledge, organization, or title/role.

3.6 Project Engineering Manager

For each design under their responsibility, the Project Engineering manager:

- Ensures this procedure is followed
- Facilitates reviews from external organizations.

3.7 Project Engineer

For each design under their responsibility, the project engineer:

- Provides oversight on the technical review process utilized for their respective project
- Defines scope and schedule for the review
- Coordinates reviewers – especially those from external organizations
- Screens review comments before sending them to the design agent.

3.8 Subject Matter Expert

The Subject Matter Expert (SME) ensures:

- They are currently listed as an SME for that subject matter when identified as an approver on a document
- The document content relevant to the SME's scope is correct, and associated requirements are satisfied.

4.0 PROCEDURE

- For performing technical reviews of technical documents and designs, continue to Section 4.1. Figure 1 and Figure 2 depict this process.
- For applicability and performance of project design reviews, proceed to Section 4.7.
- For applicability and performance of reviews of technical documents provided by a vendor at 90% (final) design completion, proceed to Section 4.8. Figure 3 and Figure 4 depict design subcontract deliverable processes.
- Review of technical documents provided by a vendor at 30% or 60% design completion are governed by TFC-BSM-IRM_DC-C-07.
- For requirements of, and documenting review comments, proceed to Section 4.6.

4.1 Determining Design Type

To determine the required review processes, the extent of technical reviews, and the required reviewers, every design, and associated document are given a Design Type. This Design Type is used as a means of grading the level of reviews required for the entire design, or the technical documents associated with it. For large projects, the overall design may be broken into several smaller design subparts that interface together. In these cases, the smaller subparts may have their own Design Type as well.

In certain cases, designs may have a lower Design Type than what would normally be expected. Similarly, design subparts may have a lower Design Type than the overall design. In both cases, Design Types IV through VI are capable of overriding Design Types I through III.

For instance, if an overall design is associated with a "Project Category 2" project, but a portion or all of the design represents an equivalent replacement, then that portion of the design may be considered Design Type IV rather than Design Type I.

Where it is unclear what Design Type applies, the Design Authority must make the final determination of Design Type.

Design Type is determined using ATTACHMENT A.

4.2 Interdisciplinary Reviews

Technical documents may require review by one or more interdisciplinary reviewers before release. Documents created internally by the Tank Operations Contractor (TOC) staff, or externally by a vendor, are treated the same in this regard.

This section provides the requirements and steps to perform interdisciplinary reviews for these documents.

4.2.1 Identifying Interdisciplinary Reviewers

Interdisciplinary reviewers are identified by utilizing Table 1.

4.2.2 Requirements for Radiological Controls and Environmental Protection Reviews
(7.1.1)

Risk screening checklists have been provided to help ensure Radiological Controls (RadCon) and Environmental Protection (Environmental) reviewers are identified correctly.

RadCon and Environmental reviewers are identified per the risk screening checklists in ATTACHMENT B.

Where identified as reviewers, RadCon and Environmental must have approved design input documents PRIOR to 30% design completion.

4.2.3 Requirements for Engineering Discipline Lead Reviews

As required per ATTACHMENT C, EDLs must review and approve design input documents including:

- Modification travelers in accordance with TFC-ENG-DESIGN-C-56, and shall have available any documents that support understanding of the scope and requirements of the project scoped by the modification traveler
- Design specifications in accordance with TFC-ENG-DESIGN-C-34, including Construction or Design specification.

Approval Designators for EDLs and their respective disciplines are provided in the Table 1 Key.

Project risk is greatly reduced if these documents are approved by the EDL(s) before the design process begins.

If design development has started without EDL approval of design input documents, the design process must stop at 30% completion. To proceed:

- The EDL(s) approve the design input documents; or,
- The Chief Engineer approves continuation of the design process.

4.2.4 Initiating Interdisciplinary Reviews

Document Originator /Project Engineer

NOTE: The Design Authority may request additional reviewers in addition to those identified in the steps below.

1. Determine the Design Type in accordance with ATTACHMENT A.

2. As required per Section 4.2.1, identify required interdisciplinary reviewers in accordance with:

   - Table 1
   - ATTACHMENT B
   - ATTACHMENT C.

3. As required per Section 4.2.3, ensure the EDL reviews are conducted in accordance with ATTACHMENT C (Approval Designators for EDLs provided in the Table 1 Key).

Document Originator

4. For TOC-created documents, proceed to Section 4.3.

Project Engineer

5. For vendor-created documents, proceed to Section 4.5.

4.3 Checking

Checking is required for ALL Engineering documents as defined by this procedure, with the exception of those listed below under item 6.

Documents not requiring checking by this criteria, but that are developed in accordance with an engineering administrative procedure, should be Peer Reviewed as defined by this procedure. A peer reviewer may be listed as an "Other Approver" on the releasing document's signature block.

Checking is performed by having a competent, capable, and experienced peer check the document in accordance with the requirements listed below, and procedure TFC-ENG-DESIGN-P-54.

1. The checker ensures the technical accuracy and completeness of the engineering document by performing these actions:

   - A mathematical sample or check, if applicable
   - A check for correct use of technical input, including quality requirements[1]
   - A check for appropriate use of methods, computer programs, etc.
   - A check of the approach/methodology used and reasonableness of the output
   - An administrative check (page numbers, etc.)
   - Compliance to applicable industry codes and standards.

[1] Determination of quality requirements is the responsibility of the document originator, in consultation with the quality assurance engineer. The checker reviews to assure the appropriate quality requirements were selected and correctly implemented. TFC-ESHQ-Q_ADM-C-01 identifies potential quality requirements.

2. A checker must meet the following criteria to perform a 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 qualified to perform similar design or analysis activities by training or experience.

3. The document originator's manager may perform the check, provided the manager meets the requirements of step 2 and:

   - Did not specify a singular approach
   - Did not rule out certain design or analysis considerations
   - Did not establish inputs in the documents
   - Is the only competent individual available to perform the check.

4. The Design Authority may perform the check, provided the Design Authority meets the requirements of step 2.

5. The checker documents satisfactory completion of the check by signing the document.

6. The following engineering documents do not require checking in accordance with this procedure. These have their own procedural preparation and review requirements and technical review checklists.

   - Commercial grade dedication packages (see TFC-ENG-DESIGN-C-15)
   - Safety basis documents and safety basis supporting documents (e.g., criticality safety documents).

4.3.1 Process for Checking

NOTE: See the flowchart in Figure 1 for the intended steps to perform checking described here.

Originator

1. If required per Section 4.3, perform checking of the document in accordance with TFC-ENG-DESIGN-P-54.
2. Once checking is completed, and comments are addressed, proceed to Section 4.4.

4.4 Design Verification
(7.1.1, 7.1.2, 7.1.3)

NOTE: This section describes Design Verification methods more extensively than checking per Section 4.3.

The extent of Design Verification must be determined using ATTACHMENT D.

Safety Instrumented System (SIS) designs do not require design verification in accordance with this procedure. They are verified in accordance with requirements set forth in TFC-ENG-DESIGN-P-43.

4.4.1 Process for Design Verification

NOTE: See the flowchart in Figure 1 for the intended steps to perform Design Verification described here.

Originator	1. Ensure checking per Section 4.4 has been completed.
	2. Determine the extent of Design Verification required in accordance with ATTACHMENT D.
Design Verifier(s)	3. Perform Design Verification in accordance with TFC-ENG-DESIGN-P-17.
Document Originator	4. Once Design Verification is completed, and comments are addressed, proceed to Section 4.6.

4.5 Completing Technical Reviews

NOTE: This section is a continuation of activities performed in the previous sections.

Document Originator /Project Engineer	1. Determine the appropriate method for collecting comments and their requirements per Section 4.6.
	2. Return to TFC-ENG-DESIGN-C-25, or the governing procedure, to route the document for remaining technical reviews and comment resolution.
	3. For vendor-produced documents, perform comment screening per Section 4.8.2 after reviews have been completed.

4.6 Review Comment Record Process

This section applies to the use of both electronic (SmartPlant) and hard-copy Review Comment Records (RCRs) on site form A-6005-747.

Each comment should include a basis. Comments provided without a basis do not require resolution, whether or not "Reviewer Concurrence Required" is checked "yes."

With the exception of comments having no basis, all comments checked "yes" for "Reviewer Concurrence Required" must be resolved to the satisfaction of both the originator/project engineer and reviewer before the document(s) is approved. If a resolution cannot be reached, then TFC-BSM-AD-C-10, (to address differing professional opinions) must be invoked as determined by Level 2 engineering management.

4.7 Project Design Reviews

The Project design review philosophy is to provide a formal, independent, and rigorous assessment during a project to ensure the design is sufficient to proceed to the next phase. While checking and Design Verification processes evaluate the technical accuracy and acceptability of the design documents, the Project design review process is an evaluation of the overall design effort to help ensure:

- Requirements are identified and sufficiently mature for the phase of the design project
- Design approach is adequate
- Key process and operational issues are identified and being adequately addressed
- Safety, Health, and Environmental requirements and inputs are identified and are adequately addressed
- Nuclear and criticality safety, other technical risks, issues, and assumptions are identified and are adequately addressed.

4.7.1 Project Design Review Requirements

The decision to perform a Project design review, and the point during the design that it is performed, is determined by the Project Engineer in accordance with the criteria below. The Project design review is scheduled and integrated to align with other Project Reviews.

Guidance for performing project design reviews is found in TFC-ENG-DESIGN-D-17.1.

Project design reviews must:

- Be performed as required by ATTACHMENT E
- Ensure design issues are identified and documented as review comments
- Collect and track review comments in a review comment list
- Issue the review comment list as an internal memo to all reviewers at the end of each review phase
- Ensure reviewers are aware of open review comments at the beginning of subsequent review phases
- Ensure review comments are addressed and closed by the end of the design project.

4.7.2 Process for Project Design Review

Project Engineer

1. Determine the need to perform a formal Project design review in accordance with ATTACHMENT E.
2. Initiate a Project design review in accordance with TFC-ENG-DESIGN-D-17.1.

4.8 Design Subcontract Deliverable Review

The Design Subcontract Deliverable Review (DSDR) process is used to monitor design performance of vendors by reviewing the final design products they submit.

Vendors perform checking and Design Verification in accordance with their procedures. Therefore, Sections 4.3 and 4.4 of this procedure do not apply to the DSDR.

All Design Types I and II must be subject to a DSDR.

However, engineering management or the Design Authority may request a DSDR on any subcontracted design to provide enhanced design engineering oversight.

4.8.1 Process for Design Subcontract Deliverable Review

Project Engineer

1. Identify all documents in the design package received from the vendor.

   NOTE: The design package should include all drawings, calculations, specifications, and design input documentation (Modification Travelers, Functions and Requirements documents, design specifications), and results of the vendor-executed design verification, etc.

   a. If the vendor's design was integrated with in-house executed portions, identify the in-house portion of the design in the package.

2. Ensure design verification of the design package has been addressed by:

   - Design verification of the design package by the vendor in accordance with their procedures

   AND/OR

   - Identifying and controlling unverified portions of the design using a TBD/Hold per TFC-ENG-DESIGN-C-25. This is acceptable if the design could not be verified due to timing; cases such as when data is not yet available, or it was previously agreed that testing would be used to verify the design.

3. If the design package has NOT been design verified, and reviews cannot be completed, do one of the following:

   a. Request the vendor to provide a design verification report or evidence of design verification completion.

b. Reject the submittal per TFC-BSM-IRM_DC-C-07, and request that the vendor complete design verification and resubmit the design package.

4. Document the design verified portions of the design package in accordance with TFC-ENG-DESIGN-P-17.

5. Review the design package in accordance with ATTACHMENT F, and ATTACHMENT G, as applicable, for the overall acceptability of the design package as a subcontractor submittal.

   a. If the design package is acceptable, continue to the next step.

   b. If the design package is unacceptable, reject the submittal per TFC-BSM-IRM_DC-C-07.

NOTE: Design type should already be identified on input documents (e.g., Modification Traveler, Specification).

5. Identify the Design Type of the design package.

   a. If a Design Type has not been previously identified, identify the Design Type per Section 4.1.

6. Identify interdisciplinary reviewers per Sections 4.2, do not proceed to Section 4.2.4, return to this point and continue.

7. Provide the reviewers with the following additional review instructions:

   a. Review the design package in accordance with ATTACHMENT F, and ATTACHMENT G as applicable, and for:

      - Alignment of design output documentation with design input
      - Quality of the design products, including compliance with applicable TOC standards
      - Compliance with applicable national codes and standards
      - Design Requirements Compliance Matrix review, if available.

8. Initiate reviews per Section 4.2.4.

4.8.2 Comment Screening

Inappropriate comments must be screened from the comment set. An example of an inappropriate comment would be one that is not worded as a needed change or deficiency with

the document, but as a statement. Other examples include comments that are incorrect, suggest an entirely different solution than was agreed to by the project and design team, comments that can be technically demonstrated to be outside of the reviewer's competence or expertise, or comments that result in noncompliance with codes or standards, etc.

Examples of out-of-scope comments include comments not related to the proposed change or comments that suggest changes to systems, structures, or components (SSCs) other than those within the project scope.

Project Engineer

1. Consolidate comments from reviewers into a single list.
2. Categorize comments as follows:
   - Appropriate comments within scope
   - Out-of-scope comments
   - Inappropriate comments (e.g., issues outside the control of the design agent or originator).
3. Discuss out-of-scope and inappropriate comments with the Design Authority and reviewers.
4. Come to an agreement on which comments should be screened out.
5. Delete screened out comments from the RCR.
6. Determine if the comments, either by quantity, content, or severity, justify rejecting the submittal.
7. If rejection is justified, proceed to TFC-BSM-IRM_DC-C-07; otherwise, continue to the next step.
8. Provide screened comments to the vendor for disposition.

Design Authority / Project Engineer

9. Upon receipt of revised documents addressing screened comments, conduct a re-review as appropriate.

NOTE: Once completed, the RCR may optionally be attached to the document in SPF or the released PDF.

10. Ensure all comments have been addressed or resolved to the level of satisfaction required by the reviewer

5.0 DEFINITIONS

Checking/Check. A method of design verification performed to ensure technical accuracy and completeness of design and analysis documents prior to approval. Applied using a graded approach, checking ensures design documents comply with technical requirements for designs of lower complexity, risk, and scope.

A check is normally performed by a peer (who was not directly involved in the preparation of the document being reviewed) of the originator. NOTE: The term "design check" is synonymous with this definition.

Competent. A competent individual is knowledgeable through education, experience, and training of applicable regulations, standards, equipment, and systems in their area of expertise as assigned by management.

Design (or Engineered design). The technical description of an item, equipment, system, structure, process, or concept developed by a design process (specifically an engineering design process).

Design package. The set of design documents that represent the design for a specific scope.

Design agent. (Source: TFC-PLN-136) The people, organization, or vendor that is distinct from the Design Authority, and is developing the design and design documents.

Design completion. For the purposes of this procedure, percent design completion must be based on the percent complete of the design development schedule for the scope covered by the applicable MT and/or Specifications document. The percent completion is based on schedule reporting only, not on numbers and types of design deliverables submitted, drafted, or completed. For example, 30% design completion would be about 1 month into a 3-month design schedule.

Design document. An Engineering Document that describes, develops, defines, assesses, analyzes, qualifies, or implements the Design. Typically, these documents include drawings, functions and requirements documents, specifications, and calculations.

Design input (partial definition). Specific criteria, limits, bases, or other initial requirements (e.g., specific functional requirements, specific codes and standards, and specific regulatory commitments) upon which the detailed final design is based. (See TFC-ENG-DESIGN-D-55.1 for complete definition.)

Design input document. A document that establishes or provides design inputs for developing a design. These include Modification travelers and Design specifications.

Design specification. A document developed in accordance with TFC-ENG-DESIGN-C-34 that defines the technical requirements for procurement of items (TFC-BSM-CP_CPR-C-06) and services (TFC-BSM-CP_CPR-C-05). These items and services include catalog items, developmental technology, engineered equipment, design/build procurements, and construction. Design specifications are NOT:

- System Specifications developed in accordance with TFC-ENG-DESIGN-C-01
- Safety Requirements Evaluation Documents (SREDs) developed in accordance with TFC-ENG-DESIGN-P-43
- Functions and Requirements Evaluation Documents (FREDs) developed in accordance with TFC-ENG-DESIGN-C-45
- System Health Reports developed in accordance withTFC-ENG-FACSUP-D-01.2.

Design subcontract deliverable review. A technical oversight review performed to ensure final designs received from subcontracted architect-engineering companies meets requirements.

Design type. A term used to indicate the relative technical risk of any given engineered design. This is based on a combination of factors including, but not limited to; technical complexity, maturity of technology, safety classification, project schedule, project cost, etc.

Design verification. The set of methods more extensive than checking that verify a design is technically acceptable. The Design Verification philosophy is the same as the checking but assures the technical accuracy of the design at an increased level of rigor, breadth, and depth. Design Verification can be performed using several methods (e.g., extensive review of design documents, alternate calculations, testing of the design). The methods and performance of Design Verification are defined in TFC-ENG-DESIGN-P-17.

Engineering document. A Technical Document created in accordance with an engineering administrative procedure that is a Technical baseline document, OR that relates to the design, analysis, procurement, manufacture, test, or inspection of systems, structures, or components (SSCs).

Such documents include but are not limited to:

- Drawings
- ECNs/DCNs
- Design specifications
- Construction specifications
- Procurement specifications
- Test specifications
- Calculations
- Certain technical reports.

Examples of non-engineering documents as defined above include, but are not limited to:

- Technology maturation plans
- Technology compendium reports
- Project execution plans and supporting reviews/checklists
- Site evaluation reports and plans (siting studies)
- Decontamination and decommissioning plans
- Risk and opportunity management plans
- Procurement/acquisition plans
- Security and vulnerability plans
- Safety and health plans
- ALARA planning documents
- Project regulatory communication strategy/plans
- Environmental permitting documents
- Waste planning documents
- Construction planning documents
- Turnover plans and documents
- Startup and readiness checklists and plans
- Safety design strategy/plans
- Statements of work

- Cost and schedule estimates
- Technical reports (used for scoping and content is not used as design input)
- Design review reports.

Equivalent replacement. (Source: TFC-ENG-DESIGN-P-16) An item that is equivalent to, but not identical to, the original item. The item may have different form, fit, or certain design characteristics, but, as a minimum, meets the same design basis requirements and performs the same function as the item being replaced. The replacement item also meets all applicable interface requirements of the original item.

Interdisciplinary reviewer. A reviewer that is generally in an organization different from the originator, but is a stakeholder in the document being reviewed. They ensure that the document being reviewed is acceptable with respect to their organizational responsibilities, subject matter expertise, duties of their assigned title/role, qualification, or training.

Like-for-Like Items. (Source: TFC-ENG-DESIGN-C-15) Items may be considered identical or like-for-like if one of the following applies:

1. The item is provided from the original equipment manufacturer or successor companies, and has not been subject to design, materials, manufacturing, or nomenclature changes.

2. The item was purchased at the same time and from the same supplier, as determined by the purchase date, date code, or batch/lot identification.

3. Evaluation of the item confirms that no changes in the design, materials, or manufacturing process have occurred since the procurement of the original item.

Modification Traveler. A document developed in accordance with TFC-ENG-DESIGN-C-56 with the purpose of controlling the process for modifications to certain facilities. It is used in part or in whole to identify design inputs and requirements.

Peer review. An informal technical review performed to assure technical accuracy and completeness of documents prior to wider review and approval. A peer review is normally performed by a peer of the originator.

Previously proved design. A design that has been previously implemented with identical design requirements and proven to perform satisfactorily to the full extent of its design requirements.

Project design review. A technical review performed to assure the design at a specific stage of a development/phase is sufficient to perform the task scope, and to assure that the required technical work commensurate with the stage of a development/phase has been accomplished.

Subject Matter Expert (SME). A person with extensive knowledge, training, and capabilities in a specific subject area. SMEs are designated by the manager of Engineering Programs, or the Design Engineering manager. For the purposes of this procedure, an SME ensures technical requirements are met, and technical rigor is sufficient for their area of expertise. The SME may also ensure that requirements of specific procedures or standards in their area of expertise are satisfied.

Technically acceptable. A technical document that satisfies the inputs, technical requirements, and purpose through its results and conclusions, OR a design associated with a facility that is

acceptable because it satisfies the approved facility design requirements, facility safety basis, facility system interfaces, and facility functional requirements as defined in the documented safety analysis.

Technical accuracy. A document that accurately incorporates and fulfills the originating technical input requirements, and meets the relevant requirements of all applicable regulatory and industry codes and standards.

Technical baseline document. A document, identified by the Design Authority, used to identify, justify, and demonstrate the physical, functional, or operational requirements of configuration controlled structures, systems, and components. See TFC-ENG-STD-46.

Technical document. A document that is developed, reviewed, and released in accordance with TFC-ENG-DESIGN-C-25 and TFC-ENG-DESIGN-C-09.

Technical review. A deliberate, thoughtful assessment process by which technical staff, who meet defined criteria, evaluate documents prior to approval to assure the documents meet technical requirements.

Vendor. (Source: TFC-BSM-IRM_DC-C-07) Any seller, subcontractor, supplier, or sub-subcontractor providing equipment, materials, services, or a combination thereof under legal agreement (purchase order, contract, etc.) with the TOC or a client.

6.0 RECORDS

The following record is generated during the performance of this procedure and is submitted at the discretion of the person generating the record:

- Review Comment Record (site form A-6005-747).

The record custodian identified in the Company Level Records Inventory and Disposition Schedules (RIDS) is responsible for record retention in accordance with TFC-BSM-IRM_DC-C-02, or TFC-ENG-DESIGN-C-09.

7.0 SOURCES

7.1 Requirements

7.1.1 10 CFR 835, “Occupational Radiation Protection,” Section 1001, “Design Control,” and Section 1002, “Facility Design and Modification.”

7.1.2 10 CFR 851, “Worker Safety and Health Program,” Sections 851.21(a)(4), 851.22(a)(1), 4(c)(1) - (3), and 6(b).

7.1.3 TFC-PLN-02, “Quality Assurance Program Description.”

7.1.4 WRPS Contract Section C.3.1.5.1.

7.2 References

7.2.1 RPP-16922, “Environmental Specification Requirements.”

7.2.2 TFC-BSM-AD-C-10, “Differing Professional Opinion Resolution.”

7.2.3 TFC-BSM-CP_CPR-C-05, “Procurement of Materials and Services.”

7.2.4 TFC-BSM-CP_CPR-C-06, “Procurement of Materials.”

7.2.5 TFC-BSM-CP_CPR-C-17, “Interface Management.”

7.2.6 TFC-ENG-DESIGN-C-01, “Development of TOC Specifications.”

7.2.7 TFC-ENG-DESIGN-C-09, “Engineering Drawings.”

7.2.8 TFC-ENG-DESIGN-C-15, “Commercial Grade Dedication.”

7.2.9 TFC-ENG-DESIGN-C-25, “Technical Document Control.”

7.2.10 TFC-ENG-DESIGN-C-34, “Development of Technical Requirements for Procurements.”

7.2.11 TFC-ENG-DESIGN-C-45, “Control Development Process for Safety-Significant Structures, Systems, and Components.”

7.2.12 TFC-ENG-DESIGN-C-56, “Modification Traveler.”

7.2.13 TFC-ENG-DESIGN-D-17.1, “Project Design Review Guidance.”

7.2.14 TFC-ENG-DESIGN-P-16, “Equivalent Replacement.”

7.2.15 TFC-ENG-DESIGN-P-17, “Design Verification.”

7.2.16 TFC-ENG-DESIGN-P-43, “Control Development Process for Safety-Significant Safety Instrumented Systems.”

7.2.17 TFC-ENG-DESIGN-P-54, “Checking of Engineering Documents.”

7.2.18 TFC-ENG-FACSUP-C-25, “Hoisting and Rigging, Load Handling, and Transport.”

7.2.19 TFC-ENG-FACSUP-D-01.2, “System Notebook Preparation.”

7.2.20 TFC-ENG-FACSUP-C-41, “Electronic Routing Board Control Procedure.”

7.2.21 TFC-ENG-STD-02, “Environmental/Seasonal Requirements for TOC Systems, Structures, and Components.”

7.2.22 TFC-ENG-STD-06, “Design Loads for Tank Farm Facilities.”

7.2.23 TFC-ENG-STD-07, “Ventilation System Design Standard.”

7.2.24 TFC-ENG-STD-22, “Piping, Jumpers, and Valves.”

7.2.25 TFC-ENG-STD-31, “Electrical Distribution Studies.”

7.2.26 TFC-ENG-STD-41, “Electrical Installations.”

7.2.27 TFC-ENG-STD-46, “Technical Baseline Management.”

7.2.28 TFC-ESHQ-Q_ADM-C-01, “Graded Quality Assurance.”

7.2.29 TFC-ESHQ-S-STD-30, “Implementation of DOE-0344, Hanford Site Excavating, Trenching, and Shoring Procedure (HSETSP).”

7.2.30 TFC-PLN-03, “Engineering Program Management Plan.”

7.2.31 TFC-PLN-13, “Fire Protection Program.”

7.2.32 TFC-PLN-43, “Treatment, Storage and Disposal Facility Hazardous Waste Operations.”

7.2.33 TFC-PLN-48, “ALARA Program Plan.”

7.2.34 TFC-PLN-58, “Chemical Management Plan.”

7.2.35 TFC-PLN-118, “Strategic Plan for Hanford Waste Feed Delivery and Treatment Process Control Systems.”

7.2.36 TFC-PLN-123, “Integrated Environmental Management System Description.”

7.2.37 TFC-PLN-138, “Implementation Plan for ISA 84 (Safety Instrumented Systems).”

7.2.38 TFC-PRJ-PM-C-03, “Project Categorization and Tailoring.”

Figure 1. Checking and Design Verification.

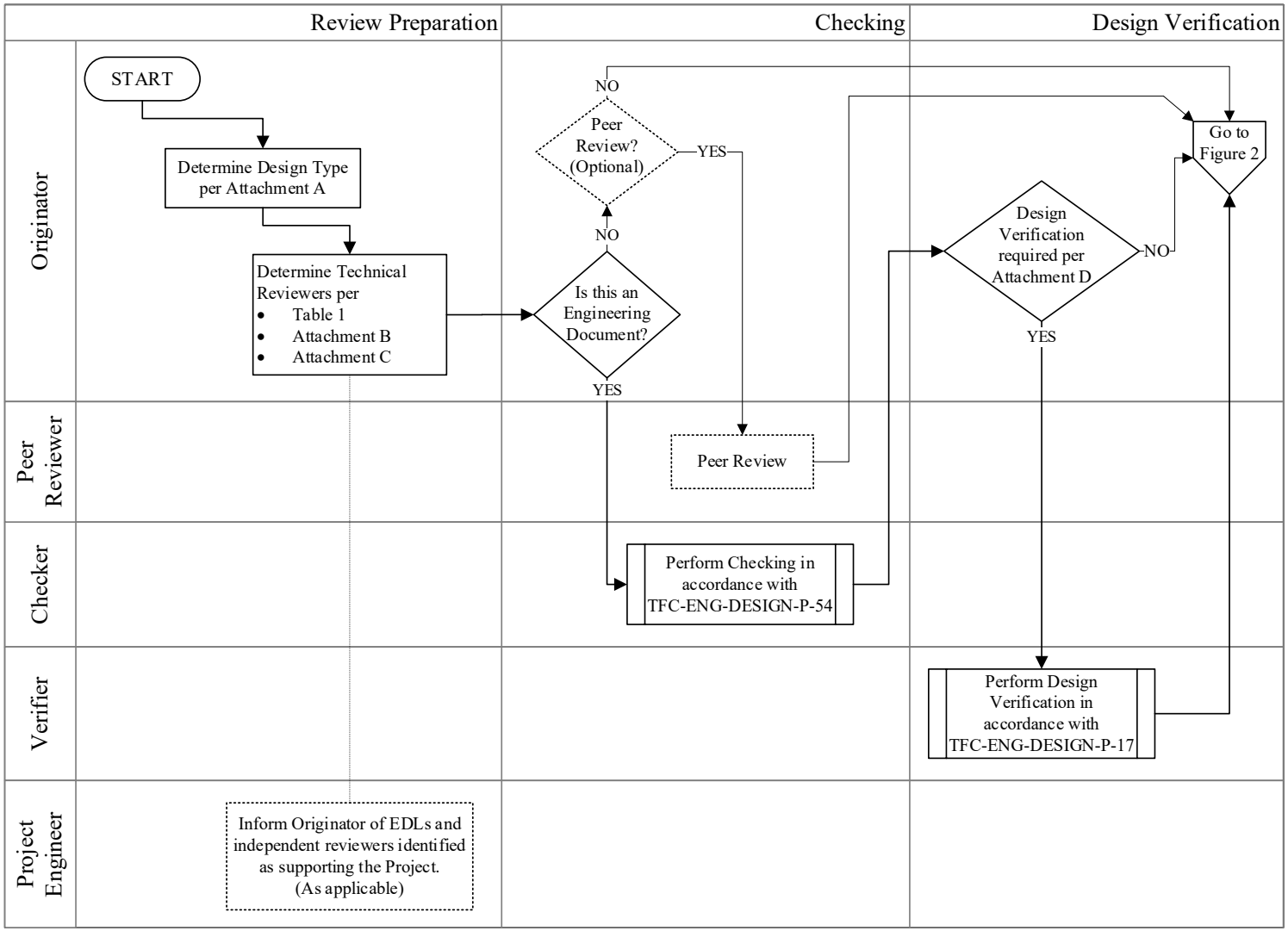

Figure 2. Technical Reviews (GUIDANCE ONLY).

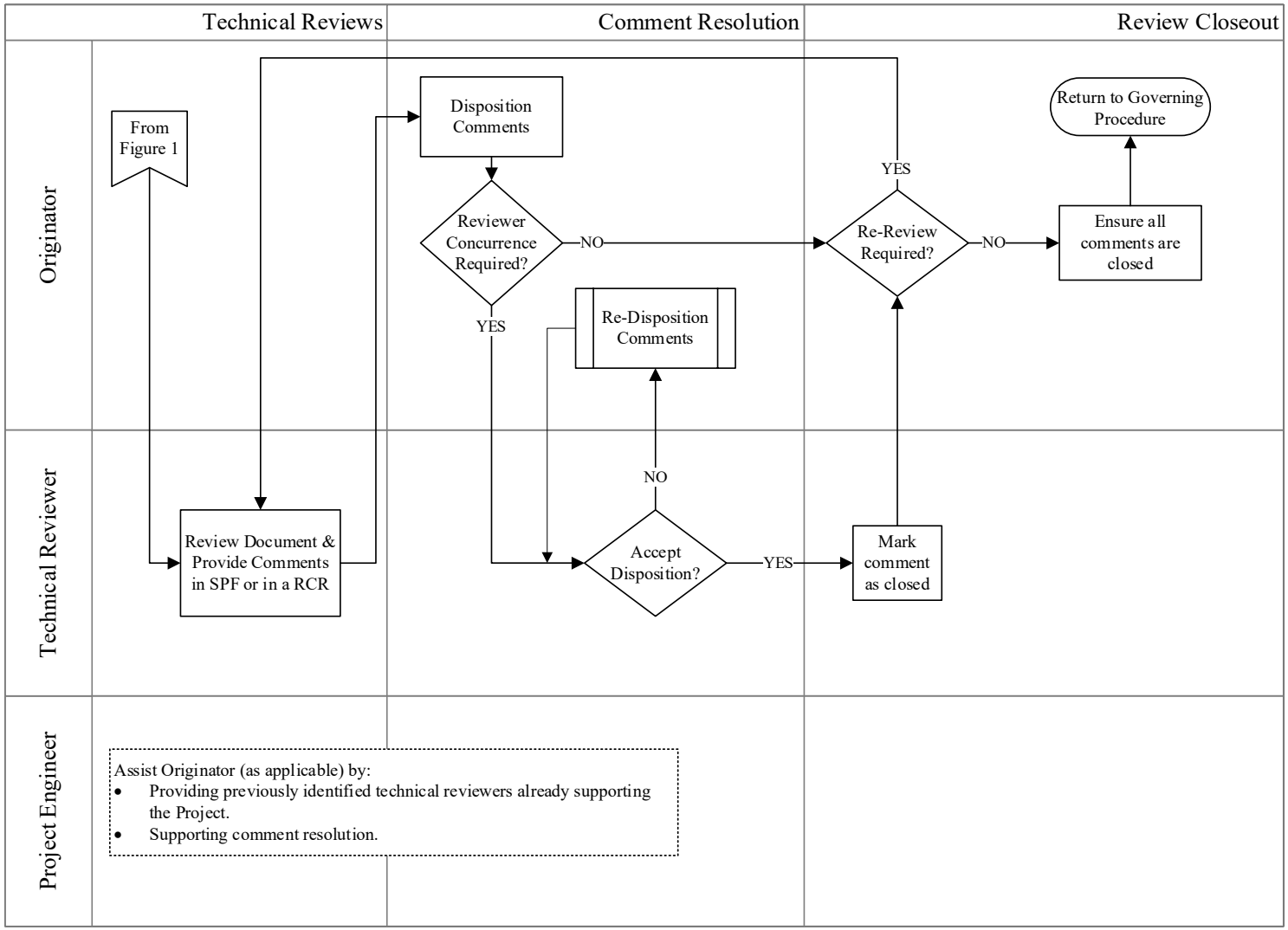

Figure 3. Design Subcontract Deliverable Review – Preparation.

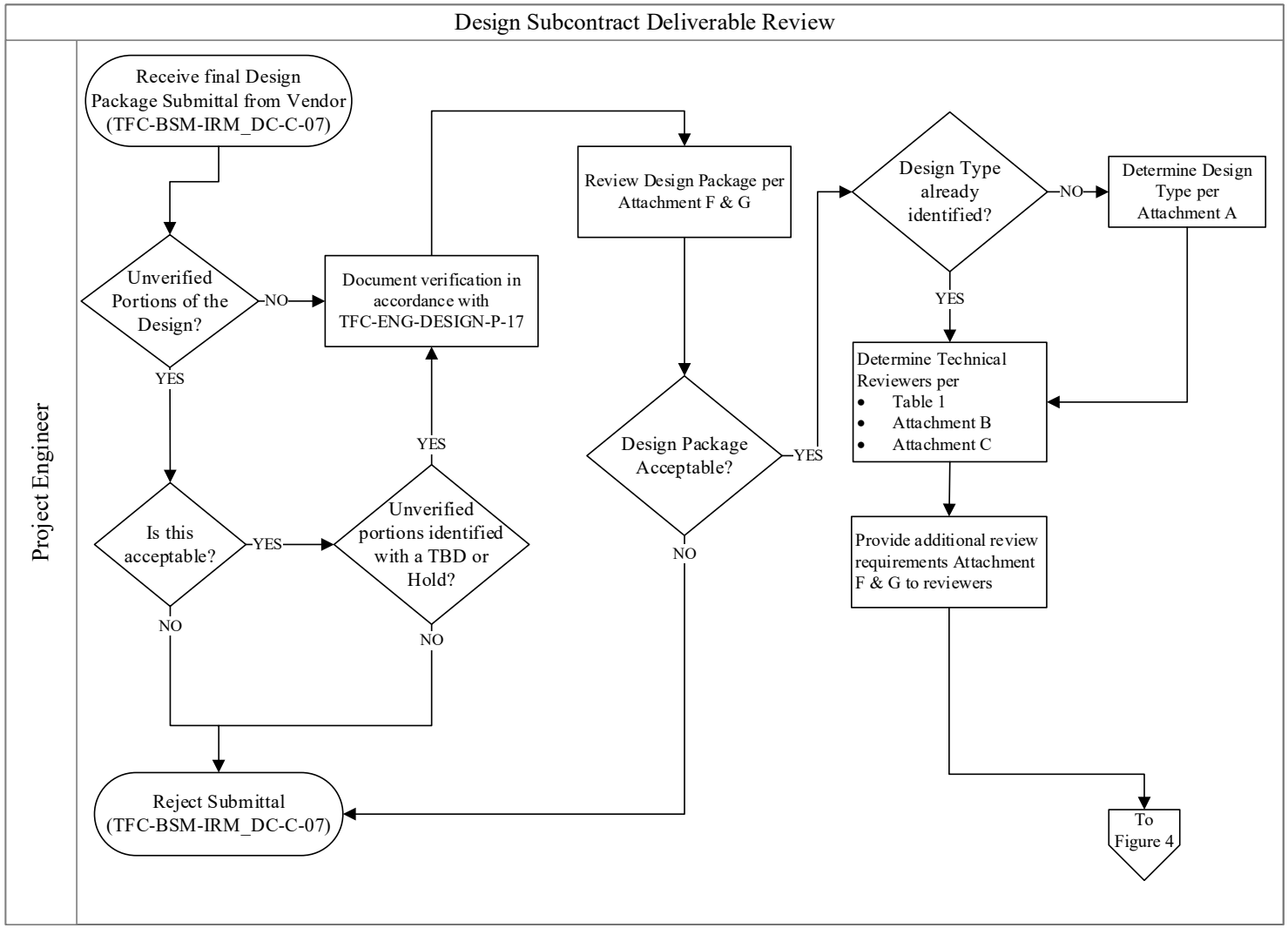

Figure 4. Design Subcontract Deliverable Review – Comments and Closeout.

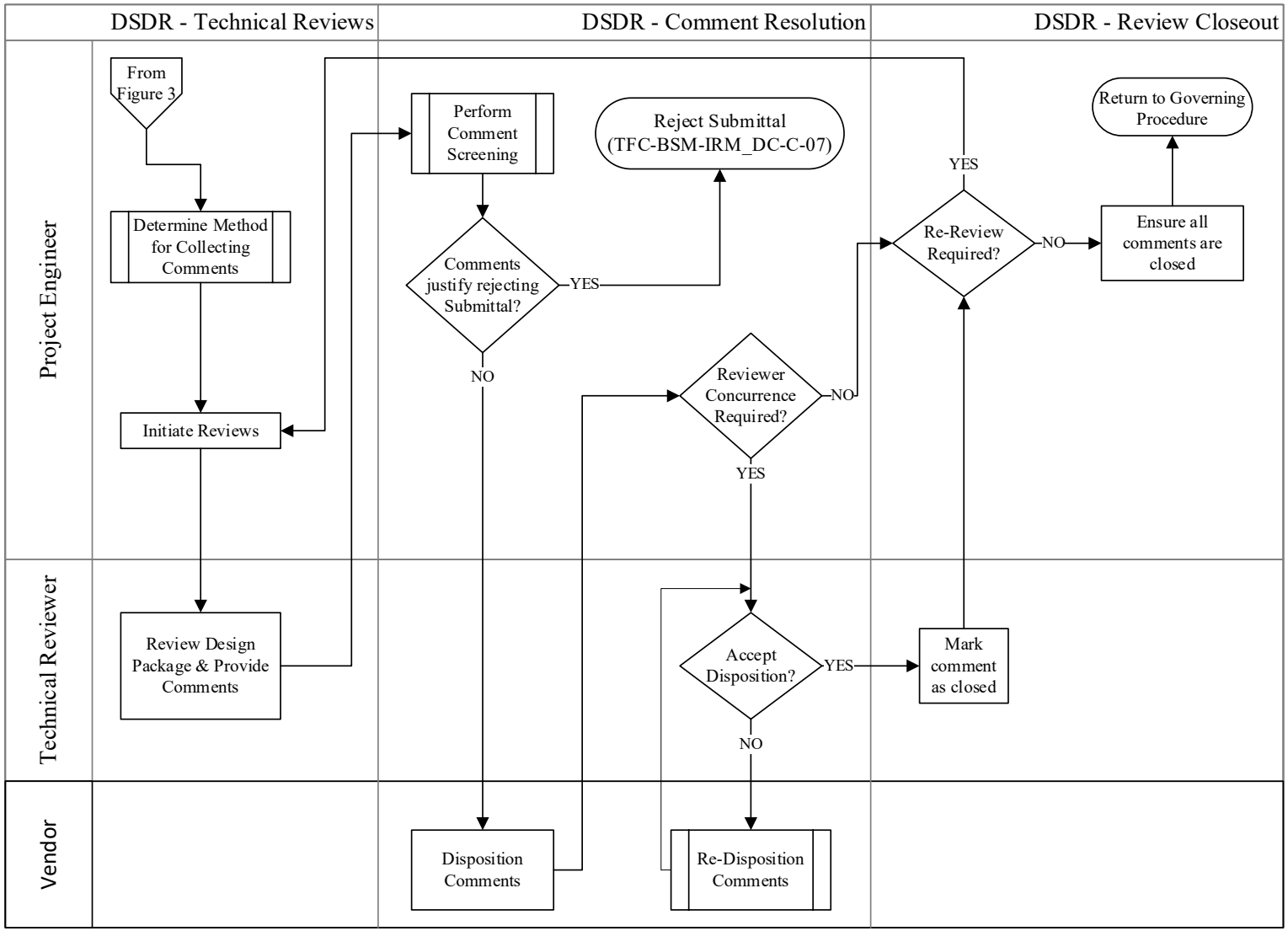

Table 1. Interdisciplinary Reviewer Matrix.

Review Criteria	Approval Designator
1. All design documents requiring DOE or other regulatory agency approval and establishing:	
a. Environmental protection including permits, regulations, and requirements.	E
b. Industrial safety requirements.	S
c. Radiological monitoring requirements.	R
d. Chemical Management Program requirements.	C
e. Fire protection requirements, construction permits, and compliance.	F
f. Criticality safety requirements.	NCS
g. Nuclear safety requirements.	NS
2. Documentation that establishes, implements[1], or modifies the following functional criteria or requirements:	
a. Environmental protection, including environmental and requirements bases of the Environmental Management System and Environmental Specification Requirements.	E (Review Only)
b. Radiological control or monitoring.	R (Review Only)
c. Industrial Safety.	S (Review Only)
d. Fire protection.	F
e. Chemical Management Program	C (Review Only)
f. Welding requirements and/or symbology, and Welding Procedure Specifications / Procedure Qualification Records (WPSs/PQRs).	WE (Review Only)
g. Nondestructive Examination (NDE) requirements, procedures and personnel certifications. (welding related NDE only)	NDE SME (Review Only)
h. Criticality safety.	NCS
i. Nuclear Safety	NS
3. All Interface Control Documents.	IM
4. Technical baseline documents that include waste stream-related technical baseline requirements and operations baseline information.	PE
5. Documents that directly relate to environmental compliance, such as RPP-12711 requiring State of Washington, Department of Ecology approval. (Ref. State of Washington, Department of Ecology Letter No. 0203589, dated August 8, 2002), HNF-SD-WM-OCD-015, compatibility assessments on tank transfers, etc.)	E
6. Documents which create or modify Safety Instrumented Systems (SIS) or Safety Instrumented Alarms (SIA).	A
7. Documents which create or modify components associated with SIS or SIA.	A (Review Only)
8. Changes to Routing board drawing H-14-107346 (i.e., ECNs or revisions).	WT
9. Changes to Electronic Routing Board (i.e., ECNs, DCN)	ERBO (Approval)
10. Fall Protection anchor design, Personal Fall Arrest System (PFAS) or Fall Restraint design and related calculations.	EF
11. Designs that require excavation of any depth. Designs or calculations of excavations or shoring configurations. (NOTE: Excavations, Excavation Permits, and Shoring are controlled by TFC-ESHQ-S-STD-30)	EX (Review Only)
12. Designs involving equipment with lifting features provided by the manufacturer, such as; integral lifting attachments, lifting hardware, instructions for lifting, provisions for user installed lifting hardware, or forklift slots.	RE

Table 1. Interdisciplinary Reviewer Matrix. (cont.)

Review Criteria	Approval Designator
13. Designs including equipment with NEW lifting features provided as part of the Design, such as; integral lifting attachments, lifting hardware, instructions for lifting, provisions for user installed lifting hardware, or forklift slots. (See TFC-ENG-FACSUP-C-25)	RE
14. Calculations involving load handling, load transport, load lifting stress evaluations, below the hook lifting devices, equipment or structures being lifted, or related concerns. (See TFC-ENG-FACSUP-C-25)	HR
15. Designs that require rigging hardware of any kind to be lifted, or documents that in itself design rigging hardware. (See DOE-RL-92-36, and TFC-ENG-FACSUP-C-25).	RE
16. Designs/calculations prepared for the purpose of qualifying piping or support systems in accordance with TFC-ENG-STD-22.	CP
17. Designs/calculations relating to code compliant piping, including; ASME Section III, B31.1, B31.3, B31.5 not in accordance with TFC-ENG-STD-22.	CP
18. Designs/calculations relating to code compliant piping, including; ASME B31.9, AWWA, UPC, IMC, IBC.	CP (Review Only)
19. Calculations prepared for the purpose of qualifying ventilation systems in accordance with TFC-ENG-STD-07.	EDL-V
20. Calculations prepared for the purpose of qualifying civil/structural systems in accordance with TFC-ENG-STD-06.	CS
21. In accordance with TFC-ENG-STD-41, specifications for electrical equipment not labeled by an Occupational Safety and Health Administration (OSHA) Identified Nationally Recognized Testing Laboratory (NRTL).	EDL-E, CSE
22. In accordance with TFC-ENG-STD-31, all arc-flash studies.	CSE
23. In accordance with TFC-ENG-STD-31, all electrical distribution studies.	EDL-E
24. Hazardous Area Classification reports	EDL-E, NS, PE (All Approval)
25. Hazardous Area Classification drawings	EDL-E (Approval)
26. Heat transfer calculations prepared to evaluate the design of SSCs exposed to outdoor environment and analyzed per ASHRAE methodology as specified by TFC-ENG-STD-02.	EDL-V
27. Design changes to drawings/documents specified in WTP interface control documents (ICDs).	ICD

Table 1. Interdisciplinary Reviewer Matrix. (cont.)

Key for Table 1 Reviewers/Approvers:

Designator	Description	Type[2]	Note
A	ISA 84	SME	3
C	Chemical Management Program	Organization	4
CE	Electrical	SME	9
CP	Piping	SME	9
CS	Structural	SME	9
CSE	Cognizant System Engineer	Assigned Role	9
CV	Ventilation	SME	9
E	Environmental Protection	Organization	5, 6
EDL-CS	Engineering Discipline Lead-Civil/Structural	Assigned Role	9
EDL-E	Engineering Discipline Lead-Electrical	Assigned Role	9
EDL-M	Engineering Discipline Lead-Mechanical	Assigned Role	9
EDL-V	Engineering Discipline Lead-Ventilation/HVAC	Assigned Role	9
EF	Fall Protection	SME	-
ERBO	Electronic Routing Board (ERB) Originator	SME	15
EX	Excavation Engineer	SME	12
F	Fire Protection	Organization	7
IM	Interface Management	Organization	8
ICS	Instrumentation and Control Engineering	Organization	14
NCS	Nuclear Criticality Safety	Organization	9
NDE SME	Nondestructive Examination (NDE)	SME	9
NS	Nuclear Safety	Organization	9
PE	Process Engineering	Organization	9
R	Radiological Control Engineering	Organization	10
RE	Qualified Rigging Engineer	Qual. Card	13
HR	Engineering Hoisting and Rigging SME	SME	13
S	Industrial Safety	Organization	10
PSE	Process Software Engineering	Organization	14
WE	Welding Engineer	SME	9
WT	Waste Transfer Engineering	Organization	9

Table 1. Interdisciplinary Reviewer Matrix. (cont.)

Notes for Table 1 and Table 1 Key:

1. Implementing documents include drawings, specifications, and ECNs/DCNs.

2. This column indicates the type of reviewer;
   - Organization: reviewing organization represented by an individual person.
   - SME: Subject Matter Expert as appointed by Engineering Management.
   - Assigned Role: a person that holds a current qualification card for the respective review description, AND assigned the role with defined responsibilities and jurisdiction by management.
   - Qual. Card: a person that holds a current qualification card for the respective review description.

   The majority of these reviewers are found by visiting the Points of Contact (POC) list in the Engineering Toolbox, located on the WRPS Engineering website. For help, email ^WRPS Subject Matter Experts.

3. Basis document: TFC-PLN-138, "Implementation Plan for ISA 84 Safety Instrumented Systems."

4. Basis document: TFC-PLN-58, "Chemical Management Plan."

5. Basis document: TFC-PLN-123, "Environmental Management System Description."

6. Basis document: RPP-16922, "Environmental Specification Requirements."

7. Basis document: TFC-PLN-13, "Fire Protection Program."

8. Basis document: TFC-BSM-CP_CPR-C-17, "Interface Management"

9. Basis document: TFC-PLN-03, "Engineering Program Management Plan."

10. Basis document: TFC-PLN-48, "ALARA Program Plan."

11. Basis document: TFC-PLN-43, "Treatment, Storage, and Disposal Facility Hazardous Waste Operations."

12. Basis document: TFC-ESHQ-S-STD-30, "Implementation of DOE-0344, Hanford Site Excavating, Trenching and Shoring Procedure (HSETSP)."

13. Basis document: TFC-ENG-FACSUP-C-25, "Hoisting, Rigging, Load Handling, and Transport."

14. Basis document: TFC-PLN-118, "Strategic Plan for Hanford Waste Feed Delivery and Treatment Process Control Systems."

15. Ref. TFC-ENG-FACSUP-C-41, "Electronic Routing Board Control Procedure."

ATTACHMENT A – DESIGN TYPE DETERMINATION

Table A-1. Design Type Determination

Design Type**	Project, Characteristic, or Parameter relating to the Design
I	This type of design is associated with: • Category* 1 Projects • Category 2 Projects • Line-Item Projects
II	This type of design is associated with: • Category 3 Projects • Retrieval Projects • Non-project corrective maintenance for nuclear facilities.
III	This type of design is associated with: • Category 4 Projects • Non-nuclear facilities (admin buildings, office trailers, site utilities, etc.)
IV	This type of design is associated with: • A replacement or upgrade of an existing General Service SSC with an equivalent replacement.
V	This type of design is associated with an identical replacement of SSCs (see Like-for-Like Items) of SSCs.
VI	This type of design is associated with: • Previously Proved Designs. • Previously verified designs in accordance with TFC-ENG-DESIGN-C-52. • Removal or isolation of SSCs using standard and/or proven methods and techniques and where supporting calculations are not required.
N/A	This is a design that does not modify the facility, or an Engineering document not associated with modifying the facility (e.g., tools, as-builts, fabrication, fabrication redlines, etc.).

* Contact the Project Manager, Project Engineer, or review the Project Navigator website (http://toc.wrps.rl.gov/pnav/) for the category of the project. See TFC-PRJ-PM-C-03, "Project Categorization and Tailoring," for discussion of Project Categories.
** See Section 4.1 for cases where a lower Design Type overrides a higher Design Type.

Equivalent replacement of Safety Significant SSCs are performed in accordance with TFC-ENG-DESIGN-C-15.

ATTACHMENT B – RISK SCREENS

Table B-1. Radiological.

If the answer to **any** of the following questions is **"YES,"** RadCon Engineering must be a reviewer. Consider all of the items listed below in the form of a question by asking: "*Does the document being reviewed …*"

(1)

Radiological Sources (2)		
Make changes[3] to, add, or remove:		
Source term inventories.	Y	N
Source term concentrations.	Y	N
Radionuclide composition or distribution.	Y	N
Radiation generating device.	Y	N
Radiological Shielding		
Make changes[4] to, add, or remove:		
Shielding composition or geometry.	Y	N
Arrangement of shielding relative to a radioactive source or material.	Y	N
Radiological Waste		
Support Activities that include:		
Handling of radioactive waste.	Y	N
Addition of radioactive waste.	Y	N
Transport of radioactive waste.	Y	N
Radiological Contamination & Containment (Airborne, Surface, or Fixated)		
Support Activities that could disturb contamination.	Y	N
Make changes[4] to, add, or remove:		
Penetration(s) in a shield wall or confinement barrier separating airborne radioactivity or contamination areas.	Y	N
Radiological contamination or airborne radioactivity by changes in the process, ventilation configuration, or other aspects.	Y	N
Ventilation flow rate(s), differential pressure(s), or the supply/exhaust configuration in an area containing radioactive material.	Y	N
An SSC that contains, conveys, or uses radioactive material or radiation generating devices (e.g., piping, ductwork, or sampling equipment).	Y	N
Radiological Monitoring		
Make changes[4] to, add, or remove:		
Radiation Monitoring Equipment (e.g., area radiation monitor, airborne radioactivity monitor/sampler, fixed head air sampler, or nuclear incident monitor).	Y	N
Radiological Areas		
Make changes[4] to, add, or remove:		
Equipment in a radiological area or radiological control area.	Y	N
Access control monitoring.	Y	N
Change room location/capacity.	Y	N
Breathing air capacity/access.	Y	N
Personnel decontamination capacity/locations.	Y	N
Radiological boundaries.	Y	N

[1] There is no requirement to fill out this sheet. Columns for "Yes" and "No" answers added for reviewer convenience.
[2] Controlled sources of non-waste radiation for the purposes of calibration/testing of known composition or generated radiation.
[3] Changes include; modifications, upgrades, deactivation, layup, replacement, decreases/increases in capacity or discharge.

ATTACHMENT B – RISK SCREENS (cont.)

Table B-2. Environmental.

If the answer to **any** of the following questions is **"YES,"** Environmental Protection must be a reviewer. Consider all of the items listed below in the form of a question by asking: "*Does the document being reviewed …*"

(4)

Air Emissions (5)		
Support activities with the potential to release chemicals to the atmosphere.	Y	N
Make changes[6] to, add, or remove:		
Emissions control equipment (e.g., connected ductwork, filters, heaters, demisters, de-entrainment devices, etc.)	Y	N
Emission barriers or boundaries (e.g., ductwork, containment barriers, vapor/exhaust seals, pressure relief, etc.)	Y	N
Emissions monitoring.	Y	N
Emissions processes.	Y	N
Emission source terms (e.g., Stationary Engines, Portable Exhausters, Boilers, Asbestos renovation/demolition, Painting, Surface Scarification, etc.).	Y	N
Water(7)		
Support activities with the potential to spill/release water or chemicals into the environment.	Y	N
Make changes[7] to, add, or remove:		
Sanitary water systems (drinking water/potable water).	Y	N
Septic or sewage systems, including mobile trailer waste water tanks.	Y	N
Underground injection wells.	Y	N
Storm drains and storm water drain systems.	Y	N
Waste water discharge system (SALDS & TEDF).	Y	N
Waste(8)		
Decommission and decontaminate (remove) **PCB** containing equipment [e.g., transformers, ballasts, capacitors (TSCA)].	Y	N
Support Activities that include:		
The potential to generate hazardous and/or radiological waste.	Y	N
Characterization of radiological and chemical waste.	Y	N
Sampling, analysis, verification, and designation of waste.	Y	N
Treatment, storage, and disposal (TSD) acceptance of waste.	Y	N
Transportation or packaging of waste.	Y	N
Make changes[7] to, add, or remove:		
Equipment that stores, transports, or transfers waste.	Y	N
Equipment that treats or disposes of waste.	Y	N
Instrumentation that monitors waste leakage.	Y	N
Equipment that controls hazards associated with waste (i.e., secondary containment piping, vaults, pits, cover blocks, berms).	Y	N
Hose-in-hose transfer lines (HIHTLs) or hose-in-sleeve.	Y	N
Replacing equipment/instrumentation that could be considered "replacement in kind or a superior upgrade" within the TSD unit boundary.	Y	N

[4] There is no requirement to fill out this sheet. Columns for "Yes" and "No" answers added for reviewer convenience.
[5] These are associated with The Clean Air Act (CAA).
[6] Changes include; modifications, upgrades, deactivation, layup, replacement, decreases/increases in capacity or discharge.
[7] These are associated with The Clean Water Act (CWA).
[8] Includes; Hazardous/Dangerous Waste, Radiological Waste, Mixed Waste and PCBs. See form A-6002-848 Waste Planning Checklist for further clarification for waste generation.

ATTACHMENT B – RISK SCREENS (cont.)

Table B-2. Environmental. (cont.)

Buildings / Trailers		
Support construction of new buildings, or installation of new trailers.	Y	N
Support renovations, structural modifications, relocation, or demolition of buildings or trailers.	Y	N
Miscellaneous		
Support activities clearing/disturbing **Vegetation** (NEPA, cultural, and ecological)	Y	N
Relate to Corrective Actions, or **Settlement Agreements with a Regulatory Agency**.	Y	N
Change **TPA Documents** (Primary or Secondary), or projects managed through a TPA milestone.	Y	N
Affect **Drawings** listed in environmental permits or permit applications. (Permits are found on the WRPS Environmental Programs website.)	Y	N

ATTACHMENT C – ENGINEERING DISCIPLINE LEAD REVIEW DETERMINATION

Table C-1. Lead Review Determination.

Design Type	**Design input document Review Applicability** (e.g., Modification traveler, Design specification, etc.)	
	General Service (GS)	**Safety Significant (SS)**
I	Required	Required
II	Required	Required
III	Required	Required
IV	Optional	Required
V	Optional	Optional
VI	Optional	Optional
N/A	Optional	Optional

NOTE: See Table 1 for EDL disciplines and designators.

ATTACHMENT D – EXTENT OF DESIGN VERIFICATION DETERMINATION

To use this table, identify the safety significance (functional classification) of the modification.

Table D-1. Design Verification Determination.

Design Type	Design Verification Extent	
	General Service (GS)	Safety Significant (SS)
I	C	DV
II	C	DV
III	C	C
IV	C	C
V	N/A	N/A
VI	C	C
N/A	C	C

C = Checking (see Section 4.3)
DV = Design Verification (see Section 4.4)
N/A = Checking and Design Verification not required since no design has occurred.

(NOTE: A column for 'Safety Class' is omitted from this table because, as of the revision, no designs of that safety level exist under TOC scope.)

ATTACHMENT E – PROJECT DESIGN REVIEW DETERMINATION

The Project design review process must be applied to Design packages meeting any of the criteria listed below. Project design reviews may optionally be performed on design packages not meeting any of these criteria. In these cases the decision to perform a project design review is made by the Project Engineering with input from the Design Authority.

- Design Type I or II where the Design package is multi-discipline
- New hazards are involved.
- A large number of individual engineering deliverables (more than 10) will be created by the design agent to complete the scope of work.
- First-of-a-kind approach and/or first implementation of existing technology.

ATTACHMENT F – VENDOR OVERSIGHT REVIEW GUIDE

Listed below is a set of considerations to be used as a guide when performing a design review of key vendor documents. Unique features for high risk and complex designs shall be agreed upon and documented in the Statement of Work.

General

1. Are all deliverables required by the SOW included as proposed and acceptable?

2. Are all deliverables complete and acceptable without the inclusion of extraneous information and requirements?

3. Are adequate design inputs identified?

4. Are the references shown retrievable?

P&IDs

1. Do system functions and features implement the requirements of the design input documents (e.g., Modification Travelers, Design Specifications, F&Rs, etc.)?

2. Reflect equipment sizing calculations, PFD, and mass and energy balance calculations?

3. Does the system contain features to mitigate potential hazards identified in the Preliminary Hazard Analysis (PrHA)?

4. Does the system contain appropriate over-pressure protection features (e.g., loop seals, vacuum breakers, pressure relief devices, flow-restricting orifices, siphon breakers, surge suppressers)?

5. Are materials of construction appropriate for the process fluids under the service conditions?

6. Are major equipment and system calculations and analyses based on appropriate design input documents and reasonable assumptions?

7. Have design requirements specified in the design input for Safety Class (SC) and Safety Significant (SS) been incorporated in the design, construction, and procurement documents?

8. Does Fire Protection design comply with TFC-PLN-13, TFC-ESHQ-FP-STD-02, applicable NFPA, FM, UL requirements?

9. Have isolation valves been provided to allow maintenance and testing without disabling the entire systems?

10. Are items with incomplete/unconfirmed assumptions shown as TBD/HOLD with appropriate explanatory notes?

11. Are slope requirements shown for slope sensitive process lines (e.g., steam lines, gravity drain lines)?

ATTACHMENT F – VENDOR OVERSIGHT REVIEW GUIDE (cont.)

LOGIC DIAGRAMS (SC & SS)

1. Are required safety functions included and correct?

2. Do safety actions and set points have an analytical basis?

CONSTRUCTION PACKAGES

1. Are specification packages for installation subcontracts properly formatted, complete, self-contained and biddable?
2. Is the acceptance criteria clearly defined?

QUANTITIES

1. Provided as required for construction consistent with the subcontract?

SINGLE LINE DIAGRAMS

1. Is equipment properly sized and sizes shown on drawing?

2. Has a load study been performed (for modifications as well as new work)?

3. Has the available short-circuit as well as motor contribution been considered?

4. Does the short-circuit withstand rating of the switchgear, Motor Control Center, etc., included in the single line match with the existing equipment in the facility (for standardization)?

5. For existing facilities, is the 480 volt system derived from a corner grounded delta (B phase grounded) transformer?

6. Has the harmonic content of the loads been determined and the system designed accordingly?

7. Does the phasing diagram match the single line diagram?

8. Does the phasing of overhead lines match the site arrangement?

GENERAL ARRANGEMENTS

1. Does the general arrangement show major equipment layout?

2. Is there access for operations and maintenance?

3. Are there lay-down areas, pull spaces and a means for removing equipment (e.g., cranes, monorails, equipment hatches, removable plates and/or gratings?

4. Has ALARA been considered and incorporated into the design?

ATTACHMENT F – VENDOR OVERSIGHT REVIEW GUIDE (cont.)

5. Are the location and boundaries of NFPA Classified Flammable Hazards identified?

PROCESS AND UTILITY FLOW DIAGRAM

1. Is all engineering information, including basic data as shown on the drawing, accurately based on information contained in scope of work and calculations?

2. Are the operating temperatures, pressures and flow rates for significant mode of operation identified for each process stream and, where applicable, for equipment?

3. Are specific gravity and viscosity identified for each liquid stream?

4. Are the material and energy balances complete and in accordance with the calculations?

5. Are equipment and critical valves necessary to understand the process shown and identified?

STRUCTURAL DESIGN

1. Are loads and loading combinations in accordance with ASCE, DOE-STD-1020, IBC, AWA, AASHTO, and other applicable national consensus codes?

2. Has a site specific soil investigation been performed?

3. Were soil properties appropriately applied?

4. Is the wind speed appropriate for the site and type of structure?

5. Do the structural design loads conform to procedure TFC-ENG-STD-06?

6. Has a dynamic analysis been performed and correct damping coefficient applied? If so, does the model and the modeling technique represent the actual structural system?

7. Is the structural force resisting system redundant or non-redundant?

8. Have appropriate factors of safety for sliding, overturning and flotation been used?

9. Are structural calculations complete and correct?

ENGINEERED EQUIPMENT

1. Are specifications provided where appropriate?

2. Are specifications properly formatted, complete, and consistent with requirements for procurement?

ATTACHMENT G – VENDOR CALCULATION REVIEW GUIDE

Listed below is a set of considerations to be used as a guide when performing a review specifically of vendor calculations.

Objective/Purpose

- The objective/purpose of the calculation is clearly stated.

Inputs

- Input data are adequately described.
- Input data is complete, and appropriate for the analysis.

Assumptions

- Necessary assumptions are reasonable, explicitly stated, and technically justifiable.
- Unverified assumptions are clearly stated and identified/tracked.

Method of Analysis

- Calculation approach is appropriate for the application being evaluated.

Use of Computer Software

- Design Analysis Software used is identified by name and version.
- As applicable, Design Analysis Software verification and validation are addressed.

Results

- Results are consistent with the inputs and method of analysis.
- Result uncertainties are addressed.

Conclusion

- Conclusions are consistent with results of the analysis, and the objective/purpose of the calculation.
- Other design documents relying on this calculation are consistent with the calculation's conclusions.