QUALITY CONTROL PROCESS

1.0   SCOPE

The Enterprise Project Management Office (EPMO) established overarching Quality Policy, Quality Objectives in the 0100-0100-005-QMS EPMO QUALITY MANUAL. This procedure defines specific EPMO Information Technology (IT) Project Performance Metrics and measurements, and the methods used to monitor, detect, assess, correct and record IT Project performance Deficiencies throughout the 0300-0300-005-B PROJECT MANAGEMENT PROCESS. When performance Deficiencies are identified the 0600-0600-005-B CORRECTIVE ACTION PROCESS is implemented, resulting in opportunities to improve IT Project performance.

2.0   OWNER

2.1   The EPMO Manager owns this procedure. No changes, additions or alterations may be made without the owner's written approval.

3.0   REFERENCE DOCUMENTS

DOCUMENT IDENTIFICATION	DOCUMENT TITLE
PMBOK	A GUIDE TO THE PROJECT MANAGEMENT BODY OF KNOWLEDGE - 5TH ED
0100-0100-005-QMS	EPMO QUALITY MANUAL
0100-0800-010-B	FORMS AND RECORDS CONTROL
0300-0300-005-B	PROJECT MANAGEMENT PROCESS
0300-0310-005-C	PROJECT INITIATION
0300-0310-015-C	PROJECT FINANCIAL ASSESSMENT
0300-0310-030-C	COST ESTIMATION
0300-0360-005-C	PROJECT CHANGE REQUEST
0300-0370-005-C	PROJECT WEEKLY STATUS REPORT
0600-0600-005-B	CORRECTIVE ACTION PROCESS
0700-0700-005-B	PREVENTIVE ACTION PROCESS
0800-0800-005-B	QUALITY ASSURANCE PROCESS

4.0   ASSOCIATED FORMS

FORMS IDENTIFICATION	FORM TITLE
0300-0310-015-D	PROJECT FINANCIAL ASSESSMENT FORM
0300-0360-005-D	PROJECT CHANGE REQUEST FORM

0300-0370-005-D	PROJECT WEEKLY STATUS REPORT
0600-0600-005-D	CORRECTIVE ACTION FORM
0810-0810-005-D	QUALITY CONTROL DECISION POINTS

5.0 DEFINITIONS

- **BASIS OF ESTIMATE:** *see Glossary of Terms and Definitions*

- **DEFICIENCY:** *see Glossary of Terms and Definitions*

- **QUALITY ASSURANCE:** *see Glossary of Terms and Definitions*

- **QUALITY CONTROL:** *see Glossary of Terms and Definitions*

6.0 PROCEDURE

Quality Control focuses on the detection, correction and elimination of IT Project performance Deficiencies. The EPMO uses various measurement methods established by the Project Management Institute (PMI) in the PMBOK. Earned Value Measurements such as Cost Performance Index (CPI) and Schedule Performance Index (SPI) are used to define "within budget" and "on schedule" IT Project performance. Basis of Estimates (BOEs) are used to determine when the overall IT Project Cost or Schedule is "off track", requiring a 0300-0360-005-D PROJECT CHANGE REQUEST FORM. In addition, Decision Point (DP) actions are measured to determine if DP processing is within the Service Level Commitments (SLCs) established in 0810-0810-005-D QUALITY CONTROL DECISION POINTS. All measurements are driven by the Project Manager (PM) providing weekly project status updates in accordance with 0300-0370-005-C PROJECT WEEKLY STATUS REPORT. The Project Management Advisor (PMA) is also a key contributor to the success of the Quality Control Process. The PMA reviews Cost and Schedule Variances, BOE Variances, DP SLC performance and Change Requests to ensure IT Projects are performing within established EPMO Thresholds. The PMA follows the procedure defined below to monitor and assess IT Projects to quickly identify, correct and eliminate IT Project performance Deficiencies.

(**Note**: *All Deficiencies will result in the implementation of the 0600-0600-005-C CORRECTIVE ACTION PROCESS.*)

6.1 Project Weekly Status Report

Proper assessment of an IT Project requires the PM to complete the 0300-0375-005-D PROJECT WEEKLY STATUS REPORT throughout the 0300-0300-005-B PROJECT MANAGEMENT PROCESS. The completed Project Weekly Status Report provides the TOUCHDOWN System the data to generate the CPI and SPI Earned Value Measurements.

6.1.1   Every Monday the PMA assesses the Project Weekly Status Report prepared by the PM in accordance with 0300-0370-005-C PROJECT WEEKLY STATUS REPORT. If the Report was not submitted the PMA will create a "Turnaround Time" Deficiency.

6.1.2   The focus of the PMA review is CPI, SPI and Key Risks. If the PMA determines a Deficiency exists (I.e. "Cost Variance", "Schedule Variance" or "Risk") based on the condition assessed, Corrective Action shall be initiated in accordance with 0600-0600-005-B CORRECTIVE ACTION PROCESS.

6.1.3   If the PMA determines no Deficiency exists and Corrective Action is not warranted based on the assessment, Preventive Action may be initiated in accordance with the 0700-0700-005-B PREVENTIVE ACTION PROCESS.

6.2   Cost Performance Index (CPI)

The TOUCHDOWN System calculates and displays the CPI Earned Value Measurement. The PM and PMA review Cost Variances weekly following the 0300-0370-005-C PROJECT WEEKLY STATUS REPORT procedure. When an IT Project reaches the EPMO Variance Threshold for Cost, the PM uses the 03000360-005-C PROJECT CHANGE REQUEST procedure to request a change (increase or decrease) to the Cost Estimate.

6.2.1   CPI Variances are generated by the TOUCHDOWN System based on inputs from the PM and State cost accounting and management systems. These measurements are used to determine Cost Variances and are defined in 0810-0810-005-B QUALITY CONTROL PROCESS. The PMA and PM assess CPI Variances on a weekly basis.

6.2.2   The PMA uses the TOUCHDOWN System to track CPI over time. The PMA assesses CPI looking at a trend (time period) of at least 60 days. If the CPI is < .90 or > 1.2, the PMA creates a "Cost Variance" Deficiency and initiates Corrective Action in accordance with the 0600-0600-005-B CORRECTIVE ACTION PROCESS.

6.3   Schedule Performance Index (SPI)

The TOUCHDOWN System calculates and displays the SPI Earned Value Measurement. The PM and PMA review Schedule Variances weekly following the 0300-0370-005-C PROJECT WEEKLY STATUS REPORT procedure. When an IT Project reaches the EPMO Variance Threshold for Schedule, the PM uses the 0300-0360-005-C PROJECT CHANGE REQUEST procedure to request a change (increase or decrease) to the Schedule Estimate.

6.3.1   SPI Variances are generated by the TOUCHDOWN System based on inputs from the PM and State cost accounting and management systems. These measurements are used to determine Schedule Variances and are defined in 0810-0810-005-B QUALITY CONTROL PROCESS. The PMA and PM assess SPI Variances on a weekly basis.

6.3.2   The PMA uses the TOUCHDOWN System to track SPI over time. The PMA assesses SPI looking at

a trend (time period) of at least 60 days. If the SPI is < .90 or > 1.2, the PMA creates a "Schedule Variance" Deficiency and initiates Corrective Action in accordance with 0600-0600-005-B CORRECTIVE ACTION PROCESS.

6.4   Basis of Estimate (BOE) Variances

All IT Projects will establish Cost and Schedule Estimates as required in 0300-0310-015-C PROJECT FINANCIAL ASSESSMENT and defined in 0300-0310-030-C COST ESTIMATION. The BOE's are "Initial", "Refined" and "Baseline", and have defined permissible variances.

6.4.1   BOE Variances are generated by the TOUCHDOWN System based on inputs from the PM and State cost accounting and management systems. These measurements are used to determine Cost and/or Schedule Variances. The PMA and PM assess BOE Variances weekly.

6.4.2   The PMA uses the TOUCHDOWN System to track BOE Variances over time. If the IT Project trends outside the established BOE thresholds, the PMA creates a "Cost Variance" or "Schedule Variance" Deficiency and initiates Corrective Action in accordance with 0600-0600-005-B CORRECTIVE ACTION PROCESS.

6.5   Decision Point Turnbacks and Service Level Commitments (SLCs)

During the 0300-0310-005-C PROJECT INITIATION phase the PMA consults with the PM to determine the required DPs. The process establishes the DPs and references their SLCs as defined in 0810-0810-005-D QUALITY CONTROL DECISION POINTS. As an IT Project progresses through its Life-Cycle, the PMA reviews assigned DPs to verify compliance with standards established herein, and requisite SLCs standards defined in 0810-0810-005-D QUALITY CONTROL DECISION POINTS.

6.5.1   The PM is responsible for submitting the required information for the review of a DP based on a due date in the Project Schedule. If the PM fails to meet the DP due date the PMA creates an "SLC" Deficiency and initiates Corrective Action in accordance with 0600-0600-005-B CORRECTIVE ACTION PROCESS.

6.5.2   If the assigned reviewer completes their actions within the defined SLC and the DP is not approved, the PMA creates an "SLC" Deficiency stating the reason for non-approval and initiates Corrective Action in accordance with 0600-0600-005-B CORRECTIVE ACTION PROCESS.

(**_Note:_** _The SLC for the DP returns to review day 1._)

6.5.3   If the assigned reviewer does not complete their actions within the defined SLC, the PMA creates a "SLC" Deficiency and initiates Corrective Action in accordance with 0600-0600-005-B CORRECTIVE ACTION PROCESS.

6.6   Change Request Re-Baseline

When a 0300-0360-005-C PROJECT CHANGE REQUEST results in a re-baseline of Cost or Schedule, the PMA will create a "Change Request" Deficiency and initiate Corrective Action in accordance with 06000600-005-B CORRECTIVE ACTION PROCESS.

(*Note: The Project Change Request procedure establishes Agency and EPMO Thresholds for action on Cost/Schedule Variances. The concept is that Agencies should correct the Variance - I.e. Preventive Action - before the problem escalates and requires EPMO intervention - I.e. Corrective Action.*)

6.7   Escalation of Deficiencies

As an IT Project is assessed and Deficiencies are identified, the EPMO Manager is responsible for escalating Deficiencies as required in 0600-0600-005-B CORRECTIVE ACTION PROCESS.

6.8   EPMO Project Performance Metrics and Measurements

Performance Metric	Measurement	Process or System
Project Weekly Status Report Delivered and Assessed on Time	Due End of Day Friday	0300-0375-005-C PROJECT WEEKLY STATUS REPORT TOUCHDOWN System
Cost Performance Index (CPI)	Earned Value (EV) / Actual Cost (AC)	TOUCHDOWN System
Schedule Performance Index (SPI)	Earned Value (EV) / Planned Value (PV)	TOUCHDOWN System
Basis of Estimate (BOE)	-25% of Project Initial Budget	0300-0310-015-C PROJECT FINANCIAL ASSESSMENT TOUCHDOWN System
Basis of Estimate (BOE)	-25% of Project Initial Schedule	0300-0310-015-C PROJECT FINANCIAL ASSESSMENT TOUCHDOWN System
Basis of Estimate (BOE)	+75% of Project Initial Budget	0300-0310-015-C PROJECT FINANCIAL ASSESSMENT TOUCHDOWN System
Basis of Estimate (BOE)	+75% of Project Initial Schedule	0300-0310-015-C PROJECT FINANCIAL ASSESSMENT TOUCHDOWN System
Basis of Estimate (BOE)	-10% of Project Refined Budget	0300-0310-015-C PROJECT FINANCIAL ASSESSMENT TOUCHDOWN System
Basis of Estimate (BOE)	-10% of Project Refined Schedule	0300-0310-015-C PROJECT FINANCIAL ASSESSMENT TOUCHDOWN System
Basis of Estimate (BOE)	+25% of Project Refined Budget	0300-0310-015-C PROJECT FINANCIAL ASSESSMENT TOUCHDOWN System

Basis of Estimate (BOE)	+25% of Project Refined Schedule	0300-0310-015-C PROJECT FINANCIAL ASSESSMENT TOUCHDOWN System
Basis of Estimate (BOE)	-5% of Project Baseline Budget	0300-0310-015-C PROJECT FINANCIAL ASSESSMENT TOUCHDOWN System
Basis of Estimate (BOE)	-5% of Project Baseline Schedule	0300-0310-015-C PROJECT FINANCIAL ASSESSMENT TOUCHDOWN System
Basis of Estimate (BOE)	+10% of Project Baseline Budget	0300-0310-015-C PROJECT FINANCIAL ASSESSMENT TOUCHDOWN System
Basis of Estimate (BOE)	+10% of Project Baseline Schedule	0300-0310-015-C PROJECT FINANCIAL ASSESSMENT TOUCHDOWN System
Decision Point (DP) Due Date	Due date is <= Today's date	0810-0810-005-D QUALITY CONTROL DECISION POINTS TOUCHDOWN System
Decision Point (DP) Required Information Not Submitted	Approver Rejection	0810-0810-005-D QUALITY CONTROL DECISION POINTS
Decision Point (DP) Not Approved	Approver Rejection	0810-0810-005-D QUALITY CONTROL DECISION POINTS
Decision Point (DP) Service Level Commitment (SLC) Not Met	Service Level Commitment (SLC) Due Date <= Today's Date	0810-0810-005-D QUALITY CONTROL DECISION POINTS TOUCHDOWN System
Change Request to Re-Baseline	Project Baseline Budget compared to Change Request Budget (+ or -)	0300-0360-005-C PROJECT CHANGE REQUEST
Change Request to Re-Baseline	Project Baseline Schedule compared to Change Request Schedule (+ or -)	0300-0360-005-C PROJECT CHANGE REQUEST

6.9   Earned Value Measurements - Components and Calculation Methods

6.9.1   **Actual Cost (AC)** - The actual costs incurred by the project as of a certain point in time. Usually, AC is used to answer the question: "How much has been spent on the project as of today?"

6.9.1.1 AC is calculated as follows:

Actual Cost (AC) = Sum of all costs incurred by the project to date

6.9.1.2 AC calculation _Example:_

Tom is the PM for a project to install a new Wi-Fi network on the Dix campus. The project has a budget of $2.5 million and involves numerous contractors. Tom has budgeted $1.2 million for Wi-Fi equipment and $1.1 million for installation, employee laptop updates and training costs. He has also budgeted $200,000 for miscellaneous costs. The project team has just begun installing the equipment needed - starting with the Wi-Fi antennas. The project has spent $400,000 on Wi-Fi equipment, $50,000 on site

surveys, $3,000 on team meetings and team building sessions. Tom will also sign a contract for an additional ten Wi-Fi antennas for $30,000 tomorrow.

6.9.1.3 What is the current AC of the example project? *Answer:* $453,000.

6.9.1.4 How was the example AC calculated?
Actual Cost (AC) = $400,000 + $50,000 + $3,000 = $453,000

(***Note:*** *Why isn't the AC $483,000? The contract for the additional ten Wi-Fi antennas is being signed* <u>*tomorrow*</u> *and has not yet been invoiced.*)

6.9.2 **Earned Value (EV)** - The estimated value of the work completed on a project as of today. If the project stopped today, the EV would show the value that it has produced.

6.9.2.1 EV is calculated as follows:
Earned Value (EV) = Percent Complete x Budget at Completion (BAC)

6.9.2.2 EV calculation *Example:*
Bill is the PM on a project to relocate his agency's data center from a closet to the State Western Data Center. After six months of work, the project is 27% complete. At the start of the project, Bill estimated that it would cost $50,000,000.

6.9.2.3 What is the current EV of the example project? *Answer:* $13,500,000.

6.9.2.4 How was the example EV calculated?
The Percent Complete = 27% (0.27). The Budget at Completion (BAC) = $50,000,000.
Earned Value (EV) = 0.27 x $50,000,000 = $13,500,000

6.9.3 **Planned Value (PV)** - The estimated value of the work to be completed on a project within a defined time period.

6.9.3.1 PV is calculated as follows:
Planned Value (PV) = Planned Percent Complete x Budget at Completion (BAC)

6.9.3.2 PV calculation *Example:*
Jenny is the PM on a project to build a new mobile web application. The project is expected to last 10 months. The estimated total cost is $2,300,000.

6.9.3.3 What is the PV of the example project at 5 months? *Answer:* $1,150,000.

6.9.3.4 How was the example PV calculated?

The Planned Percent Complete is the percentage of the project that is planned to be complete; in this case, 5 months / 10 months = 0.5 (50%). The Budget at Completion (BAC) is the estimated total cost of the project; in this case, BAC = $2,300,000.

Planned Value (PV) = 0.5 x $2,300,000 = $1,150,000

6.9.4 **Cost Performance Index (CPI)** - A measurement of a project's actual cost performance relative to plan.

6.9.4.1 CPI is calculated as follows:

Cost Performance Index (CPI) = Earned Value (EV) / Actual Cost (AC)

6.9.4.2 What does CPI mean? - The result of the CPI calculation is a number. What does this number mean?

- A value less than one means the project is underperforming in costs. Ex: CPI of 0.7 means the PM is earning $0.70 of value in return for each $1.00 spent.
- A CPI of one means the project is on track with the cost plan. Ex: CPI of 1 means the PM spent $1.00 on the project and received $1.00 of value in return.
- A value greater than one means the project is performing above planned costs. Ex: CPI of 1.4 means the project is earning $1.40 of value in return for each $1.00 spent.
- The Cost Performance Index answers the question: "What is the actual cost performance relative to the plan?"
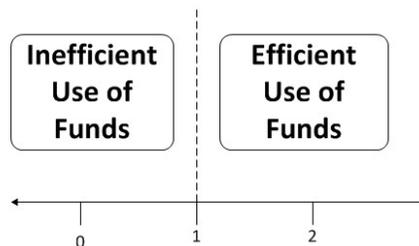
6.9.4.3 CPI calculation *Example:*

Sue is the PM for a project to implement a new secure driver's license system. The estimated value of the work completed on the project so far is $405,000. The total cost of the project is expected to be $650,000. So far the project has cost $325,000.

6.9.4.4 What is the CPI and what does it indicate about Sue's project?

Answer: The CPI is 1.25; for every $1.00 spent on Sue's project, $1.25 of value is being produced in return.

6.9.4.5 How was the example CPI calculated?

The Earned Value (EV) is $405,000. The Actual Cost (AC) is $325,000. Cost Performance Index (CPI) = $405,000 / $325,000 = 1.25

6.9.5 **Schedule Performance Index (SPI)** - A measurement of project schedule performance used to determine actual schedule progress relative to plan.

6.9.5.1 SPI is calculated as follows:

Schedule Performance Index (SPI) = Earned Value (EV) / Planned Value (PV)

6.9.5.2 What does SPI mean? - The result of the SPI calculation is a number. What does this number mean?

- A value less than one means the project is behind schedule relative to plan. Ex: A trending SPI of 0.8 means the project is projected to finish behind schedule (late).
    An SPI of one means the project is projected to finish on schedule with the plan.
- A value greater than one means the project is ahead of planned schedule. Ex: A trending SPI of 1.2 means the project is projected to finish ahead of schedule (early).
- The Schedule Performance Index answers the question: "When is the project projected to finish relative to the plan?"
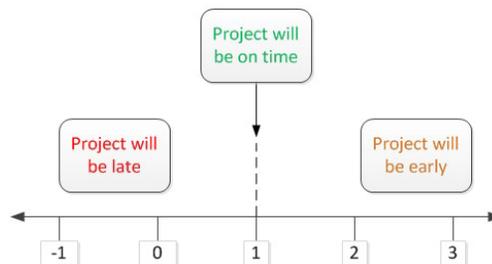
6.9.5.3 SPI calculation *Example:*

Frank is the PM for an application development project to create a new web interface for a licensing system. The estimated value of the work completed thus far is $116,000. The planned value of the project is $125,000.

6.9.5.4 What is the SPI and what does it indicate about Frank's project?

Answer: The SPI is 0.93; Frank's project is slightly behind planned schedule.

6.9.5.5 How was the example SPI calculated?

The Earned Value (EV) is $116,000. The Planned Value (PV) is $125,000. Schedule Performance Index (SPI) = $116,000 / $125,000 = 0.93

7.0   RECORDS

7.1   Unless otherwise specified in this Procedure/QWI, Records shall be maintained in accordance with 0100-0800-010-B FORMS AND RECORDS CONTROL procedure.

8.0   REASON FOR CHANGE

8.1   Initial issue.