

*Earned Value Management System (EVMS)
Surveillance Review*

**Princeton University Plasma Physics Laboratory
(PPPL)**

November 2012

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1. Executive Summary:

During the week of November 5, 2012, PPPL conducted an Earned Value Management System (EVMS) surveillance review of PU-PPPL. The focus of the review was to conduct a formal and documented EVMS compliance review of the NSTX-U Project against the 32 EVMS Criteria.

The review team sampled the EVMS data from the NSTX-U internal website, interviewed Control Account Managers and prepared this report. Each of the 32 ANSI/EIA-748-B guidelines was assessed and a separate table generated for each guideline indicating observations and findings for each guideline. The NSTX-U project management and CAMs are technically knowledgeable, know how to execute this project, and is staffed with an enthusiastic and talented team. The project management is fluent in EVMS principles and has experience in using EVMS information to manage their projects. Project controls is also particularly knowledgeable of EVMS principles and is actively engaged in baseline development, schedule maintenance and progress reporting. The NSTX-U project team demonstrated an effective application of EVMS principles to manage their project.

The NSTX-U project is satisfactorily following Guidelines 1-32 of the EVMS Criteria however to improve the substance of the EVMS data the review team has made 6 recommendations for continuous improvement opportunity(CIO):

- Recommendation (1) all of the remaining percent complete work packages should be re-assessed for objective completion criteria in order to avoid the potential for subjective measurements being applied to BCWP, particularly in control accounts that have substantial outstanding procurements associated with their ETCs.
- Recommendation (2); improve the CAMs ability to support EVMS principles with increased training and as necessary replacement in cases where the CAM is clearly overloaded.
- Recommendation (3) the NSTX-U project should perform a forward-looking review of procurements and the EV methods associated with them. The purpose of this review will be to apply EV in a consistent manner for similar types of procurements.
- Recommendation (4) the project should have additional training for the CAMs on how procurement costs are recognized in the business system for purposes of analyzing them compared to their reported BCWP. Examples should be shown for each type of procurement. If the project develops a standard EV format going forward for each procurement type, that should be rolled into the training also.
- Recommendation (5) the variance reports that were reviewed can be improved with better attention paid to corrective actions identified and by keeping a log of corrective actions so that it can be used to insure implementation in a timely manner.
- Recommendation (6); more accurately assess the anticipated future costs and document the basis for the monthly estimates provided by the CAMs. Improve CAMs ability to generate ETCs with increased training.

2. Background

The Princeton Plasma Physics Laboratory successfully completed a DOE EVMS acceptance review in October 2011. As a result of that review the DOE determined that the EVMS system deployed at PPPL to be compliant and meet the requirements of the ANSI/EIA-748B.

Relevant excerpts from the DOE-SC certification committee indicated that:

- PPPL should be commended for the actions completed thus far in implementing an EVM System
- Cost Estimates are detailed, documented, and traceable.
- Project planning process is well documented and owned by the CAMs.
- Traceability established between EVMS and accounting system.
- Monthly Project Status meeting is commendable tool for sharing project information and direction across the project team.
- CAMs have demonstrated detailed technical knowledge

The Acceptance Review of the Princeton University EVMS Report identified four [4] Corrective Action Requests (CARs) and seven [7] Continuous Improvement Opportunities (COIs). These eleven [11] actions were entered into an action tracking system and the NSTX Upgrade Project addressed each of them. The PPPL Quality Assurance (QA) Division reviewed these actions and verified that they were accomplished and closed out. A summary of the QA record of the CARs and COIs and actions is provided in Attachment I (2 pages).

In accordance with the PPPL Project Management System Description (PMSD) the Laboratory Project Management Officer is required to conduct a formal and documented EVMS compliance review against the 32 EVMS Criteria annually, and submit the report to the Laboratory Director. In order to support this compliance review a team was formed to perform a comprehensive assessment of the baseline and performance management systems, as implemented, per the PMSD. The team met with the NSTX-U Project Management team and interviewed CAMS to determine if NSTX-U is following the 32 EVMS Criteria. The 32 EVMS criteria are grouped into the following categories:

1. Organization (Criteria 1 -5)
2. Planning, Scheduling & Budgeting (Criteria 6 – 15)
3. Accounting Considerations (Criteria 16-21)
4. Analysis and Management Reports (Criteria 22-27)
5. Revisions and Data Maintenance (Criteria 28-32)

The scope of the NSTX Upgrade Project (NSTX-U) includes Title I through Title III engineering, fabrication, assembly and installation, integrated systems testing, and project management associated with two primary elements:

A Center Stack (CS) Upgrade: Design, build and install new CS assembly including a new toroidal field (TF) hub assembly, new TF flag assemblies, new ceramic break, new inner TF bundle, new ohmic heating coil, new inconel casing and insulation, new plasma facing component (PFC) tiles, new poloidal field (PF) 1a, b & c coils along with the ancillary systems to support their operation.

A 2nd Neutral Beam-line (NBL): Decontaminate and prepare a TFTR neutral beam-line (NBL) for installation on NSTX. Evaluate and refurbish internal components as necessary (cryogenic panels, beam dumps, bending magnets, beam scrapers, calorimeter, etc.). Relocate the NBL and provide a second set of beam-line services (e.g., power, water, vacuum, cryogenics, etc.).

2. SUMMARY

During the week of November 5, 2012, PPPL conducted an Earned Value Management System (EVMS) surveillance review of PU-PPPL. The focus of the review was to conduct a formal and documented EVMS compliance review of the NSTX-U Project against the 32 EVMS Criteria. The Planning and Control Division led the review team with committee members from the planning and control division, the project management office and the Engineering and Infrastructure Department. Surveillance Team – Mike Williams (ex officio), Tim Stevenson (ex officio), Al von Halle, Tom Egebo, Skip Schoen, Margaret Carideo

2.1 Agenda:

	Monday 11/5/2012	Tuesday 11/6/2012 B318	Wednesday 11/7/2012 B252 ***	Thursday 11/8/2012 B252 ***	Friday 11/9/2012
9:00	LMM	EVMS Team*	Atnafu	Chrzanowski	Start
10:00		Project Controls Langish**	Tresemer	Smith	Report
11:00			Ramakrishnan	Labik	
12:00					
1:00	ENGR staff	Perry	Hatcher	<i>CAM (optional)</i> Kaita	
2:00		Cropper	Sichta	Gentile	
3:00		Blanchard		ROLLOVER	

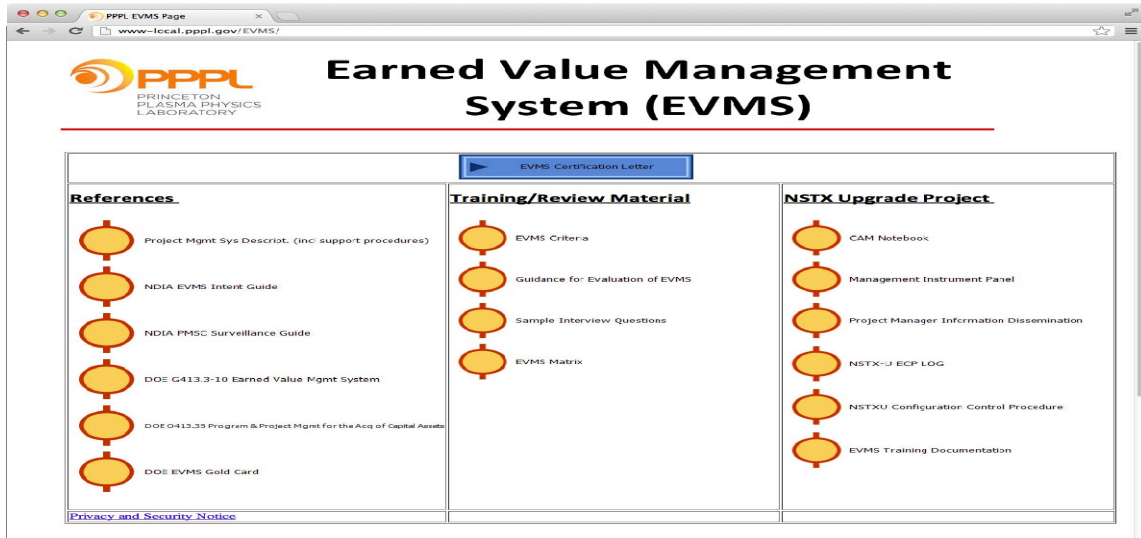
* Review Team (Williams, Stevenson, von Halle, Egebo, Carideo, Schoen)

** Presentation on NSTX-U Project Controls Implementation (Langish)

*** B252 is reserved for Wednesday & Thursday, however we may choose to do CAM interviews in CAMS offices

2.2 Objective Evidence:

The PPPL internal website has an established EVMS web page that includes sections for EVMS References, EVMS Training/Review Material and the NSTX Upgrade Project.



The NSTX Upgrade Project section has several links to project information, including one for a CAM notebook containing all the required documentation for the review.



2.3 Observations:

The NSTX-U project has management and CAMs that are technically knowledgeable, know how to execute this project, and is staffed with an enthusiastic and talented team. The project management is fluent in EVMS principles and has experience in using EVMS information to manage their projects. Project controls is also particularly knowledgeable of EVMS principles and is actively engaged in baseline development, schedule maintenance and progress reporting. The NSTX-U project team demonstrated an effective application of EVMS principles to manage their project.

Each of the 32 ANSI/EIA-748-B guidelines was assessed and a separate table generated for each guideline. Standard Surveillance EVMS Templates were used to summarize observations and are appended to this report. Consistent with the ANSI/EIA-748B standard the following observations are divided into the five major EVMS sections:

1. Organization (Criteria 1 -5)
2. Planning, Scheduling & Budgeting (Criteria 6 – 15)
3. Accounting Considerations (Criteria 16-21)
4. Analysis and Management Reports (Criteria 22-27)
5. Revisions and Data Maintenance (Criteria 28-32)

Organization:

In the area of organization (which is comprised of GL 1-5) the review team found that the NSTX-U project scope is:

- clearly defined and organized for management control,
- an organization is established for accomplishing the work,
- a detailed resource loaded schedule exists to integrate the projects plan, schedule, budget, work authorization and cost accumulation,
- an organization and policy for controlling overhead costs exists and is consistently applied,
- and the WBS and OBS are integrated and cost and schedule performance measurement is reported for both structures

No issues were identified and the NSTX-U project is satisfactorily following Guidelines 1-5 of the EVMS Criteria

Planning, Scheduling & Budget:

In the area of Planning, Scheduling and Budgeting (GL 6-15) the review team found that for the NSTX-U project:

- the authorized work is detailed in a resource loaded schedule with interdependencies identified and measureable against the established program milestones,
- each work packages (i.e., each P3 activities) has a defined earned value technique which is used to measure progress,
- a time-phased budget baseline is established at the control account level and used for performance measurement. In addition work authorization documentation exists to establish budgets and goals for performance measurement based,
- significant cost elements (labor, materials etc...) are include in the development of authorized work,
- work authorization documentation includes control account plans with detailed breakdowns of dollars, hours and other measurable units,
- the sums of all the work packages within a control account equals the control account budget,
- level of effort activity within control accounts is held to the minimal practical levels,
- a documented process for managing indirect costs is defined and used to develop work authorization budgets,
- a Risk Management Plan for NSTX-U was developed to establish contingency levels for each Control account,
- the CPR report that contains the Performance Measurement Baseline includes the sum of all Control accounts and clearly identifies the project contingency.

No significant issues were identified and the NSTX-U project is satisfactorily following Guidelines 6-15 of the EVMS Criteria however the following recommendations are made to improve the substance of the EVMS data:

Recommendation (1) that all of the remaining percent complete work packages be re-assessed for objective completion criteria in order to avoid the potential for subjective measurements being applied to BCWP, particularly in control accounts that have substantial outstanding procurements associated with their ETCs.

Intent Guideline 7 states “Identify physical products, milestones, technical performance goals, or other indicators that will be used to measure progress.” Typical attributes include objective completion criteria should be determined in advance to measure progress...

Many of the remaining work packages use 50%/50% earned value technique however there remains considerable amount using percent complete that might not have enough objective completion criteria established.

Recommendation (2) to improve CAMs ability to support EVMS principles with increased training and as necessary replacement in cases where the CAM is clearly overloaded.

The level of EVMS proficiency among the CAMS is understandably not at the same level, however there was a case where a CAM was not able to readily explain how/why EV techniques were established in his control account. This can be resolved with increased training for that individual. It was clear from the surveillance team interviews that one CAM was overloaded with managerial and technical responsibilities and was not able to provide sufficient time to thoroughly support his CAM responsibilities. The NSTX-U project should provide additional technical support to this CAM so that he can delegate some responsibilities to others.

Accounting Considerations:

In the area of Accounting (GL 16-21) the review team found that for the NSTX-U project:

- direct costs are recorded in a manner consistent with the budgets in a formal system controlled by the general books of accounts,
- direct costs for control accounts are not rolled up to two or more WBS or OBS elements,
- indirect costs for the project are allocated to direct costs per the documented procedure (defined in PPPL's CAS disclosure statement),
- costs are accumulated and assigned to control accounts in a manner consistent with budgets using recognized, acceptable, costing techniques.

No significant issues were identified and the NSTX-U project is satisfactorily following Guidelines 16-21 of the EVMS Criteria however the following recommendations are made to improve the substance of the EVMS data:

Recommendation (3) the NSTX-U project should perform a forward-looking review of procurements and the EV methods associated with them. The purpose of this review will be to apply EV in a consistent manner for similar types of procurements.

Recommendation (4) the project should have additional training for the CAMs on how procurement costs are recognized in the business system for purposes of analyzing them compared to their reported BCWP. Examples should be shown for each type of procurement. If the project develops a standard EV format going forward for each procurement type, that should be rolled into the training also.

Intent Guideline 21 states- “For EVMS, the material accounting system will provide for:

1. Accurate cost accumulation and assignment of costs to control accounts in a manner consistent with the budgets using recognized, acceptable, cost techniques,
2. Cost performance measurement at the point in time most suitable for the category of material involved, but no earlier than the time of progress payments or actual receipt of material,
3. Full accountability of all material purchased for the project including the residual inventory.”

Analysis and Management Reports:

In the area of analysis and management reports (which is comprised of GL 22-27) the review team found that the NSTX-U project is:

- on a monthly basis generating CPRs that contain the necessary EV indices’ for management control. Schedule and Cost variances are identified and the actual expenditures are reconcilable with the accounting system,
- on a monthly basis generating variance analyses reports consistent with the PEP thresholds,
- utilizing indirect rates established by the PPPL budget office, consistent with the laboratories CAS disclosure statement,
- Summarizing data elements and associated variances at the control account level up through the WBS and OBS. Written analysis reports are generated if thresholds identified in the PEP are exceeded,
- Developing revised estimates at completion on a monthly basis based on performance to date, commitments and estimates for future conditions. This information is compared to the PMB to identify variances to program management.

No significant issues were identified and the NSTX-U project is satisfactorily following the Guideline 22-27 of the EVMS Criteria however the following recommendation is made to improve the substance of the EVMS data:

- Recommendation (5) the variance reports that were reviewed can be improved with better attention paid to corrective actions identified and by keeping a log of corrective actions so that it can be used to insure implementation in a timely manner.

Intent Guideline 23 states “Identify, at least on a monthly, the significant differences between both planned and actual schedule performance and planned and actual cost performance, and provide reasons for the variances in the detail needed by program management.” Further Guideline 26 states “Implement managerial action taken as the result of the earned value information”. Typical attributes include variances causes and impacts are identified in sufficient

detail needed by project management; corrective actions are implemented in a timely manner and follow-up of the implementation to see what if planned actually was implemented.

- Recommendation (6) to accurately assess the anticipated future costs and document the basis for the monthly estimates provided by the CAMs. Improve CAMs ability to generate ETCs with increased training.

Intent Guideline 27 states “Develop revised estimates of cost at completion based on performance to date, commitment values for material, and estimates of future conditions....” Typical attributes include control account manager should generate the ETC at the work package and planning package level.

Although a standard format is used to insure that CAMs provide input to their ETCs on a monthly basis it was clear during the surveillance team interviews that some CAMs were more thorough in their input than others. It was also observed that the many of the CAMs were not aware of the impact to the project of their monthly ETC reporting. Additional training or explanations to the CAMs of the value of the EAC exercise will improve its reliability.

Revisions and Data Maintenance Reports:

In the area of revisions and data maintenance reports (which is comprised of GL 28-32) the review team found that the NSTX-U project is:

- Incorporating authorized changes in a timely manner and reflecting those changes based on changes to the budgets and schedule,
- CAMs effectively utilize the ECP process for changes in work scope,
- In addition to the CAMs oversight, the NSTX-U Work Control Center provides a secondary check to insure that only authorized technical changes are implemented,
- CAMs status jobs on appropriate cycles, often breaking Primavera lines down into more discreet tasks for statusing
- reconciling budgets in terms of changes to the authorized work and internal planning in detail needed by management for effective control,
- controlling retroactive changes to records and only making adjustments for correction of errors to improve baseline integrity and accuracy of performance measurement data,
- preventing revisions to the budget except for authorized work and documenting changes to the PMB.

No issues were identified and the NSTX-U project is satisfactorily following the Guideline 28-32 of the EVMS Criteria.

Charge questions:

Is the PEP current and functioning to execute the project EVMS successfully?

Yes. The latest version of the approved PEP is available on the NSTX-U EVMS web page in the CAM notebook. This PEP remains in effect until the completion of the NSTX Upgrade Project and revision and/or changes to the document are made in accordance with the project's change approval level.

Have changes to the Performance Measurement Baseline been performed with change control per project requirements?

Yes. Once an Engineering Change Proposal (ECP) has been prepared, and the impacts fully documented, the ECP is forwarded to the project Change Control Board (CCB) that is comprised of senior members of the NSTX Upgrade Project management team. The NSTX Upgrade Project Manager or his designee chair the CCB. Once a proposed change is approved, the project implements the change in a timely manner. An updated list of approved, disapproved, and pending changes is be maintained electronically on the NSTX Upgrade Project web site.

Has the CAM basis of estimate for ECPs been held to the same standards and review as with original work?

Yes. A revised work authorization document is issued indicating the impact of the change and the PMB (resource loaded schedule, control accounts, WBS dictionary etc...) is updated accordingly.

Are CAM estimates of percent complete accurately and objectively reflecting actual progress on work scope such that Cost and Schedule Indices are valid?

Yes. The review team has issued 3 CIOs (CIO-1, 3 & 4) that when implemented will improve the substance of the EVMS data **(see Recommendations 1, 3 and 4)**

Are Variances identified, documented, and corrected as appropriate per the PEP?

Yes. The review team has issued 2 CIOs (CIO- 5 & 6) that when implemented will improve the substance of the EVMS data **(see Recommendations 5 and 6)**

Has the integrity of the EVMS process been maintained per the EVMS criteria since certification including the end result PARSII data?

Yes. The review team has issued 2 CIOs (CIO- 1 & 4) that when implemented will improve the substance of the EVMS data **(see Recommendations 1 and 4)**

Appendix 1

Excerpt of CARs and CIOs generated at the DOE-SC Acceptance Review of Princeton University's EVMS (October 2011) from NSTX-U Project Reviews Recommendation Log

The DOE EVMS Acceptance Review of the Princeton University EVMS Report identified four [4] Corrective Action Requests (CARs) and seven [7] Continuous Improvement Opportunities (CIOs). This NSTX-U Project log documents the actions taken to disposition those CARs and CIOs.

Review	Item	Concern/Recommendation	Responsibility / WBS or Job	Comment/Action	Current Status	Status	Verified	Verification Information	Verified By
October 2011 OPA EVMS Acceptance Review	CAR-1	Acceleration of schedule and added scope without formal baseline change: --The project should measure against a realistic baseline --Project is managing to an accelerated schedule not baseline --Follow formal change control processes and procedures --Document changes to performance baseline	Strykowski	The NSTX-U project will submit an Engineering Change Proposal (ECP) to change the performance measurement baseline to reflect accelerated approval of selected tasks. The ECP is being drafted and expected to be submitted for review and approval by October 31, 2011.	Action Plan - 10/31/11: (1) Near term. The NSTX-U project will submit an Engineering Change Proposal (ECP) to change the performance measurement baseline to reflect the OE-OFES approval to accelerate selected tasks. The ECP is being drafted and expected to be submitted for review and approval by November 11, 2011. The ECP will document OFES authorization to proceed with critical path/high value procurement and begin select outage removal tasks in advance of receiving CD-3 approval. (2) The entire PMB will be assessed in concert with DOE-PSO and DOE-OPA mid fiscal year once the following prerequisites are met: CD-3 approval received (January 2012 target) Fiscal 2011 funding received and reconciled with other NSTX Program (non-project) objectives A reasonable and achievable accelerated plan is prepared that provides; Adequate contingency set-aside. Detailed accelerated procurement planning including identification of risk and availability of procurement staff to support the plan. Critical skills resource leveling. The decision to change the PMB is approved by DOE-PSO and DOE.	CLOSE D	YES	Verified with Ron Strykowski on 12/9/11. The final PU-PPPL Corrective Action Plan was issued on 11/22/11. The reference documents were generated documenting the accelerated schedule. An ECP was submitted to update both the cost and schedule for the NSTXU project.	Jedic
October 2011 OPA EVMS Acceptance Review	CAR-2	VARs must be written at the Control Account Level as a minimum	Strykowski	When a variance threshold is triggered a variance analysis report will be written at the control account level. The PPPL Project Management System Description (PMSD), section 2.3.2 on Variance Analysis, will be updated to indicate that "when a variance threshold is triggered the variance analysis report must be written at the control account level".	Action Plan - 10/31/11: 1. Agreed. When a WBS Level II variance threshold is triggered a variance analysis report will be written at the control account level. Target: Complete 2. Agreed. The PPPL Project Management System Description (PMSD), section 2.3.2 on Variance Analysis, will be updated to indicate that "when a variance threshold is triggered the variance analysis report must be written at the control account level". Target: Complete 3. Agreed. The CAM training material will be prepared to demonstrate the proper method for preparing a variance analysis report. Target: Complete 4. Agreed. A PEP revision has been completed (needs approval by end of February); however, the following thresholds are noted in the latest revision which is in the approval cycle: SV +15% or -10% or >\$50K and > 10% of BAC or any impact on any DOE Level 1 or 2 Milestone CV +15% or -10% or > \$50K. and > 10% of BAC	CLOSE D	YES	Verified on 3/22/12 with Ron Strykowski. The National Spherical Torus Experiment (NSTX) Upgrade Project Execution Plan (Rev 1) dated 2/29/12 was updated to address the concern that the VARs must be written at the Control Account level. This was addressed on page 20 of the document under section 8.4 Reporting. In that section it states "If a WBS level II VAR be required the VAR will be prepared at the control account level for those CA's that drive the WBS II variance."	Jedic
October 2011 OPA EVMS Acceptance Review	CAR-3	Schedule logic and excessive constraints degrades the integrity of the schedule and critical path.	Strykowski	The Primavera schedule data base is being reviewed and updated to improve the schedule logic to minimize hanging ends and reduce the number of constraints to only those necessary. The Primavera data base consistent with the ECP referenced above in CAR-01 will be reviewed and updated prior to October 31, 2011.	Agreed. Accuracy and completeness of the project's master schedule is necessary to ensure correct and timely information to all levels of the project team. The Project's Master Resource Loaded schedule is the key document used for performance measurement, milestones and lower level working schedules. This master schedule is statused each month during a group meeting consisting of the CAM, Project Manager, Project Controls, CSU and NBI Managers, and Associate Director for Engineering and Infrastructure. As well as reviewing each task for progress, the CAM and Project Controls manager validate the logical sequences of tasks and add additional links if warranted. Furthermore, criticality of each task is noted by reviewing the total float value remaining on each task. To ensure work is prioritized properly, logically linked and consistent with budgetary guidance the project control office performs QC checks to ensure all ECP's are properly included, and that there are no unexplained hanging ends, unnecessary constraints or tasks without predecessors. (See cell comment for remainder of explanation)	CLOSE D	YES	Verified with Ron Strykowski on 12/9/11. The final PU-PPPL Corrective Action Plan was issued on 11/22/11. The schedule and critical path has been updated to reflect the new accelerated schedule. This is statused each month to keep it evergreen. Support documents showing updates were reviewed.	Jedic
October 2011 OPA EVMS Acceptance Review	CAR-4	Inconsistent identification and application of LOE vs. Discrete across Control Accounts	Strykowski	Each of the work packages that are identified in the PMB will be reviewed to determine if LOE scope is inadvertently included in a work package that is identified as using discrete effort for EV technique. If instances are found where LOE and discrete scope is included in a work package an ECP will be generated to separate the LOE work from the discrete work so that the EV technique applied to the work package is appropriate. As a best practice the amount of LOE work included in a control account that is dominated by work packages that use discrete effort for EV technique is kept to a minimum (<15%) so as not to mask variances.	Upon closer review it is obvious that in several NSTX-U Control Account there was no time budgeted for EVMS/PM related Level of Effort (LOE) activities. On future DOE 413.3B projects this will be consistently incorporated in ALL Control Accounts during the planning phase. For the NSTX Upgrade Project the Control Accounts that have not included LOE time for this type of activity will incur a cost variance as a result of time spent on this type of activities. No further action should be required for this CAR.	CLOSE D	YES	Verified on 3/28/12 with Steve Langish. Confirmed with Steve that no time was budgeted for EVMS/PM related LOE activities for several NSTX-U Control Accounts. No further action will be taken on the NSTXU Control Accounts that have no included LOE. These will incur a cost variance as a result of the time spend on these activities. This, however, will be incorporated on future DOE 413.3B projects.	Jedic

NSTX-U Project Reviews Recommendations Log

Review	Item	Concern/Recommendation	Responsibility / WBS or Job	Comment/Action	Current Status	Status	Verified	Verification Information	Verified By
October 2011 OPA EVMS Acceptance Review	CIO-1	Recommend improvement in CAM ownership of EAC development, tracking and active revision	Langish	Ownership will be improved by REQUIRING CAMs to provide a monthly update of the EAC and their explanation of how/why it changed. This can be accomplished via the monthly staking process where the CAMs will be required to supply a value for their EAC each month.	This will be implemented in the Status process for the month of October. (12/13/11) This has been implemented; however, the effectiveness of the implementation is still on-going. The CAM refresher training will address this specifically for reinforcement.	CLOSE D	YES	Verified with Steve Langish on 11/30/12. A system has been implemented for collecting the needed info from the CAMs on a monthly basis. This has now been effectively working in collecting the needed input during the previous months.	Jedic
October 2011 OPA EVMS Acceptance Review	CIO-2	Recommend validation of actual costs from COBRA by CFO	Langish	Tony Bleach to "approve" monthly actuals with digital signature.	Discussions have begun with Tony Bleach to refine the process. Currently using September close as a way of refining. (10/21/11) Division Head of PPPL accounting to "approve" monthly actuals with digital signature. The Head of Accounting reports directly to the laboratory CFO.	CLOSE D	YES	Verified via Steve Langish email on 10/21/11. The actual NSTX Upgrade Project costs for September 2011 were validated by Anthony Bleach on the PDF document "SEP2011_APPROVED_ACTUALS". To ensure this happens on a monthly basis, the "Project Management System Description (PMSD)" R2, October 2011 has been revised to add a requirement for a monthly validation of the project actual costs by the Accounting Office. This revision was made in section 4.1 of the document (pg 97).	Jedic
October 2011 OPA EVMS Acceptance Review	CIO-3	Recommend additional EV training, some examples include: a) PPPL change control processes, procedures, and responsibilities (when and how) b) EAC c) Understanding of Control Account Plans	Langish	Additional training will be conducted to specifically focus on 1) change control processes/procedures/responsibilities 2) estimate at complete (EAC) 3) control account plans	Training material has been updated; however, the training has not yet been scheduled. Will be performed in early January.	CLOSE D	YES	Verified with Steve Langish on 1/31/12. CAM training was performed (reference CAM Training PowerPoint presentation dated 1/1/12). The training was completed in 2 training sessions (1/11/12 & 1/25/12). Training records were reviewed.	Jedic
October 2011 OPA EVMS Acceptance Review	CIO-4	Recommend documentation clarifications and corrections, some examples include: a) Formally document management decisions b) Include UB and clarify MR in System Description c) Clarify matrix relationship between Engineering and Infrastructure and CFO in System Description	Langish	a) Create a section in the on-line CAM Notebook where management decisions can be formalized/posted. b) PMSD will be updated to include UB and clarify MR in System Description c) PMSD will be updated to clarify matrix relationship between Engineering and Infrastructure and CFO in System Description	First draft to be completed by 21 Oct 2011. Revision 2 to be completed by 30 Nov 2011. (12/13/11) a) Completed b) c) First draft is completed. Hope is to have issued by end of December.	CLOSE D	YES	Verified with Steve Langish on 1/6/12. ITEM a: Management decisions are documented in a spreadsheet of Approved CD3 tasks which can be found at this link (http://www-local.pppl.gov/EVMS/MGMTDECISION/ind ex.htm) ITEM b: The Project Management System Description (PMSD) was updated Dec 2011 to include Undistributed Budget (UB) and clarify Management Reserve (MR). UB is defined on page 62. MR is covered in multiple areas (i.e. pgs 28, 28, 37 & 69). ITEM c: The matrix relationship between Engineering and Infrastructure and CFO is covered on page 6 of the PMSD.	Jedic
October 2011 OPA EVMS Acceptance Review	CIO-5	Recommend including documentation of EV technique (% Complete) in each Work Authorization Form.	Langish	Action will be taken to include the EVT on the Work Approval Form (WAF). To include methodology for taking % complete.	The on-line WAF has been updated to include the Earned Value Technique (EVT) used. The form HAS been posted on the Project Management web page. The CAMs on the NSTX-U project are aware that they are to have a methodology for how they are taking progress on % complete tasks and that documenting the approach is ideal; however, the project is not currently requiring that CAMs provide documentation for their approach. No further action should be required for this CIO.	CLOSE D	YES	Verified with Steve Langish on 2/22/12. The Work Authorization Form is accessible through the Project Management webpage and has been updated to incorporate the EVT into the form.	Jedic
October 2011 OPA EVMS Acceptance Review	CIO-6	Recommend continued improvement to Change Control Procedures and Processes, some examples include: a) Consistent mechanism needed to process administrative changes b) Time phasing was changed in June 2011 but not reflected in CPR Format 3 c) PEP requires log of approved/disapproved/pending changes and ensure continuous maintenance.	Langish	Recommend continued improvement to Change Control Procedures and Processes, some examples include: a) Consistent mechanism needed to process administrative changes b) Review committee did not review May CPR3 which would have show the change from May to June. June-July-Aug same! c) This was performed during the certification review		CLOSE D	YES	Verified with Steve Langish on 12/20/11. a) An online ECP Log is now active and can be found at (http://www-local.pppl.gov/EVMS/ECP/Log.pdf) to track administrative changes b) reviewed PDF from Steve titled "CPR3 CIO6" which documents that the change is now reflected in the CPR Format 3. c) The ECP log cited above will track changes. It is accessible from the NSTXU Control Account Manager Notebook via this link. (http://www-local.pppl.gov/EVMS/CAMNB/INDEX.htm)	Jedic
October 2011 OPA EVMS Acceptance Review	CIO-7	PEP and RAM have one control account listed against 4 WBS elements.	Langish	The Project Execution Plan Work Breakdown Structure (WBS) Dictionary and the Responsibility Assignment Matrix (RAM) were both updated during the Certification Review to correct this issue. No Control Accounts are associated with more than one WBS element.	The CAMs on the NSTX-U project are aware that they are to have a methodology for how they are taking progress on % complete tasks and that documenting the approach is ideal; however, the project is not currently requiring that CAMs provide documentation for their approach. No further action should be required for this CIO.	CLOSE D	YES	Verified with Steve Langish on 10/14/11. The RAM and PEP (document page 38) were updated on 10/6/11 to correct having one control account listed against 4 WBS elements.	Jedic

Appendix 2- PPPL Surveillance EVMS Templates for 32 EVMS Criteria

- a. **Guideline 1: Define the authorized work elements for the program. A work breakdown structure (WBS), tailored for effective internal management control, is commonly used in this process.**

Reviewer Name(s): Thomas Egebo

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

One Work Breakdown Structure, along with the WBS dictionary, exists for the project and is documented in the PEP

<http://www-local.pppl.gov/EVMS/NSTXUPEP.PDF>

This WBS provides complete definition of the work scope requirements.

All work for the project is identified by the WBS and was presented in the performance reports

<http://www-local.pppl.gov/EVMS/COBRA/INDEX.htm>

CAR-__

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-__

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

- b. Guideline 2: Identify the program organizational structure including the major subcontractors responsible for accomplishing the authorized work, and define the organizational elements in which work will be planned and controlled.**

Reviewer Name(s): Thomas Egebo

Compliant with ANSI/EAI-748: **Yes.**

Observations and Findings (Justification for Compliance):

An OBS exists for the project and can be found in the PEP

<http://www-local.pppl.gov/EVMS/NSTXUPEP.PDF>

All authorized work is assigned to an organizational element within the OBS and can be shown on the Cost Performance Reports.

<http://www-local.pppl.gov/EVMS/COBRA/INDEX.htm>

OBS intersections with the WBS are identified in the RAM:

<http://www-local.pppl.gov/EVMS/CAMNB/NSTXURAM.pdf>

CAR-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

- c. **Guideline 3: Provide for the integration of the company’s planning, scheduling, budgeting, work authorization and cost accumulation processes with each other, and as appropriate, the program work breakdown structure and the program organizational structure.**

Reviewer Name(s): Thomas Egebo

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

A detailed resource loaded schedule exists for the PMB

<http://www-local.pppl.gov/EVMS/SCHEM/CURRENTSCHEM.pdf>

Control account plans exist and a RAM exists that documents the Control Accounts:

<http://www-local.pppl.gov/EVMS/CAMNB/NSTXURAM.pdf>

Work Authorizations containing statements of work that are authorized are signed off per the PMSD and the PEP:

<http://www-local.pppl.gov/EVMS/WAD/index.htm>

Performance Reports are available by WBS and OBS:

<http://www-local.pppl.gov/EVMS/COBRA/INDEX.htm>

CAR-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

d. Guideline 4: Identify the company organization or function responsible for controlling overhead (indirect costs).

Reviewer Name(s): Thomas Egebo

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

Indirect costs are allocated to project control accounts. Indirect costs are applied to each project at the current approved annual rates. The PPPL CASB disclosure statement explains in detail the process concerning the collection and reporting of indirect costs. PPPL's CASB disclosure statement identifies all indirect cost pools, and defines how these cost pools are distributed to the final or benefiting cost objects.

CAR-__

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-__

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

- e. **Guideline 5: Provide for integration of the program work breakdown structure and the program organizational structure in a manner that permits cost and schedule performance measurement by elements of either or both structures as needed.**

Reviewer Name(s): Thomas Egebo

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

Control Accounts are identified at the intersection of the WBS and the OBS and documented in the project RAM

<http://www-local.pppl.gov/EVMS/CAMNB/NSTXURAM.pdf>

The control accounts are the points of work authorization and are shown in the work authorizations documents

<http://www-local.pppl.gov/EVMS/WAD/index.htm>

The estimated costs of work performance management and measurement are identified at the task levels within each control account. Tasks/Work Packages within each control account are identified and statused each month:

<http://www-local.pppl.gov/EVMS/WORKPACK.pdf>

CPRs identify appropriate indices' by control account, which roll up the work packages within each control account:

http://www-local.pppl.gov/EVMS/COBRA/Oct12_CPRs_NSTXU.pdf

CAR-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

3.1 Guideline 6: Schedule the authorized work in a manner which describes the sequence of work and identifies significant task interdependencies required to meet the requirements of the program.

Reviewer Name(s): Thomas Egebo

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

P3 (distinct tasks that relate directly to WADs/WAFs) activities are identified with start and finish dates, basis for measuring performance for each P3 activity and show linkages for interdependencies. The baseline schedule is the basis for measuring performance and the current schedule provides current status and forecasts to complete

<http://www-local.pppl.gov/EVMS/SCHED/CURRENTSCHED.pdf>

All Control Accounts are integrated within the total project schedule for determination of project critical path. The critical path has been developed and documented.

<http://www-local.pppl.gov/EVMS/SCHED/CP.pdf>

During monthly status meetings EACs are obtained for each P3 activity (by the performing individual) of the remaining work.

DOE deliverable milestones (Level I & II) and Project (Level III) milestones have been identified as key targets and are included in the schedule

<http://www-local.pppl.gov/EVMS/NSTXUPEP.PDF>

<http://www-local.pppl.gov/EVMS/SCHED/ms.pdf>

CAR-__

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

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Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

3.2 Guideline 7: Identify physical products, milestones, technical performance goals, or other indicators that will be used to measure progress.

Reviewer Name(s):

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

Each discrete activity identified in P3 has a defined technique for earned value measurement that enables performance assessment. Many of the activities use 50%/50% technique however there remains considerable amount using % complete that might not have enough objective completion criteria established.

<http://www-local.pppl.gov/EVMS/WORKPACK.pdf>

Recommendation that all of the remaining % complete activities be re-assessed for objective completion criteria in order to avoid the potential for subjective measurements being applied to BCWP, particularly in control accounts/activities that have substantial outstanding procurements associated with their ETCs.

CAR-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-___

Subject (Issue):

Re-Assess work packages/activities that use % Complete Earned Value Techniques to better provide objective completion criteria

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

3.3 Guideline 8: Establish and maintain a time-phased budget baseline, at the control account level, against which program performance can be measured. Initial budgets established for performance measurement will be based on either internal management goals or the external customer negotiated target cost including estimates for authorized but undefinitized work. Budget for far-term efforts may be held in higher level accounts until an appropriate time for allocation at the control account level. On government contracts, if an over-target baseline is used for performance measurement reporting purposes, prior notification must be provided to the customer.

Reviewer Name(s): Thomas Egebo

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

A resource loaded schedule at the work package level exists. Budgets are assigned to each individual P3 schedule activity and a performance plan for this work package is generated and the time phased BCWS priced in appropriate escalated dollars and is summarized with other Control accounts to generate the PMB.

<http://www-local.pppl.gov/EVMS/COBRA/INDEX.htm>

Detailed breakdowns of how resources were estimated for each P3 activity as well as priced out using PPPL Budget office provided rates. Standard CPR reports have been generated that include EV indices which allows performance to be measured at the control account for program performance.

<http://www-local.pppl.gov/EVMS/WAD/index.htm>

<http://www-local.pppl.gov/EVMS/Trends/INDEX.htm>

CAR-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

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Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

3.4 Guideline 9: Establish budgets for authorized work with identification of significant cost elements (labor, material, etc.) as needed for internal management and for control of subcontractors.

Reviewer Name(s): Thomas Egebo

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

It's clear that all appropriate labor, material, travel, subcontract etc...cost elements are included in the Control Account estimates and plans. Detailed cost estimates for labor (both in hours and dollars) and other expenses were provided and priced out using standard PPPL budgeted rates. The resultant output (cost and schedule with earned value techniques) is used to generate a work package budget for approval by the CAM and Project Manager for authorization. This allows internal management at the control account levels. A RAM was provided.

Details were reviewed and observed in the Work authorization documentation, which included resource loaded schedules and estimate details .

<http://www-local.pppl.gov/EVMS/WAD/index.htm>

CPRs reflect the Work authorizations documentation.

<http://www-local.pppl.gov/EVMS/COBRA/INDEX.htm>

CAR-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

3.5 Guideline 10: To the extent it is practicable to identify the authorized work in discrete work packages, establish budgets for this work in terms of dollars, hours, or other measurable units. Where the entire control account is not subdivided into work packages, identify the far term effort in larger planning packages for budget and scheduling purposes.

Reviewer Name(s): Thomas Egebo

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

The WBS and the OBS were used to support development of a RAM to assign responsibility for the NSTX-U cost accounts. Work in this cost account is clearly defined in the WBS and assigned to a single organizational element. Based on the WBS; detailed schedules were developed that included detailed cost estimates of each resource (both labor and non-labor). These detailed activities represent a sub-level of the work package. The effort in this work package is identified as discrete measurable units both in hours, dollars and other measurable units as appropriate.

Level of effort tasks are limited to those areas, typically management and oversight activities that don't lend themselves to measurable metrics, where appropriate. Work authorization documentation includes the control account plans with detailed breakdowns of dollars, hours and other measurable units.

<http://www-local.pppl.gov/EVMS/WAD/index.htm>

WBS and OBS are identified and defined in Project PEP.

<http://www-local.pppl.gov/EVMS/NSTXUPEP.PDF>

RAM identifies control accounts

<http://www-local.pppl.gov/EVMS/CAMNB/NSTXURAM.pdf>

CAR-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

3.6 Guideline 11: Provide that the sum of all work package budgets plus planning package budgets within a control account equals the control account budget.

Reviewer Name(s):

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

Detailed work packages are identified for each control account (and in almost all control accounts no planning packages). Work package resources and corresponding budgets are consistent with the detailed estimates by the CAM contained in their Work Approval Forms (WAFs). The sum of the work packages within the control account correspond to the work authorization documents. Control Account Plans exist and their totals correspond to the PMB.

<http://www-local.pppl.gov/EVMS/WAD/index.htm>

CAR-__

Subject (Issue):

Referenced Guideline(s):

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Description of Issue:

Recommendation:

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Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

3.7 Guideline 12: Identify and control level of effort activity by time-phased budgets established for this purpose. Only that effort which is unmeasurable or for which measurement is impracticable may be classified as level of effort.

Reviewer Name(s):

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

Multiple Control Accounts were reviewed. The Earned Value (EV) methodology for each activity involved in this work package is specified on the control account plan. Level of Effort activity within control accounts is held to minimal practical levels. Level of Effort work packages within control accounts are separately substantiated and budgeted on a time-phased basis for reporting purposes. Where level of effort and discrete work packages exist within the same control account the earned value technique (for each work package) is clearly identified.

<http://www-local.pppl.gov/EVMS/WORKPACK.pdf>

CAR-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

3.8 Guideline 13: Establish overhead budgets for each significant organizational component of the company for expenses which will become indirect costs. Reflect in the program budgets, at the appropriate level, the amounts in overhead pools that are planned to be allocated to the program as indirect costs.

Reviewer Name(s):

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

Indirect budgets have been established and used to price out the direct resources estimated for each activity in the work package to obtain fully loaded values. PPPL base cost burdening methodology was provided that specified how overheads were to be applied to each direct expense. A documented process for managing indirect costs is defined in the CAS disclosure statement.

CAR-__

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-__

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

3.9 Guideline 14: Identify management reserves and undistributed budget.

Reviewer Name(s):

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

The NSTX-U Project does not have any management reserve or undistributed budget identified. A Risk Management Plan for NSTX-U was developed to establish contingency levels for each Control account.

<http://www-local.pppl.gov/EVMS/RiskRegistry.pdf>

As defined in the Projects PEP the identified Contingency is managed by the PSO Federal Project Director and the PPPL Project Manager maintains a contingency tracking log. Changes that require the use of contingency are controlled through the NSTX-U Baseline Change Proposal Procedure.

<http://www-local.pppl.gov/EVMS/NSTXUPEP.PDF>

http://www-local.pppl.gov/EVMS/ECP/ecp_log.htm

CPR identifies PMB and Contingency:

http://www-local.pppl.gov/EVMS/COBRA/Oct12_CPRs_NSTXU.pdf

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Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

3.10 Guideline 15: Provide that the program target cost goal is reconciled with the sum of all internal program budgets and management reserves.

Reviewer Name(s):

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

Project Measurement Baseline (PMB) contains all control accounts and they sum up to the project management baseline and are clearly indicated in the CPRs.

http://www-local.pppl.gov/EVMS/COBRA/Oct12_CPRs_NSTXU.pdf

An Engineering Change Proposal (ECP) Log is maintained to address changes to the baseline consistent with the Project Control Process

<http://nstx->

[upgrade.pppl.gov/Engineering/Systems_Engineering/Project_Plans_and_Procedures/NSTXU_Procedures/PROC-001/NSTXU_PROC-001-01.pdf](http://nstx-upgrade.pppl.gov/Engineering/Systems_Engineering/Project_Plans_and_Procedures/NSTXU_Procedures/PROC-001/NSTXU_PROC-001-01.pdf)

http://www-local.pppl.gov/EVMS/ECP/ecp_log.htm

The CPR report that contains the Performance Measurement Baseline includes the sum of all Control accounts and clearly identifies the project contingency.

CAR-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

4.1 Guideline 16: Record direct costs in a manner consistent with the budgets in a formal system controlled by the general books of account.

Reviewer Name(s):

Compliant with ANSI/EAI-748: **Yes—List justification for compliance below.**

Observations and Findings (Justification for Compliance):

Reviewed PPPL budget manual (chapters 2 & 3) for procedures specific to opening cost accounts within the Business system, and the expense class definitions for direct costs. Reviewed PPPL's CAS disclosure statement (8/10/11) and chapters 9 & 10 of the PPPL Accounting manual to ascertain how direct costs are recorded on PPPL's GP business system. Project control account numbers are directly traceable to PPPL's business system, and direct costs are charged against these control accounts in appropriate expense classes. A trace for direct labor and direct material costs was performed for one control account from source documents (timesheet and invoice/accrual) into the GP business system job cost reports, then to Cobra. In addition, the Accounting division performs and documents a monthly reconciliation of project costs to GL costs prior to reporting financial results to DOE via STARS.

CAR-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO

4.2 Guideline 17: When a work breakdown structure is used, summarize direct costs from control accounts into the work breakdown structure without allocation of a single control account to two or more work breakdown structure elements.

Reviewer Name(s):

Compliant with ANSI/EAI-748: **Yes—List justification for compliance below.**

Observations and Findings (Justification for Compliance):

The PEP document was reviewed, in particular Appendix 1, the NSTX-U WBS. The work breakdown structure was reviewed to determine that no cost account is rolled up to more than one WBS element. The cost collection account structure and authorized setup was reviewed in the PPPL Budget and the PPPL Accounting manual. A trace was performed on two of the WBS elements, WBS 1.8 (control accounts 8200, 8210, 8250) and WBS 1.4 (control accounts 4100 and 4500). The trace was done from the current month cost in the CPR report back to the job cost reports from the financial system, and also from the CPRs to the PARS II data submitted. No discrepancies were observed.

CAR-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

4.3 Guideline 18: Summarize direct costs from the control accounts into the contractor’s organizational elements without allocation of a single control account to two or more organizational elements.

Reviewer Name(s):

Compliant with ANSI/EAI-748: **Yes—List justification for compliance below.**

Observations and Findings (Justification for Compliance):

Documents reviewed: WBS appendix in the PEP, Responsibility assignment matrix (RAM), online CAM notebook, item 4, Organizational breakdown structure (OBS) , online CAM notebook, item 3, online CPR reports – CAM notebook, item 11. Direct costs are collected in individual cost accounts which are then summarized to the WBS through the OBS without being divided at any level among two or more elements.

CAR-__

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-__

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

4.4 Guideline 19: Record all indirect costs which will be allocated to the project.

Reviewer Name(s):

Compliant with ANSI/EAI-748: **Yes—List justification for compliance below.**

Observations and Findings (Justification for Compliance):

Reviewed the PPPL Budget manual, PPPL's Cost accounting disclosure statement dated 8/10/11. Revisions to the CAS statement are approved by the CFO and by DOE Contracting Officer. All indirect and allocated cost pools are identified in the CAS and Budget Manual, as well as the method(s) of distributing the costs to the final benefitting cost objectives. A formal review of the indirect rates takes place during the laboratory ETC exercise (during the last quarter of the FY) whereby all indirect and allocated cost pools are reviewed, and again at fiscal year end. All indirect rates are adjusted and reported as actuals at fiscal year end. A trace was performed on two control accounts; one for labor and one for materials; this trace confirmed that indirect costs are applied as defined by PPPL's CAS disclosure statement.

CAR-__

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-__

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

4.5 Guideline 20: Identify unit costs, equivalent unit costs, or lot costs when needed.

Reviewer Name(s):

Compliant with ANSI/EAI-748: **Yes—List justification for compliance below.**

Observations and Findings (Justification for Compliance):

Guideline 20 applies to the manufacture of units and the measurement of unit or lot cost. Since PPPL is not a manufacturing facility and does not produce quantities of units or lots for customers, this guideline does not apply.

CAR-__

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-__

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

- 4.6 Guideline 21: For EVMS, the material accounting system will provide for:**
- **Accurate cost accumulation and assignment of costs to control accounts in a manner consistent with the budgets using recognized, acceptable, costing techniques.**
 - **Cost performance measurement at the point in time most suitable for the category of material involved, but no earlier than the time of progress payments or actual receipt of material.**
 - **Full accountability of all material purchased for the project including the residual inventory.**

Reviewer Name(s):

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

Three accounting traces were performed to validate that EV for material purchases is being taken 1) according to an appropriate EV method for the material and 2) that EV is not being taken prior to actual receipt of goods.

- The first trace, in control account 1200, schedule line 1201-0048B, is for the TF Outer Leg weldments. This is a procurement, valued at \$145k in the resource loaded schedule. The baseline schedule start/finish for this item is 15-Oct-12 to 15-Oct-12, and the EV method utilized for this line item is 0-100. October's Cobra data shows that all of the BCWS has been recognized, but none of the ACWP or BCWP. This procurement was placed with Carolina Fabricators, under a BPA agreement. Further review of this BPA indicates that delivery was required by 22-Oct-12, but now the vendor has agreed to a series of scheduled deliveries commencing 30-Nov-12 and ending approximately six weeks later.
- Issues noted: the EV method of 0-100 is not appropriate for this procurement, since the project has knowledge of a series of scheduled deliveries. In addition, recognizing all of the BCWS in October gives this line item a negative schedule variance to be rolled up to control account 1200. Regarding the matching of cost recognition in the Accounting system (ACWP) against the BCWP, BPAs are not recorded as a cost in the accounting system (per PPPL accounting manual) until a bill is paid. These costs will most likely begin with the deliveries and commence in February 2013. Delivery of the final part is scheduled for early January 2013, therefore the recording of BCWP may not coincide with the recording of ACWP, leading to an incorrect positive cost variance, and removal of the negative schedule variance.
- The second trace, in control account 4100, schedule line 4100-0042, is for the procurement of coils with mandrels. This line item is valued at \$120k in the resource loaded schedule. The baseline schedule start/finish for this line item is 6-Jun-12 to 10-Dec-12, and the EV method utilized for this line item is % complete. This line item is Closed, and the actual dates are listed as 2-Jul-12 to 12-Jul-12. October's Cobra data shows that this line item is 100% complete, with all of the BCWP recognized, \$95k of BCWS, and \$20k of BCWS. The ACWP was recognized in the Accounting system with deliveries (receipt transactions) in June 2012 and September 2012 for two purchase orders. Review of the data recorded earlier for the EV shows that this line item was recorded at 100% complete in July-2012, even though final receipt was made in Sept-2012.
- Issues noted: the EV method of % complete was not appropriate for these procurements, since the purchase order cost is recorded upon receipt of the delivered goods; 0-100 would be more appropriate. In addition, BCWP was all earned by the project in July, two months earlier than the actual date of final receipt of goods.
- The third trace, in control account 1305, schedule line 1305-0950, is for the manufacture of OH copper conductor. This is a procurement, valued at \$139k in the resource loaded schedule. The baseline start/finish for this item is 2-Oct-12 to 18-Jan-13, the actual start/finish dates are 01-Dec-11 to 25-May-12, and the EV method is 50-50 for this procurement. This line item is closed. October's cobra data shows that this line item is 100% completed, with all of the BCWP recognized, and approximately ¼ of the BCWS recognized. Delivery of product was reflected in the accounting

system with a receipt entry in May, 2012. Review of the EV system yielded that full BCWP credit was taken in May, 2012. This is an example of an item that was procured early by the project, and the cost appears to have been matched correctly with the BCWP.

- Issues noted: the EV method of 50-50 is not the most appropriate method for a purchase order with costs being recognized only upon delivery. 0-100 would be more appropriate here. Also, the EV system is calculating a recognized BCWS of \$38k in the October 2012 period. If the EV system is working from the baseline start date, the BCWS should show as \$69k in October 2012.

CAR-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-1

Subject (Issue): EV methods are inconsistent across the same types of orders.

Referenced Guideline(s):7, 8, 21

Referenced Data Trace: see above

Description of Issue: see above

Recommendation: Recommend the project perform a forward-looking review of procurements and the EV methods associated with them. The purpose of this review will be to apply EV in a consistent manner for similar types of procurements.

CIO-2

Subject (Issue): EV being taken prior to the receipt of goods.

Referenced Guideline(s):7, 8, 21

Referenced Data Trace: see above

Description of Issue: see above

Recommendation: Recommend the project have additional training for the CAMs on how costs are recognized in the business system for purposes of matching to their reported BCWP. Examples should be shown for each type of procurement. If the project develops a standard EV format going forward for each procurement type, that should be rolled into the training also.

5.1 Guideline 22: At least on a monthly basis, generate the following information at the control account and other levels as necessary for management control using actual cost data from, or reconcilable with, the accounting system:

- **Comparison of the amount of planned budget and the amount of budget earned for work accomplished. This comparison provides the schedule variance.**
- **Comparison of the amount of the budget earned and the actual (applied where appropriate) direct costs for the same work. This comparison provides the cost variance.**

Reviewer Name(s): Thomas Egebo

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

On a monthly basis CPR reports are generated at the control account level and includes comparisons of planned budget vs. budget earned for work accomplished and schedule variances are identified.

Also on a monthly basis in the CPR budget earned for work accomplished is compared to the actual cost for that work and this comparison provides the cost variance at the control account level.

<http://www-local.ppppl.gov/EVMS/COBRA/INDEX.htm>

Variances are highlighted at the control account levels and CAMS are required to prepare VARs consistent with the PEP requirements.

CAR-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

5.2 Guideline 23: Identify, at least monthly, the significant differences between both planned and actual schedule performance and planned and actual cost performance, and provide the reasons for the variances in the detail needed by program management.

Reviewer Name(s): Thomas Egebo

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

On a monthly basis differences between the planned and actual schedule performance and the actual schedule performance and the actual costs incurred are identified at the control account in terms of SV (schedule variance) and CV (cost variance). This data is accessible in the monthly CPRs.

<http://www-local.pppl.gov/EVMS/COBRA/INDEX.htm>

Variance analyses are prepared on a monthly basis consistent with the variance thresholds included in the PEP:

<http://www-local.pppl.gov/EVMS/NSTXUPEP.PDF>

Variance analyses are prepared by the CAMs as required in the PEP and approved by the Project Manager

<http://www-local.pppl.gov/EVMS/VARIANCE/INDEX.htm>

Variance reports are uploaded to PARS II consistent with the variance threshold identified in the PEP.

CAR-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-___

Subject (Issue):

The variance reports that were reviewed can be improved with better attention paid to the corrective actions identified and by keeping a log of the corrective actions so that it can be used to insure implementation in a timely manner.

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

5.3 Guideline 24: Identify budgeted and applied (or actual) indirect costs at the level and frequency needed by management for effective control, along with the reasons for any significant variances.

Reviewer Name(s): Thomas Egebo

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

The PMB was established at CD-2 in December 2010 utilizing indirect rates established by the PPPL budget office, consistent with the laboratories CAS disclosure statement. Actual applied indirect costs are identified by the PPPL budget office and used by the NSTX-U project (via the actual costs incurred) for comparison to actual work performed. Indirect costs are reported monthly and variances caused by indirect rates can be identified. In addition the indirect analysis and the resulting forward pricing indirect rates is used by the NSTX-U project to forecast their EACs.

CAR-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-___

Subject (Issue):

The NSTX-U project should consider documenting the indirect variance to the PMB based on the actual rates incurred to date plus the revised forward pricing rates being used in their EACs

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

5.4 Guideline 25: Summarize the data elements and associated variances through the program organization and/or work breakdown structure to support management needs and any customer reporting specified in the project.

Reviewer Name(s): Thomas Egebo

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

Cost and schedule performance reports are generated on a monthly basis:

<http://www-local.pppl.gov/EVMS/COBRA/INDEX.htm>

<http://www-local.pppl.gov/EVMS/SCHED/INDEX.htm>

Data elements and associated variances are summarized at the control account level up through the WBS and OBS. Written analysis reports are generated if thresholds identified in the PEP are exceeded.

<http://www-local.pppl.gov/EVMS/VARIANCE/INDEX.htm>

CAR-__

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-__

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

5.5 Guideline 26: Implement managerial action taken as the result of earned value information.

Reviewer Name(s):

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

Daily meetings are held with construction staff and the engineering team to discuss daily work plans. Weekly meetings are held to go over schedule performance. Monthly meetings are held to review monthly performance and highlight variances. Variances are reported on a monthly basis:

<http://www-local.pppl.gov/EVMS/VARIANCE/INDEX.htm>

PPPL and DOE management is kept informed of project progress via independent Project Status review Board meetings which are held by the laboratory where NSTX-U EV data is presented to laboratory Deputy Director of Operations In addition monthly IPT meetings are held where EV data is presented.

The NSTX-U project maintains a risk registry:

<http://www-local.pppl.gov/EVMS/RiskRegistry.pdf>

CAR-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-___

Subject (Issue):

Corrective actions that are identified are not formally maintained. NSTX CS manager should be auctioned to develop corrective action plan log to formalize implementation of managerial actions identified.

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

5.6 Guideline 27: Develop revised estimates of cost at completion based on performance to date, commitment values for material, and estimates of future conditions. Compare this information with the performance measurement baseline to identify variances at completion important to company management and any applicable customer reporting requirements including statements of funding requirements.

Reviewer Name(s): Thomas Egebo

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

The EAC is updated on a monthly basis and includes unrecoverable cost variances and approved changes (per the ECP process). A documented process exists for CAMS to provide monthly updates to their EACs. In addition the NSTX-U project performs bottoms up EACs every 6 months. EAC results are contained in the monthly CPR data communicated to laboratory management and DOE:

<http://www-local.pppl.gov/EVMS/COBRA/INDEX.htm>

CAR-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-___

Subject (Issue):

Some of the CAMs were not clear on how and why they do monthly EACs.

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

6.1 Guideline 28: Incorporate authorized changes in a timely manner, recording the effects of such changes in the budgets and schedules. In the directed effort prior to negotiation of a change, base such revisions on the amount estimated and budgeted to the program organizations.

Reviewer Name(s): Thomas Egebo

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

The NSTX-U Project change control process ensures that changes to the NSTX Upgrade Project design and requirements are properly identified, screened, evaluated, implemented, and documented. A formal procedure has been established to implement the process of change classification and submittal of supporting documentation.

<http://www-local.pppl.gov/EVMS/CAMNB/ECP%20Instructions.pdf>

Once an Engineering Change Proposal (ECP) has been prepared, and the impacts fully documented, the ECP is forwarded to the project Change Control Board (CCB) that is comprised of senior members of the NSTX Upgrade Project management team. The NSTX Upgrade Project Manager or his designee chair the CCB. Once a proposed change is approved, the project implements the change in a timely manner. An updated list of approved, disapproved, and pending changes is be maintained electronically on the NSTX Upgrade Project web site.

http://www-local.pppl.gov/EVMS/ECP/ecp_log.htm

A revised work authorization document is issued indicating the impact of the change and the PMB (resource loaded schedule, control accounts, WBS dictionary etc...) is updated accordingly.

CAR-__

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-__

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

6.2 Guideline 29: Reconcile current budgets to prior budgets in terms of changes to the authorized work and internal replanning in the detail needed by management for effective control.

Reviewer Name(s): Thomas Egebo

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

The NSTX-U project incorporates approved changes (ECPs) into the PMB in a timely manner, updating budgets accordingly. An ECP log documents the approved changes:

http://www-local.pppl.gov/EVMS/ECP/ecp_log.htm

Work authorization documents are updated and issued to formalize the baseline change/authorization and include, the ECP number that is implemented; implementation date; prior budget; new budget; and appropriate approval/signoff levels.

http://www-local.pppl.gov/EVMS/WAD/1305_WAD_ALL.pdf

CAR-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

6.3 Guideline 30: Control retroactive changes to records pertaining to work performed that would change previously reported amounts for actual costs, earned value, or budgets. Adjustments should be made only for correction of errors, routine accounting adjustments, effects of customer or management directed changes, or to improve the baseline integrity and accuracy of performance measurement data.

Reviewer Name(s): Thomas Egebo

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

The project does not allow retroactive changes to reported earned value. Changes to actual costs reported are only allowed for correction of errors and they are not made retroactive, but only in the current reporting period and are only allowed in accordance with PPPL budget office and accounting office policies (i.e., the RFBA process).

CAR-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

6.4 Guideline 31: Prevent revisions to the program budget except for authorized changes.

Reviewer Name(s): Thomas Egebo

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

All changes to the NSTX-U program budget strictly follow the change control process in accordance with the thresholds identified in the PEP:

<http://www-local.pppl.gov/EVMS/NSTXUPEP.PDF>

The NSTX-U Project change control process ensures that changes to the NSTX Upgrade Project design and requirements are properly identified, screened, evaluated, implemented, and documented. A formal procedure has been established to implement the process of change classification and submittal of supporting documentation.

<http://www-local.pppl.gov/EVMS/CAMNB/ECP%20Instructions.pdf>

Once an Engineering Change Proposal (ECP) has been prepared, and the impacts fully documented, the ECP is forwarded to the project Change Control Board (CCB) that is comprised of senior members of the NSTX Upgrade Project management team. The NSTX Upgrade Project Manager or his designee chair the CCB. Once a proposed change is approved, the project implements the change in a timely manner. An updated list of approved, disapproved, and pending changes is be maintained electronically on the NSTX Upgrade Project web site.

http://www-local.pppl.gov/EVMS/ECP/ecp_log.htm

A revised work authorization document is issued indicating the impact of the change and the PMB (resource loaded schedule, control accounts, WBS dictionary etc...) is updated accordingly.

CAR-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-___

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

6.5 Guideline 32: Document changes to the performance measurement baseline.

Reviewer Name(s): Thomas Egebo

Compliant with ANSI/EAI-748: **Yes**

Observations and Findings (Justification for Compliance):

All changes to the NSTX-U program budget strictly follow the change control process in accordance with the thresholds identified in the PEP:

<http://www-local.pppl.gov/EVMS/NSTXUPEP.PDF>

An updated list of approved, disapproved, and pending changes is be maintained electronically on the NSTX Upgrade Project web site.

http://www-local.pppl.gov/EVMS/ECP/ecp_log.htm

A revised work authorization document is issued indicating the impact of the change and the PMB (resource loaded schedule, control accounts, WBS dictionary etc...) is updated accordingly.

CAR-__

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

CIO-__

Subject (Issue):

Referenced Guideline(s):

Referenced Data Trace:

Description of Issue:

Recommendation:

This report is submitted to the NSTX-U Project Manager and the Head of the Office of Project Management by:

Thomas Egebo – (PPPL Division Head Planning & Control)

Margaret Carideo – (PPPL Planning & Control – ITER & Tokamaks)

Stanford E. (Skip) Schoen – (PPPL Planning & Control – ITER Fabrication)

Alfred von Halle – (PPPL Engineering & Infrastructure – Division Head – Electrical)