



**NOAA NESDIS  
CENTER for SATELLITE APPLICATIONS  
and RESEARCH**

**PEER REVIEW GUIDELINE**

**PRG-9  
TEST READINESS REVIEW  
PEER REVIEW GUIDELINE**

**Version 3.0**

# NOAA NESDIS STAR

PEER REVIEW GUIDELINE PRG-9

Version: 3.0

Date: October 1, 2009

TITLE: Test Readiness Review Peer Review Guideline

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TITLE: PRG-9: TEST READINESS REVIEW PEER REVIEW GUIDELINE VERSION 3.0

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## TEST READINESS REVIEW PEER REVIEW GUIDELINE VERSION HISTORY SUMMARY

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3.0	Renamed PRG-9 and revised by Ken Jensen (RIS) for version 3.		10/1/2009

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## LIST OF ACRONYMS

CDR	Critical Design Review
CICS	Cooperative Institute for Climate Studies
CIMSS	Cooperative Institute for Meteorological Satellite Studies
CIOSS	Cooperative Institute for Oceanographic Satellite Studies
CIRA	Cooperative Institute for Research in the Atmosphere
CL	Checklist
CLI	Checklist Item
CM/DM	Configuration Management/Data Management
CREST	Cooperative Remote Sensing and Technology Center
CTR	Code Test Review
DDD	Detailed Design Document
DG	Document Guideline
DPP	Development Project Plan
EPG	Enterprise Process Group
EPL	Enterprise Product Lifecycle
ICD	Interface Control Document
IPT	Integrated Product Team
NESDIS	National Environmental Satellite, Data, and Information Service
NOAA	National Oceanic and Atmospheric Administration
OSDPD	Office of Satellite Data Processing and Distribution
PAL	Process Asset Library
PBR	Project Baseline Report
PDR	Preliminary Design Review
PRG	Peer Review Guideline
PRR	Project Requirements Review
QA	Quality Assurance
RAD	Requirements Allocation Document
SOW	Statement of Work
SPSRB	Satellite Products and Services Review Board

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SRR	System Readiness Review
STAR	Center for Satellite Applications and Research
SWA	Software Architecture Document
TBD	To Be Determined
TD	Training Document
TG	Task Guideline
TRD	Test Readiness Document
TRR	Test Readiness Review
TRRR	Test Readiness Review Report
UTP	Unit Test Plan
VVP	Verification and Validation Plan

## 1. INTRODUCTION

The NOAA/NESDIS Center for Satellite Applications and Research (STAR) develops a diverse spectrum of complex, often interrelated, environmental algorithms and software systems. These systems are developed through extensive research programs, and transitioned from research to operations when a sufficient level of maturity and end-user acceptance is achieved. Progress is often iterative, with subsequent deliveries providing additional robustness and functionality. Development and deployment is distributed, involving STAR, the Cooperative Institutes (CICS, CIMSS, CIOSS, CIRA, CREST) distributed throughout the US, multiple support contractors, and NESDIS Operations.

NESDIS/STAR is implementing an increased level of process maturity to support the exchange of these software systems from one location or platform to another. Test Readiness Review (TRR) standards and guidelines are a part of this process improvement.

### 1.1. Objective

The objective of this Peer Review Guideline (PRG) is to provide STAR standards and guidelines for reviewing a project's compliance with requirements at a project TRR<sup>1</sup>. This PRG defines standards and guidelines for participation on a TRR review team. It contains all information needed to prepare for, conduct, and close the TRR.

The intended users of this PRG are the TRR reviewers.

### 1.2. Overview

This PRG contains the following sections:

Section 1.0 -	Introduction
Section 2.0 -	References
Section 3.0 -	Preparing For The Review
Section 4.0 -	Conducting The Review
Section 5.0 -	Closing The Review

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<sup>1</sup> Refer to the STAR EPL Process Guidelines (PG-1 and PG-1.A) for a description of the STAR EPL gates and reviews.

## 2. REFERENCE DOCUMENTS

The reference documents for the TRR include the recommended and optional process assets (c.f. Section 3.4) and the TRR artifacts (c.f. Section 3.5).

### 3. PREPARING FOR THE REVIEW

This section is concerned with how the TRR review team is selected and how the review team members should prepare for the TRR.

#### 3.1. Background – The STAR EPL Process

The TRR is a standard review that occurs at a well-defined stage in the STAR EPL process. It is important that the TRR reviewers understand this process well enough to be able to evaluate the project's status with respect to the TRR entry criteria, objectives and exit criteria.

The STAR EPL consists of 11 process steps that take a product from initial conception through development, operations, maintenance, and retirement. In this lifecycle, project stakeholders work together to enable a product to predictably mature as it progresses through the lifecycle steps.

The process steps are organized into nine project phases:

- Basic (step 1)
- Exploratory (steps 2 – 3)
- Plan (steps 4 – 5)
- Design (steps 6 – 8)
- Build (steps 9 – 11)

The implementation of the process steps can be tailored to be appropriate for the characteristics of a given project, but all steps must be followed to ensure that the products are developed from research to operations by a standard, repeatable process. Tailoring details for a given project should be documented in the project artifacts (c.f. Section 3.5).

The TRR reviewer is referred to the STAR EPL Process Guidelines (PG-1) and Appendix (PG-1.A) for a thorough treatment of the entire process.

The STAR EPL standards and process assets are managed by a STAR Enterprise Process Group (EPG). The EPG is responsible for maintaining the STAR EPL process standards, managing changes, and providing training and guidance to help stakeholders implement the standards. The TRR reviewers for a project are encouraged to contact the EPG with any questions or concerns as they prepare for and close the TRR. Use the following contact:

Ken Jensen  
Ken.Jensen@noaa.gov

### **3.2. The Test Readiness Review (TRR)**

The TRR is a Build phase Technical Review that occurs during step 9 (Code and Test Data Development) of the STAR EPL process.

The objectives of this phase are to develop, test, refine, and integrate pre-operational code to implement the algorithm design, develop operations documentation, determine whether the system performance meets project requirements and confirm that all required documentation is ready for operations and maintenance.

The Build phase of the STAR EPL consists of process steps 9 – 11. Step 9 (Code and Test Data Development) culminates with a Test Readiness Review (TRR). The unit test plan and its supporting artifacts are established in step 9 and approved at the TRR. Step 10 (Code Test and Refinement) culminates with a Code Test Review (CTR). The unit test results, system test plan, and refined pre-operational code are established in step 10 and approved at the CTR. Step 11 includes the System Readiness Review (SRR) and culminates with a Gate 5 Review. The integrated pre-operational product processing system is established in step 11 and approved at the SRR. The Gate 5 Review approves the system for delivery to operations.

The primary purpose of the TRR is to review the project's readiness to conduct tests of the software units. The software units are the Layer-2 elements that are defined in the system layer product software architecture, as described in the Software Architecture Document (SWA). To achieve this purpose, the development team will produce project artifacts (c.f. Section 3.5) that should demonstrate readiness for unit testing to the satisfaction of the TRR reviewers.

In addition, the TRR should:

- Review the software architecture and interfaces
- Review the unit test plan
- Review the allocation of project requirements to design components
- Evaluate risks and proposed actions to mitigate risks
- Review the status of previous actions and new actions

### 3.3. Review Team

Responsibility for oversight of the project will have previously been assigned to a STAR Division and a specific STAR Branch within the Division,

The TRR Review Lead is nominally the STAR Branch Chief, but the Branch Chief may designate an alternative Lead, especially for relatively small projects). In deciding whether to lead or delegate, the Branch Chief should consider that the TRR is a technical review. Management issues (e.g., recommended modifications to the plan, resources, budget, and schedule) may be raised at the TRR, driven by risks that have developed since the CDR, but are not considered part of the normal technical review content and are not reflected in the review exit criteria except as they contribute to risk factors.

The Review Lead selects the TRR review team. It is recommended that the following guidelines be followed for selecting the team:

Personnel who are on the project development team are excluded from the review team. There are no exceptions to this rule. The review is intended to be a dialogue between the developers and the reviewers, with the reviewers providing an objective evaluation of the project's test readiness. The membership of the project development team should be clearly documented in the project's DPP. Any additions to the development team since the CDR should be noted in Section 1 of the Test Readiness Document (TRD, c.f. Section 4.2.1 of this PRG).

It is highly desirable to include the CDR reviewers on the TRR review team. They will already be familiar with the project, the actions that came out of the CDR, the TRR entry and exit criteria, and many of the reference artifacts that were CDR artifacts. The addition of new review team members is also recommended to provide "fresh eyes" and a coding and testing perspective.

Include a systems engineer who is familiar with the STAR EPL process, especially with regard to the iterative development of requirements, requirements allocation, design and coding. It is highly desirable that the same systems engineer who was a CDR reviewer be maintained on the TRR review team.

Include one or more software engineers who are familiar with the project's software architecture and the STAR EPL standards for code detailed design, or can familiarize themselves quickly. It is highly desirable that the same software engineers who were CDR reviewers be maintained on the TRR review team. If there has been some contention or controversy about the software architecture coming out of CDR, or if substantial new actions have been placed upon the software architecture as a result of the CDR, it is recommended that at least one new software engineer be added to the review team.

Include one or more representatives from STAR QA who are familiar with the project's QA history and the STAR EPL standards for QA, or can familiarize themselves quickly. It is highly desirable that the same QA personnel who were CDR reviewers be maintained on the TRR review team. If there has been some contention or controversy about QA coming out of CDR, or if substantial new actions have been placed upon QA as a result of the CDR, it is recommended that at least one new QA person be added to the review team.

Include one or more representatives from STAR CM/DM who are familiar with the project's CM/DM baseline and the STAR EPL standards for CM/DM, or can familiarize themselves quickly. It is highly desirable that the same CM/DM personnel who were CDR reviewers be maintained on the TRR review team. If there has been some contention or controversy about CM/DM coming out of CDR, or if substantial new actions have been placed upon CM/DM as a result of the CDR, it is recommended that at least one new CM/DM person be added to the review team.

Invite a technical representative from the intended operational organization (e.g. Office of Satellite Data Processing and Distribution (OSDPD)). Consult with that organization's management for the selection of its representative. Ideally, this person will become the project's Operations Lead.

Invite one or more representatives from the Satellite Products and Services Review Board (SPSRB). The STAR Division Chief should consult with SPSRB management for the selection of SPSRB representatives.

The review team members will provide a diversity of skills and experience that can be usefully applied to the various aspects of the review. This will be detailed in Section 4.

The Review Lead should meet with the review team as soon as possible to plan the review preparation, including the assignment and scheduling of review preparation tasks (e.g. selection and study of process assets, review of reference artifacts, delivery dates of TRR artifacts, and review of specific TRR artifacts) and should subsequently monitor progress against the review preparation plan.

### 3.4. Process Assets

STAR EPL process assets are a set of process guidelines, stakeholder guidelines, peer review guidelines, review check lists, task guidelines, document guidelines and training documents that define the enterprise standards and best practices. They are established and maintained under Configuration Management (CM) by an EPG under the direction of a Steering Committee. They are contained in a STAR Process Asset Repository (PAR) on the STAR website:

[http://www.star.nesdis.noaa.gov/star/EPL\\_index.php](http://www.star.nesdis.noaa.gov/star/EPL_index.php)

Process assets that are relevant for TRR preparation are briefly described in this section. There are separate subsections for recommended process assets and optional process assets.

The process assets described in this section should be available to the TRR reviewers in the STAR EPL PAR.

The TRR reviewer is encouraged to refer to each process asset for a more detailed description as soon as possible. Any problems (e.g., lack of access, missing process assets, questions about content, inconsistencies between process assets) should be brought to the attention of the STAR EPG (c.f. Section 3.1) as soon as possible.

#### 3.4.1 Recommended Process Assets

It is very important that the TRR reviewers be familiar with these process assets before conducting the TRR.

**CL-9: Test Readiness Review Checklist** contains the standard TRR Check List Items (CLIs) that the TRR reviewers are required to complete, unless the list has been tailored for

the specific project. Refer to the DPP to determine whether the TRR Check List has been tailored. In that case, use the tailored Check List in the DPP Appendix.

**SG-18: Technical Reviewer Guidelines** contains the stakeholder guidelines for Technical Review reviewers. The TRR reviewer will find general guidelines for conducting technical reviews. These complement the specific TRR guidelines contained in this PRG.

**TG-9: Code and Test Data Development Task Guideline** is a STAR EPL process asset that contains the task guidelines for the Code and Test Data Development step (9) of the STAR EPL process. The TRR reviewer will find guidelines for interaction between the TRR review team and other project stakeholders.

**DG-9.3: Test Readiness Review Report Guidelines** is a STAR EPL process asset that contains the standards and guidelines for writing the Test Readiness Review Report (TRRR). The TRR reviewers, who are responsible for writing this report, will find it highly useful to know the required report content in advance of the review, so they can ensure that the review content will provide them with the information they need for the report.

### 3.4.2 Optional Process Assets

The process assets designated as optional will be helpful to the TRR reviewers, but are not required. Typically, a TRR reviewer will refer to some of these, depending on the division of responsibilities within the review team.

**DG-1.2: Software Architecture Document Guideline** contains standards and guidelines for the Software Architecture Document (SWA). The SWA is a standard project artifact for the TRR (c.f. Section 3.5.5 of this PRG). The TRR reviewers who are responsible for ensuring that the project's SWA complies with STAR standards should use DG-1.2 as a resource.

**DG-5.1: Development Project Plan Guideline** contains standards and guidelines for the DPP. The DPP is a standard project artifact for the TRR (c.f. Section 3.5.2 of this PRG). The TRR reviewers who are responsible for ensuring that the project's DPP complies with STAR standards should use DG-5.1 as a resource.

**DG-5.4: Project Baseline Report Guideline** contains standards and guidelines for the Project Baseline Report (PBR). The PBR is a standard project artifact for the TRR (c.f. Section 3.5.11 of this PRG). The TRR reviewers who are responsible for ensuring that the project's PBR complies with STAR standards should use DG-5.4 as a resource.

**DG-6.2: Requirements Allocation Document Guideline** contains standards and guidelines for the Requirements Allocation Document (RAD). The RAD is a standard project artifact for the TRR (c.f. Section 3.5.4 of this PRG). The TRR reviewers who are responsible for ensuring that the project's RAD complies with STAR standards should use DG-6.2 as a resource.

**DG-6.3: Verification and Validation Plan Guideline** contains standards and guidelines for the Verification and Validation Plan (VVP). The VVP is a standard project artifact for the TRR (c.f. Section 3.5.7 of this PRG). The TRR reviewers who are responsible for ensuring that the project's VVP complies with STAR standards should use DG-6.3 as a resource.

**DG-8.1: Detailed Design Document Guideline** contains standards and guidelines for the Detailed Design Document (DDD). The DDD is standard a project artifact for the TRR (c.f. Section 3.5.6 of this PRG). The TRR reviewers who are responsible for ensuring that the project's DDD complies with STAR standards should use DG-8.1 as a resource.

**DG-9.1: Unit Test Plan Guideline** contains standards and guidelines for the preparation of the Unit Test Plan (UTP). UTP v1r0 is a project artifact for the TRR (c.f. Section 3.5.8 of this PRG). The TRR reviewers who are responsible for ensuring that the project's UTP complies with STAR standards should use DG-9.1 as a resource.

**DG-9.2.A: Test Readiness Document Appendix Guideline** contains Microsoft PowerPoint slide templates for the standard TRD presentation slides. The TRR reviewer can use this document to become familiar with the expected content and format of the review.

**TD-11.1: FORTRAN Coding Standards** is a STAR EPL process asset that contains the STAR EPL standards and guidelines for FORTRAN programming. The TRR reviewers who are responsible for ensuring that the project's pre-operational FORTRAN code complies with STAR standards should use TD-11.1 as a resource.

**TD-11.2: C Coding Standards** is a STAR EPL process asset that contains the STAR EPL standards and guidelines for C programming. The TRR reviewers who are responsible for ensuring that the project's pre-operational C code complies with STAR standards should use TD-11.2 as a resource.

## 3.5. Project Artifacts

Project artifacts are a set of items that are produced by the appropriate stakeholders during the product life cycle to support the reviews. They are maintained under CM in a project artifact repository.

The following TRR artifacts should be established in the project artifact repository via Baseline Build 3.0:

- Test Readiness Document
- Development Project Plan v3.0
- Critical Design Review Report
- Requirements Allocation Document v1.3
- Software Architecture Document v2.2
- Detailed Design Document v1.1
- Verification and Validation Plan v1.3
- Unit Test Plan v1.0
- Pre-Operational Code
- Pre-Operational Test Data
- Project Baseline Report v3.0

The TRR artifacts should be available to the TRR reviewers at least one week in advance of the date scheduled for the TRR. The project plan for some projects may call for some or all of these artifacts to be available to the reviewers earlier than one week in advance of the TRR. Consult the DPP for this information. If an artifact is not available on schedule, contact the Development lead to resolve any problems that may be caused by late access to the artifacts.

### 3.5.1 Test Readiness Document

The Test Readiness Document (TRD) consists of the TRR presentation slides. The TRD is described in detail in Section 4.2.

### 3.5.2 Development Project Plan

The Development Project Plan (DPP) documents the plan for the development, testing, review, and transition to operations for the project, including stakeholders, tasks, work breakdown structure (WBS), schedule and resources. It contains the project objectives, tasks, milestones, stakeholders, and schedule. This information will be useful for the TRR reviewer in reviewing Section 1 of the TRD, and will be needed by the review team for determining a review preparation schedule (c.f. Section 3.7 of this PRG).

The DPP includes the TRR review objectives, which may or may not be tailored from the standard STAR EPL objectives for a TRR (c.f. Section 4.1 of this PRG). This information will be useful for the TRR reviewer in reviewing Section 1 of the TRD.

### 3.5.3 Critical Design Review Report

The Critical Design Review Report (CDRR) is the approved report of the Critical Design Review (CDR) reviewers. This artifact will be useful for the TRR reviewer in reviewing Section 2 of the TRD.

The CDRR should include the approval status for each CDR requirement, in the form of a checklist where each checklist item (CLI) has a disposition status (Pass, Conditional Pass, Defer, Waive, or Not Applicable (N/A)).

CLIs with “Conditional Pass” status must have associated actions that should be closed prior to TRR. CLIs with “Defer” status also must have associated actions. Most items with “Defer” status at CDR will have been deferred to the TRR, though some items may be deferred to later in the product lifecycle. The actions associated with items deferred to the TRR must be addressed at the TRR.

The CDRR should also include an assessment of risk items, with recommendations for risk mitigation. In most cases, these recommendations will result in actions.

The CDRR should summarize the CLIs and risks with a list of actions. Each action item should include a description, an association with a CLI and/or a risk, an assignment, and an intended closure date. The TRR reviewers are responsible for ensuring that the status of all CDR actions is reviewed and disposed of at the TRR.

The CDRR should include the TRR entry criteria and TRR exit criteria. The TRR reviewers are responsible for ensuring that TRR entry and exit criteria are met.

### 3.5.4 Requirements Allocation Document

The Requirements Allocation Document (RAD) contains the basic and derived requirements for the work products and the allocation of the requirements to system components and product components. This information will be useful to the TRR reviewer in reviewing the Unit Test Readiness Sections (4, 5, 6...) of the TRD. RAD v1r2, produced for the CDR, should have documented the requirements and requirements allocation at the end of the Design phase of the STAR EPL. Often, the RAD must be revised (v1r3) to document revisions to the requirements allocation that are needed to reflect detailed design changes that occur during pre-operational code development.

### 3.5.5 Software Architecture Document

The Software Architecture Document (SWA) provides the software architecture for the processing code that will implement the algorithm. This information will be useful for the TRR reviewer in reviewing Section 3 of the TRD and also the Unit Test Readiness Sections (4, 5, 6...) of the TRD.

The software system is an integrated collection of software elements, or code, which produce well-defined output products from a well-defined set of input data. The software architecture describes the structure of the system software elements and the external and internal data flows between software elements.

At the detailed design level of maturity, the software architecture should describe four layers of data flows:

- Layer 0 (Context-Layer) consists of the external interfaces to the software system.
- Layer 1 (System-Layer) consists of the flows between the software units that comprise the software system
- Layer 2 (Unit-Layer) consists of the flows within each software unit
- Layer 3 (Sub-Unit-Layer) consists of the flows within sub-units

The SWA should document all of these data flows with figures (data flow diagrams) and tables that provide a complete description of all software components and their input, internal, and output data flows.

SWA v2r1, produced for the CDR, should have described the software architecture as it existed at the completion of the Design Phase of the STAR EPL. Often, the SWA must be

revised (v2r2) for TRR to document revisions to the software architecture that occur during pre-operational code development.

### **3.5.6 Detailed Design Document**

The Detailed Design Document (DDD) describes the product design and the design components at a level of detail that is sufficient for the development programmers to be able to use as a reference for writing fully functional pre-operational code. This information will be useful for the TRR reviewer in reviewing the Unit Test Readiness Sections (4, 5, 6...) of the TRD. A separate DDD is produced for each software unit that is part of the product processing system. The software units are the Layer-2 elements that are defined in the system layer product software architecture, as described in the SWA.

The standard purpose and function of the DDD is to provide a method of detailing the unit-level structural procedure within the unit, place these in the context of the product system data processing chain, and specify the data, its formats, and the relationships that exist between the data to form the basis for the detailed design of the unit code.

DDD v1r0, produced for the CDR, should have described the detailed design as it exists at the completion of the Design Phase of the STAR EPL. Often, the DDD must be revised (v1r1) to document revisions to the detailed design that occur during pre-operational code development.

### **3.5.7 Verification and Validation Plan**

The Verification and Validation Plan (VVP) describes the work products to be verified and validated, the requirements for each selected work product and the verification and validation methods for each selected work product.

The VVP is initially written during step 6 for the Project Requirements Review (PRR), and is revised for each subsequent Technical Review to reflect the maturation of design, code, test data, and test results. VVP v1r3, an artifact for the TRR, reflects the plan as it exists at the conclusion of code and test data development. This information will be useful for the TRR reviewer in reviewing the Unit Test Readiness Sections (4, 5, 6...) of the TRD.

### **3.5.8 Unit Test Plan**

The Unit Test Plan (UTP) contains the test plan for each software unit in the project's product processing system. The UTP, a complement to the project's VVP, focuses on the specifics of the software units and the testing of their functionality and performance. This information will be useful for the TRR reviewer in reviewing the Unit Test Readiness Sections (4, 5, 6...) of the TRD.

UTP v1r0 should document the purpose and function of each unit, its traceability to the project requirements, unit data flows, unit components and unit functions to be tested, a test data description, planned test methods and test sequences and identified test risks.

### **3.5 9 Pre-Operational Code**

The Pre-Operational Code consists of all software components of the detailed design that was approved at the CDR, ready for unit testing.

It is expected that SPSRB coding standards will be applied to the pre-operational code. Currently, coding standards exist for Fortran, C, and C++ code, and general programming standards exist for all code. These standards are found on the SPSRB web site at [http://projects.osd.noaa.gov/spsrb/standards\\_prog.htm](http://projects.osd.noaa.gov/spsrb/standards_prog.htm). This requirement may be waived if the circumstances of a specific project provide a compelling reason for a waiver. Waivers should be agreed to as early as possible, included in the project plan, and accepted by operations prior to unit testing.

### **3.5 10 Pre-Operational Test Data**

Pre-Operational Test Data are the data files used for unit testing of the Pre-Operational Code, including the input data and output data identified in the current baseline version of the SWA.

### **3.5 11 Project Baseline Report**

The Project Baseline Report (PBR) v3r0 includes the change history, approval status, and location of every Configuration Item in the project's baseline for Baseline Build 3.0. This information will be useful for the TRR reviewer in reviewing the Unit Test Readiness Sections (4, 5, 6...) of the TRD.

## 3.6. Entry Criteria

The TRR reviewers should ensure that all TRR entry criteria have been met before commencing the review. The TRR entry criteria should have been established at the CDR and documented in the CDRR. Note that entry criteria may be tailored from the standard STAR EPL set of TRR entry criteria. In that case, the CDRR should provide a rationale for deviations from the standard set.

The standard STAR EPL set of TRR entry criteria, listed in the standard TRR check list (CL-9), includes:

- Entry # 1 - A Critical Design Review Report (CDRR) has been written. The TRR reviewers have access to the current baseline version of the CDRR.
- Entry # 2 - A Development Project Plan (DPP) has been written. The TRR reviewers have access to the current baseline version of the DPP.
- Entry # 3 - A Requirements Allocation Document (RAD) has been written. The TRR reviewers have access to the current baseline version of the RAD.
- Entry # 4 - A Software Architecture Document (SWA) has been written. The TRR reviewers have access to the current baseline version of the SWA.
- Entry # 5 - A Detailed Design Document (DDD) has been written for each software unit in the software architecture. The TRR reviewers have access to the current baseline version of the DDDs.
- Entry # 6 - A Verification and Validation Plan (VVP) has been written. The TRR reviewers have access to the current baseline version of the VVP.
- Entry # 7 - A Unit Test Plan (UTP v1r0) has been written. The TRR reviewers have access to the current baseline version of the UTP.
- Entry # 8 – Pre-operational code to implement the detailed design is accessible to the TRR reviewers.
- Entry # 9 - Pre-operational test data, including "truth" data is accessible to the TRR reviewers.
- Entry # 10 - A Project Baseline Report (PBR v3r0) has been written. The TRR reviewers have access to the current baseline version of the PBR.
- Entry # 11 - A Test Readiness Document (TRD) has been written. The TRR reviewers have access to the current baseline version of the TRD.

The standard set of entry criteria calls for the availability of the standard set of project artifacts without reference to the quality of these artifacts. Project artifacts DPP, RAD, SWA, DDD, and VVP were reviewed and approved at CDR, though risks and actions concerning them may still be carried to the TRR and changes to these artifacts since the CDR must be reviewed and approved. Assessment of the quality of the new artifacts (CDRR, UTP, code, and test data) is the main business of the TRR.

It is the responsibility of both the development team and the review team to ensure that TRR entry criteria have been met prior to the TRR. The TRR Review Lead and the Development Lead should be in communication during the entire step 9 process to identify and resolve issues affecting the TRR entry criteria well in advance of the scheduled TRR date.

### 3.7. Review Team Preparation

The sequence of steps that should be taken by the TRR review team in preparing for the TRR is as follows:

- The STAR Branch Chief selects the Review Lead, in consultation with the Division Chief
- The Review Lead selects the Review Team, following the guidelines in Section 3.3 of this PRG.
- The Review team meets to plan review preparation. The initial meeting should accomplish the following:
  - Assemble the necessary review tasks and assign them to review team members. These tasks include:
    - Review PRG-9 (this document), focusing on the sections that pertain to the areas you have been assigned to review. All team members should do this.
    - Review the project's TRR check list. This will be available as a DPP Appendix or, if there has been no tailoring, as the process asset CL-9. Note CLIs, focusing on the sections that pertain to the areas you have been assigned to review. Refer to these CLIs when reviewing the project artifacts. All team members should do this.
    - Review the project's DPP. Guidelines for the DPP review are in Section 4.2.1 of this PRG.

- Review the CDRR for the project. Guidelines for the CDRR review are in Section 4.2.2 of this PRG.
- Review the software architecture and external interfaces, documented in the SWA. Guidelines for the software architecture review are in Section 4.2.3 of this PRG.
- Review the project's unit test plan, documented in the UTP. Guidelines for the unit test plan review are in Section 4.2.4 of this PRG.
- Review the project's baseline of configuration items, documented in PBR v3r0. Guidelines for the baseline review are in Section 4.2.4 of this PRG.
- Review the status of project risks. Guidelines for the review of project risks are in Section 4.2.6 of this PRG.
- Review the status of project actions. Guidelines for the review of project actions are in Section 4.2.6 of this PRG.
- Identify contacts with the development team and with other stakeholders, using the DPP to identify the relevant stakeholders. Assign the relevant contacts to the review team members, based on their assigned tasks.
- Determine the time, place, frequency, required attendees and optional attendees of TRR review team meetings.
  - The time should be based on the convenience to the review team.
  - The place usually should be at the site of the Review Lead. For cases where a majority of the required attendees are located at a different site than the Review Lead, this site can be selected as an alternative place. The selected site should have the infrastructure for hosting video and/or teleconferencing for off-site attendees.
  - The frequency should be determined by the project timeline, the size of the project, and the size of the review team. Short project timelines large-size projects and large review teams typically require more frequent review team meetings. Also, decide whether TRR review team meetings will be held on a regular basis or on an "as needed" basis. It is recommended that meetings initially be held on a regular basis until it is determined that "as needed" meetings will suffice.

- The required attendees should be determined by the Review Lead on a meeting-by-meeting basis, depending on the meeting's agenda and current issues. Usually, all review team members are required attendees, though some may be designated as optional attendees for a meeting whose agenda and issues are not relevant to their role and responsibilities. The Review Lead may invite members of the development team to a meeting whose agenda and issues will benefit from their involvement.
- Review preparation plan is iterated, finalized, communicated to stakeholders.
- The review preparation schedule and risks are finalized, in consultation with the relevant stakeholders. The schedule should include a schedule of deliveries of project artifacts, drawn up in consultation with the Development Lead. It is recommended that informal deliveries of project artifacts in draft condition be included in the schedule. It should be understood that informally delivered "as is" draft artifacts are solely for the purpose of helping the reviewers prepare for the review and are not reviewable items. Reviewers are encouraged to provide feedback to the development team to assist them in improving the artifacts prior to their final pre-review delivery.
- The schedule for closing the review is finalized. This involves the writing and delivery of a TRR Report (TRRR, c.f. Section 5.3 of this PRG).
- Review Lead communicates the proposed review schedule and risks to project management and to the Development Lead.
- Review Lead communicates requests for deliveries to the Development Lead, according to the review preparation schedule.
- Review tasks and schedule are finalized, in consultation with project management, and are folded into the DPP.
- Review team members, and relevant stakeholders identified on the review preparation schedule, work their assigned tasks according to the schedule.
- Review Lead monitors the status of the review preparation schedule and risks, and communicates issues to program management and the Development Lead. Review Lead, Development Lead, and program management collaborate in resolving any issues that arise. If necessary, the project plan may be modified to accommodate the resolution of issues.

## 4. CONDUCTING THE REVIEW

### 4.1. Review Objectives

The TRR objectives should be established in the DPP. Nominally, these will be the STAR EPL standard objectives for a TRR. The TRR objectives may be tailored for a specific project, in which case the DPP should document the tailored objectives. If there is no tailoring, it is sufficient for the DPP to state that the standard objectives apply, and note that these are specified in this PRG, as follows:

The STAR EPL standard objectives for a TRR are:

- Identify relevant stakeholders and document their involvement according to the project plan.
- Review the software architecture, including external interfaces, and identify changes since CDR.
- Identify changes to the detailed design since CDR.
- Identify changes to the verification and validation plan since CDR.
- Demonstrate the test readiness of each unit in the software architecture.
- Provide all applicable technical data to support unit testing, including:
  - Pre-operational code and test data
  - Unit test plan
- Identify and evaluate risks. Recommend risk mitigation activities.
- Document the closing of all action items since CDR. Make recommendations for open actions and new actions.

### 4.2. The Test Readiness Document

The TRD, a Microsoft PowerPoint file, is the presentation document for a project's TRR.

The TRD should accomplish the TRR objectives stated in Section 4.1 of this PRG.

The intended target audience is the TRR reviewers. Typically, the TRD is prepared by the project's development team under the direction of the Development Lead.

The TRD presentation slides are organized into sections. The number of sections depends upon the number of units in the test plan. These sections, described in DG-9.2 and illustrated in DG-9.2.A, are:

- Introduction
- Critical Design Review Report
- Software Architecture
- Unit 1 Test Readiness
- Unit 2 Test Readiness
- .....
- Unit N Test Readiness
- Risks and Actions
- Summary and Conclusions

A description of these sections is provided in the following seven subsections, taken from the TRD Document Guidelines (DG-9.2), for the benefit of TRR Reviewers who have been assigned the task of reviewing the corresponding TRD section.

#### **4.2.1 Section 1 – Introduction**

The TRD shall include an Introduction Section. This section should be organized as follows:

- 1.0 INTRODUCTION
  - 1.1 Development Project Plan
  - 1.2 Project Objectives
  - 1.3 Project Stakeholders
  - 1.4 Project Timeline
  - 1.5 Project Plan Changes
  - 1.6 Stakeholder Involvement
  - 1.7 TRR Guidelines and Checklist
  - 1.8 TRR Report

## 1.9 Review Objectives

- **Section 1.1: Development Project Plan**

- Confirm that the TRD provides a pointer to the DPP. TRR reviewers should be able to obtain the DPP by using this pointer. A pointer to the DPP Document Guidelines (DG-5.1) should also be provided.

- **Section 1.2: Project Objectives.**

- Confirm that the project objectives are consistently identified in the TRD and the DPP.

- **Section 1.3: Project Stakeholders.**

- Confirm that stakeholder roles have been identified. Stakeholder roles are identified in Section 4.2.1 of the STAR EPL Process Guidelines (PG-1). Stakeholders should be named when known. There may be more than one name for a stakeholder role. Unspecified stakeholders should be identified by role with a TBD. Unspecified stakeholders constitute a project risk that should be addressed in Section 6 of the TRD. The ensemble of roles and named personnel constitute the Integrated Product Team (IPT).
- Confirm that a description of the tasks expected for each stakeholder is documented at a level of detail sufficient to give you a good sense of the IPT. This can be done explicitly in the TRR presentation slides and/or by reference to other project artifacts (e.g. DPP).

- **Section 1.4: Project Timeline**

- Confirm that project milestones have been identified in the TRD and the DPP. Milestones should include the STAR EPL standard reviews (with the TRR highlighted) and associated review dates.
- Confirm that a timeline of project tasks and schedule of milestones has been included in the TRD and the DPP. It is recommended that an illustration of the project tasks and schedule be shown (e.g. a Gantt chart taken from a Microsoft Project file of the project plan). In particular, the tasks and schedule for the Build phase should be clearly illustrated, with the TRR milestone indicated.

- **Section 1.5: Project Plan Changes**
  - Confirm that any modifications to the Project Plan since the CDR are clearly explained, including the rationale and documentation of management concurrence.
  
- **Section 1.6: Stakeholder Involvement**
  - Confirm stakeholder involvement according to the project plan. Stakeholder involvement should be described in a way that shows the project plan is being followed.
  
- **Section 1.7: TRR Guidelines and Checklist**
  - This section should provide pointers to the TRR Peer Review Guidelines (PRG-9, this document) and TRR Checklist (CL-9).
  
- **Section 1.8: TRR Report**
  - This section should provide a pointer to the TRR Report Document Guidelines (DG-9.3).
  
- **Section 1.9: Review Objectives**
  - Ensure that the stated review objectives are satisfactory. Nominally, these objectives will be the STAR EPL standard objectives for a TRR. The standard objectives capture the standard sections of the review (c.f. Section 3).
  - Tailoring of review objectives is permissible. If the development team wishes to drop standard objectives or add other objectives, it is the responsibility of the Development Lead to consult with the TRR reviewers well enough in advance of the review to obtain reviewer buy-in for deviations. In that case, the TRD should note all deviations and note any impacts on exit criteria. Impacts on exit criteria will be common, since the standard objectives are designed to meet the standard exit criteria.

## 4.2.2 Section 2 – Critical Design Review Report

The TRD shall include a Critical Design Review Report Section. This section should be organized as follows:

### 2.0 CRITICAL DESIGN REVIEW REPORT

#### 2.1 Critical Design Review Report

#### 2.2 TRR Entry Criteria

#### 2.3 TRR Exit Criteria

- **Section 2.1: Critical Design Review Report**
  - The CDRR is an essential artifact for the TRR, because it documents the baseline from which to assess project progress since the last Technical Review. The TRD should provide a pointer to this document. Access to this document is part of the TRR entry criteria. If the TRR reviewer cannot obtain access to the CDRR by using this pointer, and cannot otherwise obtain access to the current baseline version of the report, the reviewer should notify an appropriate person (e.g. Review Lead, Development Lead, Program Manager, STAR Web Developer) to obtain access.
- **Section 2.2: TRR Entry Criteria**
  - Confirm that the entry criteria (c.f. Section 3.6 of this PRG) listed in this section are complete and correct.
  - Look for examples where the entry criteria listed in this section differ from the set that was established at the CDR, as documented in the CDRR. For these examples, the TRD should provide a convincing rationale for deviations, including tailored entry criteria and waived entry criteria. The TRR reviewers must approve any deviations. It is the responsibility of the Development Lead to consult with the TRR reviewers well enough in advance of the review to obtain reviewer buy-in for the deviation. If approved, the modified entry criteria should be documented in the TRRR with the modifications and rationale explicitly noted.
  - For cases where advance reviewer buy-in for entry criteria deviations has not been obtained, the reviewers must decide whether the review should be delayed until the discrepancy is resolved or can continue with an action to resolve the discrepancy after the review.

- Confirm that each TRR entry criteria item is satisfied. Use the TRR artifacts as references for deciding on the status of each entry criteria item.
- **Section 2.3: TRR Exit Criteria**
  - Confirm that the exit criteria (c.f. Section 5.1 of this PRG) listed in this section are complete and correct. The TRR exit criteria should be documented in the CDRR. Note that exit criteria may be tailored from the standard STAR EPL set of TRR exit criteria. In that case, the CDRR should document a rationale for deviations from the standard set.
  - Look for examples where the exit criteria listed in this section differ from the set that is documented in the CDRR. For these examples, the TRD should provide a convincing rationale for the deviations, including tailored exit criteria and waived exit criteria. The TRR reviewers must approve any deviations. It is the responsibility of the Development Lead to consult with the TRR reviewers well enough in advance of the review to obtain reviewer buy-in for the deviation. If approved, the modified exit criteria should be documented in the TRRR with the modifications and rationale explicitly noted.
  - For cases where advance reviewer buy-in for exit criteria deviations has not been obtained, the reviewers must decide whether the review should be delayed until the discrepancy is resolved or can continue with an action to resolve the discrepancy after the review.
  - Confirm that each TRR exit criteria item is satisfied. Use the TRR artifacts as references for deciding on the status of each exit criteria item.

#### 4.2.3 Section 3 – Software Architecture and Interfaces

The TRD shall include a Software Architecture and Interfaces Section. The purpose of this section is to provide the design context for the test readiness sections to follow. Most of the content for this section should be obtained directly from SWA v2r1. This section should be organized as follows:

- 3.0 SOFTWARE ARCHITECTURE AND INTERFACES
  - 3.1 Software Architecture Overview
  - 3.2 Context-Layer
  - 3.3 System-Layer

- **Section 3.1: Software Architecture Overview**

- This section should explain the concept and function of software architecture. Confirm that the TRD illustrates the four layers of software architecture data flows.
- **Section 3.2: Context-Layer**
  - This section should describe the flows between the software system and external sources and sinks, known as the “Context-Layer” of the software architecture. Confirm that the external interfaces described in the TRD are consistent with the SWA.
  - External interfaces should have been approved at the CDR, but there is always the possibility of changes to requirements and/or design since CDR that may result in changes to the external interfaces. If there are changes, the TRR reviewers must dispose of them. To assist the TRR reviewers, the TRD should note the changes, provide the rationale for the changes, and provide a pointer to a revised SWA that demonstrates the changes are low risk and maintainable.
  - The TRD should list all CDR open actions on the design of external interfaces. These will be addressed in Section 6 of the TRD.
- **Section 3.3: System-Layer**
  - This section should describe the flows between the major software units that comprise the software system, called the System-Layer of the software architecture.
  - Confirm that the TRD description of the System-Layer data flow is consistent with the SWA. The System-Layer data flow expands upon the Context-Layer data flow of Section 3.2, showing the next (first) layer of decomposition. The TRD should present the System-Layer data flows as a data flow diagram and as a table to help the reviewers.
  - The System-Layer data flow should have been approved at the CDR, but there is always the possibility of changes to requirements and/or design since CDR that may result in changes to the System-Layer software architecture. If there are changes, the TRR reviewers must dispose of them. To assist the TRR reviewers, the TRD should note the changes, provide the rationale for the changes, and provide a pointer to a revised SWA that documents the changes.
  - The TRD should list all CDR open actions on the System-Layer software architecture. These will be addressed in Section 6 of the TRD.

## 4.2.4 Section 4 – Unit 1 Test Readiness

The TRD shall address the test readiness of each software unit in its own separate section (Sections 4, 5, 6....). The purpose of each section is to demonstrate that the specified software unit is ready for unit testing.

This section should be organized as follows:

### 4.0 UNIT 1 TEST READINESS

4.1 Purpose and Function

4.2 Process Flow

4.3 Test Items

4.4 Requirements Trace

4.5 Test Data Description

4.6 Test Environment

4.7 Test Configuration

4.8 Test Methods

4.9 Test Sequence

4.10 Unit Test Risks

- **Section 4.1: Purpose and Function**

- The purpose of this section is to explain the purpose of the unit and its function in the product processing system. This explanation should be consistent with the unit's DDD and the UTP.
- Confirm that the purpose of each unit and its function in the product processing system are consistently and satisfactorily explained in the TRD, UTP, and the unit's DDD.

- **Section 4.2: Process Flow**

- This section should show the data flows between the major sub-units (the Layer-2 process flow), as documented in the SWA and UTP.
- Confirm that the unit layer process flow diagram for each unit is consistently and satisfactorily shown in the TRD, UTP, and SWA.

- **Section 4.3: Test Items**

- This section should list and describe all unit components that have been selected for testing. These items should be part of the system architecture as documented in the SWA and should be included in the VVP. Typically, they are sub-processes of the unit's process flow (e.g. Layer-2 elements, Layer-3 elements, etc.).
- Confirm that the TRD and UTP list and describe all unit components that have been selected for testing, consistent with the VVP.
- Test items should include all pre-operational code that has been written to implement the unit design. Confirm that the appropriate coding standards have been followed in the coding of all pre-operational code.
- **Section 4.4: Requirements Trace**
  - This section should trace the test items to the requirements. Confirm that the TRD and UTP list the requirements allocated to each unit test item, consistent with the RAD.
  - Requirements and/or requirements allocations may have been changed since the CDR, driven by changes to customer needs and/or by design constraints that have arisen during coding. It should be noted whether a changed requirement has been previously approved (e.g. at a delta Requirements Review). If a changed requirement has not yet been approved, it becomes the responsibility of the TRR reviewers to dispose of the changed requirement. To assist the TRR reviewers, the TRD should explain the rationale for the change (e.g., revealed by a detailed design issue, operational constraint), note the potential effects on the project plan, document the agreement of affected stakeholders, note new or modified risks that result from the change and note any recommended actions that result from the change.
- **Section 4.5: Test Data Description**
  - This section should list all data files that will be used as input files for each unit test, and describe each file's format and contents, consistent with the unit's DDD and with Section 3.5 of the UTP. "Test data" includes sensor data (real, proxy, or simulated), ancillary data, control files, parameter files, and look up tables.
  - This section should list all "truth" data sets that will be used to assess the performance of each unit, consistent with Section 3.5 of the UTP.
  - Truth data can be obtained from real observations of appropriate environmental parameters for a test scene consisting of real or proxy sensor data, or it can be constructed by simulations of appropriate environmental

parameters associated with simulated sensor data (e.g. forward modeling). The TRD and Section 3.5 of the UTP should explain how each real or proxy truth data set has been obtained and how each simulated truth data set has been constructed. Confirm that the “truth” data sets have been satisfactorily obtained or constructed.

- **Section 4.6: Test Environment**

- This section should describe the environment in which the unit tests will be performed, consistent with the VVP and Section 3.6 of the UTP, and demonstrate that the planned test environment complies with the project’s test environment requirements, as documented in the RAD.

- **Section 4.7: Test Configuration**

- This section should identify all configuration items that will be used in the unit test, including code modules, test data sets, utilities, libraries, etc., consistent with Section 4.7 of the UTP.
- Confirm that PBR v3r0 documents that each item in the test configuration is in the project baseline under configuration control.

- **Section 4.8: Test Methods**

- This section should describe the method or methods that will be used to test each test item, as documented in Section 3.8 of the UTP, and demonstrate that the methods selected for verification of a given item will address the requirements to be verified for that item, as documented in the VVP.

- **Section 4.9: Test Sequence**

- This section should describe the planned sequence of test actions in sufficient detail that a reviewer can confirm that all test items are exercised, all test data is utilized, and all planned test methods are used as planned. This description should be consistent with Section 3.9 of the UTP. Confirm that the planned sequence of test actions is sufficient to determine whether all relevant requirements are satisfied.

- **Section 4.10: Unit Test Risks**

Confirm that this section and Section 3.10 of the UTP consistently identify and evaluate risks to successful implementation of the test plan for this unit.

## 4.2.5 Section 5 – Unit 2 Test Readiness

Typically, a product processing system will include more than one unit. The number of units included in this project's system is identified in Section 3 of the TRD, in the description of the System-Layer (Layer 1) software architecture.

Section 4 of the TRD addressed a single software unit. If there are multiple units, each individual unit should be addressed in its own section of the TRD. In that case, Section 5 of the TRD would repeat the Section 4 format with material appropriate for the second unit: This section should be organized as follows:

- 5.0 UNIT 2 TEST READINESS
  - 5.1 Purpose and Function
  - 5.2 Process Flow
  - 5.3 Test Items
  - 5.4 Requirements Trace
  - 5.5 Test Data Description
  - 5.6 Test Environment
  - 5.7 Test Configuration
  - 5.8 Test Methods
  - 5.9 Test Sequence
  - 5.10 Unit Test Risks

Section 6 would do the same with material appropriate for the third unit, etc.

Typically, the System-Layer process flow has some sequential order to it, with outputs from one unit feeding other units. In that case, it is useful for the development team to present the unit readiness sections of the TRD in a sequential order that is consistent with the System-Layer sequential process flow.

Because there is no standard number of units for a project's software architecture, the standard STAR EPL TRR checklist (CL-9) does not contain separate CLIs for unit readiness Sections 5, 6, etc. The project TRR checklist may add CLIs for the project's specific units. If so, this tailored TRR checklist should be included in the DPP, and the TRR reviewers should use the tailored checklist. If a project uses the standard TRR checklist and its software architecture includes multiple units, the TRR reviewers should treat the Section 4 CLIs as applying to all units. That is, a Section 4 CLI is not to be approved unless all units satisfy the CLI.

## 4.2.6 Section 6 – Risks and Actions

The TRD shall include a Risks and Actions section. The purpose of this section is to provide an updated description of the status of identified project risks and associated actions for reviewer assessment and concurrence.

This section should be organized as follows:

### 6.0 RISKS AND ACTIONS

#### 6.1 CDR Risks and Actions

#### 6.2 New Risks and Actions

#### 6.3 Risk Summary

- **Section 6.1: CDR Risks and Actions**

- The status of project risks at CDR should have been reported in a “Risk Assessment” section of the CDRR.
- Confirm that the CDRR and TRD correctly document the status of risks at CDR. Each risk should be reported as follows:
  - Risk Statement – the description of the risk
  - Assessment – the results from analysis of the risk. The assessment should include quantitative evaluation of Severity and Likelihood of Occurrence
  - Mitigation – the plan to mitigate the risk
  - Actions – list of actions to implement the mitigation plan
- Confirm that the CDD provides the status of the associated actions for each CDR risk. Each action should be reported as follows:
  - Action statement
  - Closure Criteria
  - Closure Plan
  - Status – status of the action, with respect to the closure plan

- **Section 6.2: New Risks and Actions**

- Confirm that the TRD reports the status of each risk that has been identified since CDR in sufficient detail for the reviewers to be able to assess the development team's recommended actions to mitigate the risks. Each new risk should be described in the TRD as follows:
  - Risk Statement – the description of the risk
  - Assessment – the results from analysis of the risk. The assessment should include evaluation (e.g. High, Medium, Low)
  - Mitigation – the plan to mitigate the risk
  - Actions – list of actions to implement the mitigation plan
- Confirm that the TRD provides the status of the associated actions for each new risk. Each action should be reported as follows:
  - Action statement
  - Closure Criteria
  - Closure Plan
  - Status – status of the action, with respect to the closure plan
- **Section 6.3: Risk Summary**
  - Confirm that the TRD provides a list of risks that can be closed.
  - Confirm that the TRD provides a list of risks that remain open, in priority order (HIGH, then MEDIUM, then LOW). If the CDRR contained a table of risks, look for an updated table that has the same format. The updated table should add risks identified since CDR, modify the evaluation and prioritization of CDR risks based on current status, and update the mitigation plans, actions and status. For each risk, list the actions that must be closed to reduce the risk to an acceptable level, with closure plans and estimated closure dates.

#### 4.2.7 Section 7 – Summary and Conclusions

The TRD shall include a Summary and Conclusions Section. This section is organized as follows:

- 7.0 SUMMARY AND CONCLUSIONS
  - 7.1 Review Objectives Status
  - 7.2 Issues, Actions and Risks

7.3 Next Steps

7.4 Open Discussion

- **Section 7.1: Review Objectives Status**

- Confirm that all review objectives have been addressed by the TRD. Look for notable conclusions from each TRD section to be summarized here.

- **Section 8.2: Issues, Actions and Risks**

- Confirm that the TRD lists all outstanding issues, actions and risks that require attention. Look for notable conclusions from each issue, action and risk to be summarized here.

- **Section 8.3: Next Steps**

- Confirm that the TRD lists the recommendations of the development team for the next steps after the TRR, including preparation for Code Test Review (CTR).

- **Section 7.4: Open Discussion**

- The TRD states here that the review is open for free discussion. Note: If the development team has prepared for and conducted the review in accordance with standards and if the reviewers have prepared for the review in accordance with standards, there should be no need for additional discussion.

## 5. CLOSING THE REVIEW

### 5.1. Exit Criteria

The TRR reviewers should ensure that all TRR exit criteria have been met before closing the review. The TRR exit criteria should have been established at the CDR and documented in the CDRR. Note that exit criteria may be tailored from the standard STAR EPL set of TRR exit criteria. In that case, the CDRR should provide a rationale for deviations from the standard set. The standard STAR EPL set of TRR exit criteria, listed in the standard TRR check list (CL-9), includes the following 14 items:

- Exit # 1 - CDR "Conditional Pass" items have been satisfactorily disposed of.
- Exit # 2 - CDR "Defer" items have been satisfactorily disposed of.
- Exit # 3 - Changes to the project plan since Gate 4 Review are approved.
- Exit # 4 - Requirements allocation changes since CDR are approved.
- Exit # 5 - Changes to external interfaces since CDR are approved.
- Exit # 6 - Changes to the software architecture since CDR are approved.
- Exit # 7 - Changes to the detailed design since CDR are approved.
- Exit # 8 - Changes to the verification and validation plan since CDR are approved.
- Exit # 9 - The unit test plan and UTP are satisfactory
- Exit # 10 - Pre-operational code to implement the detailed design has been written according to standards and has been built into executable units.
- Exit # 11 - Pre-operational test data, including "truth" data, are satisfactory.
- Exit # 12 - The project baseline and PBR are satisfactory.
- Exit # 13 - The project artifacts document all approved changes to requirements, requirements allocation, external interfaces, software architecture, detailed design, and verification and validation plan since the CDR.
- Exit # 14 - The TRRR documents the current status of project risks, actions and TRR exit criteria.
- Exit # 15 - Project risks and actions are acceptable. Project is ready for unit testing.

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The interpretation of the terms “satisfactory” and “acceptable” in the exit criteria is subjective. That is, an item is “satisfactory” or “acceptable” if the reviewers find it satisfactory or acceptable to them. The reviewers are encouraged to refer to the set of relevant process assets (c.f. Section 3.4 of this PRG) to assist them in determining what their criteria for “satisfactory” and “acceptable” should be.

Note that several exit criteria pertain to changes in requirements, design, and verification plan since the CDR. These are necessary to ensure project control. Prior to the Build phase of the STAR EPL, these changes are expected and customary. Therefore, previous Technical Reviews (Project Requirements Review (PRR), Preliminary Design Review (PDR), and CDR) are expected to review planned updates to the project artifacts that document these changes. After CDR, changes to requirements, design, and verification plan are not expected and customary. Therefore, there are no planned updates to these project artifacts (RAD, SWA, DDD, and VVP). To ensure project control of these changes, it is necessary to include approval of these changes as explicit TRR exit criteria. If there are no changes that apply to a given exit criteria CLI, the TRR reviewers can dispose of the CLI with a “N/A” designation.

Note also that exit criteria item # 14 applies to the TRRR. This document (c.f. Section 5.3 of this PRG) is the responsibility of the TRR reviewers. The TRR is not properly closed until a TRRR has been written that satisfies exit criteria item # 14.

## 5.2. TRR Checklist

The TRR checklist is an essential item that must be completed to close the review. It contains the CLIs that must be checked off by the TRR reviewers. Checking off a CLI involves recording one of the following dispositions for each item:

- Pass – The item is approved.
- Conditional Pass – The item is approved conditionally. The condition or conditions typically involve one or more specific actions that must be closed to pass the item. If there are a sufficient number of Conditional Pass items, the TRR reviewers may require a delta TRR to approve the closure of these actions.
- Defer – The item is deferred for consideration at a later review (e.g. Code Test Review or System Readiness Review), often with recommended actions to be addressed prior to that review.
- Waive – The item has been excused for this project’s lifecycle. It is expected that a rationale for waiving an item be provided in the TRRR.

- Not Applicable (N/A) – The item is not applicable to this project’s lifecycle. This disposition will only occur if the item was mistakenly included in the project’s TRR checklist or if the item refers to potential changes that do not occur. The distinction between this disposition and the “Waive” disposition is that “Waive” items are applicable to the project’s lifecycle, though they have been excused for some reason.

In addition, the checklist includes the following Columns to be filled in for each CLI:

- Risk – A risk evaluation pertaining to the item (e.g. Red/Yellow/Green/Blue or High/Medium/Low/None). An item with a risk evaluation of Medium or worse should generate at least one action. Low risk items may also generate actions, at the discretion of the reviewers.
- Actions (Y/N) – Note (Yes or No) whether there are open actions pertaining to this item.
- Comments – Include any explanatory comments (e.g. rationales for the designation of the item, rationales for the risk evaluation, description of open actions, identification of the review that should address the actions).

The TRR reviewers can use the standard checklist provided in the TRR Checklist spreadsheet (STAR EPL process asset CL-9) to record their disposition of the CLIs, if the checklist for this project’s TRR has not been modified. If there has been a modification, the TRR reviewers should use a modified spreadsheet that includes the TRR CLIs that have been agreed to. The TRR CLIs that have been approved for a specific project should be included in the project plan (DPP). Any modifications to the checklist during the Design phase must be approved by project management and should be documented in a DPP revision and in the CDRR.

Typically, each member of the review team is assigned a subset of the checklist to check off, and some items may be assigned to more than one review team member. The Review Lead is responsible for collecting the finished checklists from each review team member, resolving conflicts between team members, and producing a unified checklist with all items checked off. The TRRR (c.f. Section 5.3 of this PRG) typically includes a copy of this unified TRR checklist.

### 5.3. TRR Report

The TRRR is the one project artifact that is the responsibility of the TRR review team. Responsibilities for writing parts of the TRRR should be assigned to review team members by the Review Lead. These should be agreed upon well in advance of the review, during review preparation meetings.

Standards and guidelines for the TRRR can be found in STAR EPL process asset DG-9.3 (Test Readiness Review Report Guidelines). The TRR review team should follow the standards and guidelines in DG-9.3, unless there are tailored standards and guidelines specific to this project. In that case, the DPP should either note the tailored standards and guidelines or should provide a reference to a document where these are noted.

The TRRR should be updated to record the closing of “Conditional Pass” and “Defer” items after the TRR. TRRR updates should include a change history. Details can be found in DG-9.3.

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