J.5 IRS PROCESS APPRAISAL REVIEW METHODOLOGY (PARM) SUMMARY OVERVIEW

J.5.1 BACKGROUND

In response to a General Accounting Office (GAO) recommendation, the IRS implemented a Service-wide initiative in July, 1995, to require and ensure that all contractors perform software development activities in accordance with Level 2 or higher of the Software Engineering Institute (SEI) Software Capability Maturity Model (SW-CMM®). The IRS shall accept the CMM Integration Software (CMMI℠-SW Level 2 or higher to substantiate, or in lieu of, the SW-CMM®

J.5.2 INTRODUCTION

The IRS CMM® Review Team, hereafter referred to as the Review Team, uses the IRS PARM to verify the software development process maturity of post award contractors in the context of the SW-CMM®or the CMMI℠. The IRS PARM applies the following principles and considerations:

- A contractor's software maturity can be verified by review and analysis of existing reusable appraisal data resulting from SEI-approved appraisal methods, such as the:
    - Software Capability Evaluation (SCE℠)
    - CMM®-Based Appraisal—Internal Process Improvement (CBA-IPI)
    - Standard CMMI℠ Appraisal Method for Process Improvement (SCAMPI℠)
    - Other CMM® Appraisal Framework (CAF) or other Class A, Appraisal Requirements for CMMI℠ (ARC) methodologies.

- Verification of contractor software process maturity through the reuse of existing appraisal data can reduce the extensive cost to the IRS and the contractor of performing a SCE℠ each time a SW-CMM® or CMMI℠ level verification is needed.

- Organizational process improvement data can be used to supplement the appraisal data submitted for the verification process.

- The methodology must permit verification of contractor maturity throughout the acquisition life cycle, accommodate the variety of contractor organizations, and achieve consistent results independent of contract size or type.

- The methodology must incorporate the principles of proven verification

techniques such as those applied by CAF – compliant methodologies for CMM® or Class A, ARC-compliant methodologies for CMMI℠. The purpose of the PARM's reuse of existing appraisal data is to cost effectively perform post-contract award monitoring of the Contractor's software practices and to assess potential risks to the IRS. Phases I, II and III of the PARM discussed below are not considered viable substitutes for CAF or Class A, ARC compliant appraisals.

J.5.3 IRS PARM DESCRIPTION

The IRS PARM institutes four progressive review phases that permit effective monitoring of contractor software development maturity levels at the least cost to the IRS and the contractor. The four phases of the IRS PARM are defined as follows:

Phase I Review contractor appraisal history and results data.

Phase II Review contractor project-specific process documentation and records of performance.

Phase III Conduct onsite, structured, management and technical interviews.

Phase IV Conduct a formal, onsite SCE℠ or SCAMPI℠

All software development contractors are subject to the IRS PARM Phase I annually. The IRS PARM requires all contractors to submit a consistent set of information that builds an IRS repository of data to baseline and tracks each contractor's performance. The Review Team verifies the contractor's asserted CMM® or CMMI℠ level using the Phase I data received or requests additional information by subjecting the contractor to subsequent phases, as appropriate. Where no reusable appraisal data is available, the IRS can determine contractor software process maturity only through the performance of a SCE℠ or IRS PARM Phase IV.

Contractors who have been determined to be at CMM® or CMMI℠ Level 1 may request an out-of-cycle process maturity verification (other than the standard annual review cycle). Additionally, the IRS reserves the right to perform a SCE℠ or SCAMPI℠ at any time, with appropriate notice and scheduling.

The Review Team applies the following criteria, during evaluation of the contractor data, to determine whether the contractor has submitted convincing evidence to demonstrate compliance with CMM® or CMMI℠ Level 2:

- *Results*—Demonstrate that the contractor is operating at the required CMM® or CMMI℠ level or higher

- *Relevancy*—Show that the assessed organization is currently performing IRS work, and/or the proposed organization to perform IRS work is a source of best practices

- *Objectivity*—Demonstrate that the assessment team included evaluators independent of the appraised organization to avoid conflict of interest in the findings

- *Timeliness*—Show that the on-site appraisal commenced within the last 18 months immediately preceding the PARM Phase I submittal due date.

- *Consistency*—Give evidence that the appraisal was performed in accordance with accepted methodologies prescribed by the SEI CAF or Class A, ARC.

J.5.4 PARM DEFINITIONS

The Review Team applies the following definitions, for the PARM.

(1) *CMM® Appraisal Framework (CAF)* – A framework for rating the software process maturity of an organization against a generally accepted reference model, in this case the CMM®, through the use of a CAF compliant appraisal method. The CAF is ***not*** an appraisal method. CAF objectives include: a) defining requirements for CAF compliant methods, b) providing guidance for comparing different methods, c) defining CAF compliant method components and their interrelationships, and d) defining the CAF compliant method rating process and its prerequisites. The primary activities that make up a CAF compliant appraisal method include: a) planning and preparing for an appraisal, b) conducting the appraisal, and c) reporting the results.

(2) Entity – Refers to the organizational scope of an appraisal. An appraised entity may be any portion of an organization including: an entire company, a targeted business unit, a particular geographic site, organizational units involved in producing software for a particular purpose, organizational units involved in providing a specific software service, as part of the whole system development life cycle, a particular project, or a team matrixed across multiple companies.

(3) *Organization* – A unit within a company or other entity within which many projects are managed as a whole. All projects within an organization share a common top-level manager and common policies.

(4) Software Development Activities – Any activity, in whole or in part, included in commonly accepted Software Development Life Cycles: project planning and oversight, establishing a software development environment, systems requirements analysis, system design, software requirements analysis, software design, software implementation and unit testing, unit integration and testing, software qualification testing, software and hardware integration and testing, system testing, preparing for software use, preparing for software transition, software configuration management, software product evaluation, software quality assurance, corrective action, joint technical and management reviews, software maintenance, software prototyping, RAD and JAD, COTS installation/modification, and website development.

(5) Software life cycle – The period of time that begins when a software product is conceived and ends when the software is no longer available for use. The software life cycle typically includes a concept phase, requirements phase, design phase, implementation phase, test phase, installation and checkout phase, operation and maintenance phase, and, sometimes, retirement phase.

(6) Software Maintenance – Modification of a software product after delivery to correct faults, to improve performance or other attributes, or adapt to a modified environment.

(7) Appraisal Requirements for CMMI^{SM} (ARC) – The ARC define the Class A requirements for the SCAMPI^{SM} appraisal method used with the CMMI^{SM} model. The Class A appraisal provides a CMMI^{SM} rating and includes all ARC requirements.

J.5.5 PARM PHASE DETAILS

Each PARM phase can be described in terms of the data requested from the contractor, the review process used by the Review Team in evaluating the data submitted, and the possible set of decisions the Review Team may provide as a result of the evaluation. The following table provides these details of each PARM phase:

Data Requested	Review Process	Possible Decisions
PARM Phase I - Assessment History and Results		
Letter stating the contractor organization's CMM® or CMMI^{SM} maturity level Appraisal details for the last 18 months Details of process	Apply the verification criteria to the data submitted in the context of the SEI-defined appraisal	Sufficient evidence—process maturity level verified - Out of PARM Questions regarding implementation of SW-CMM or CMMI^{SM}-SW Level 2 practices—subject contractor to Phase II Questions regarding IRS interpretation of appraisal or organizational data —subject

improvement infrastructure relevant to the IRS Current and future process improvement plans including scheduled appraisals	framework	contractor to Phase III Phases II or III not seen as profitable or lack of appraisal data —subject contractor to Phase IV Insufficient evidence - no reusable supporting data (e.g., SCAMPI^{SM} or SCE^{SM}) and maturity level not verified – Out of PARM
PARM Phase II - Documents and Records Review		
Project-specific information such as policies and procedures Evidence and records of performance that demonstrate compliance with Level 2 Key Process Areas (KPAs) or CMMI^{SM} Process Areas (PAs).	Analyze the data in the context of the practices associated with CMM® Key Process Areas (KPAs) or the CMMI^{SM} Process Areas (PAs)	Sufficient evidence—process maturity level verified - Out of PARM Questions regarding use of appraisal data—subject contractor to Phase III Phase III not seen as profitable—subject contractor to Phase IV Insufficient evidence - no reusable supporting data (e.g., SCAMPI^{SM} or SCE^{SM}) and maturity level not verified – Out of PARM

Data Requested	Review Process	Possible Decisions
PARM Phase III - Structured Interviews/Briefings		
Management briefing(s) on special topics Structured technical and management interviews Engineering floor walkthroughs	Analyze new information provided in the context of questions raised as a result of PARM Phase I and apply to the evaluation criteria as appropriate	Sufficient evidence—process maturity level verified - Out of PARM Insufficient evidence—subject contractor to Phase IV Insufficient evidence - no reusable supporting data (e.g., SCAMPI^{SM} or SCE^{SM}) and maturity level not verified – Out of PARM
PARM Phase IV - Highly Focused SCE		
Project documentation Onsite interviews	Perform formal SCE^{SM} or SCAMPI^{SM} in accordance with SEI methodology with associated Level 2 CMM® Key Process Areas (KPAs) or the CMMI^{SM} Process Areas (PAs)	SW-CMM® or CMMI^{SM}-SW level determination—process maturity level verified - Out of PARM

J.5.6 REFERENCES

M.C.Paul, C.V. Weber, S. Garcia, M.B. Chrissis, and M. Bush, *Key Practices of the Software Capability Maturity Model® (SW-CMM®), Version 1.1*, Software Engineering Institute, CMU/SEI-93-TR-25, February, 1993.

Steve Masters and Carol Bothwell, *CMM Appraisal Framework, (CAF), Version 1.0,* Software Engineering Institute, CMU/SEI-95-TR-001, February 1995

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