

and Problem Analysis

CONTRACT PERFORMANCE REPORT FORMAT 5 - Explanations and Problem Analysis				FORM APPROVED OMB No. 0704-0188
<b>1. CONTRACTOR</b>		<b>2. CONTRACT</b>		<b>3. PROGRAM</b>
a. NAME Princeton University-Plasma Physics Lab		a. NAME DOE-SC-OFES-NSTX Upgrade		a. NAME NSTX Upgrade Project
b. LOCATION (Address and ZIP Code) Princeton, New Jersey		b. NUMBER DE-AC02-09CH11466		b. PHASE CD-3
c. TYPE M&O		d. SHARE RATIO		c. EVMS ACCEPTANCE No X Yes (YYYYMMDDI 2011 / 12 / 20)
				4. REPORT PERIOD a. FROM (YYYYMMDD) 2012 / 05 / 01 b. TO (YYYYMMDD) 2012 / 05 / 31

**5. Evaluation**

**1. 1/1200 STRUCTURES & SUPPORT**

	Budget	Earned	Actuals	SV in \$	SV in %	CV in \$	CV in %	SPI	CPI
Cumulative:	2,295	2,938	3,462	643	28%	-524	-18%	1.28	0.85
At Complete:	3,554	4,222	-668	-19%	6.71	0.81			

**Explanation of Variance/Description of Problem:**

- (1) Analysis, design validation, and documentation efforts were underestimated. Some documentation was incomplete or lacking detail. These necessitate additional man-hours for analysis and design finalization.
- (2) Man-hour crossover with title 3 engineering has occurred: (a) due to machine access field data/measurements, (b) Feedback received from vendors/fabrication. These produced design modifications.
- (3) CAD models and detailed drawings required rework - (a) per PPPL procedures (b) due to model functionality: These required additional designer man-hours.
- (4) Individuals working on multiple, simultaneous, and unrelated tasks produced rework and efficiency. These required additional engineering and designer man-hours.

**Impact:**

Cost and schedule variances until the design efforts are completed.

**Corrective Action:**

Stop all EAEM charges to this account. Complete validation and documentation with minimal support from EAEM group. Where applicable, use conservative judgment and/or prior experience to facilitate design finalization, documentation, and procurements. Ensure all title 3 efforts are clearly defined and charged accordingly. Reduce the number of unrelated activities being worked on.

**Monthly Summary (to include technical causes of VARs, Impacts) and Corrective Action(s):**

Underestimation of Analysis effort, rework, and inefficiencies have led to a negative cost variance in this Control Account. Reduction of Analysis labor to the bare minimum will allow the negative variance from worsening.

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Date: 6/26/12

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5. Evaluation

1304 Inner TF Bundle

	Budget	Earned	Actuals	SV in \$	SV in %	CV in \$	CV in %	SPI	CPI
Cumulative:	1,622	1,523	1,780	-99	-6%	-257	-17%	0.94	0.86
	BAC	EAC	VAC in \$	VAC in %	TCPI to BAC	TCPI to EAC			
At Complete:	3,430	3,687	-257	-7%	1.16	1.00			

Explanation of Variance/Description of Problem:

It appears that all the costs for soldering the production conductors was charged against 1304 instead of 1305. Only developmental soldering tasks were to be charged on 1304. The development time for the soldering operations have greatly exceeded the planning budgets. The more elaborate heating and control systems was costly. This includes the installation of a new air handling system for the soldering operations. Additional costs for straightening the TF conductors was also a contributing factor.

Impact:

The delay in receipt of TF conductors form Major Tool/EWI will have a project schedule impact. The soldering development and learning times were quite long but are not contributing to delay in schedule since TF conductors were delayed.

Corrective Action:

Hours charged against 1304 for soldering will be transferred to 1305. Memo was sent to personnel that were charging this number to make corrections for future charges. Soldering plans and procedures have been finalized and ready for production.

*UNDERSTAND BETTER AND CONTROL LABOR CHARGES.*

*ERP 39 TO REFLECT INCREASED OVERSIGHT TIME.*

*PERFORM BOTTOMS UP ESTIMATE, REVIEW, AND PROCESS ERP IF WARRANTED*

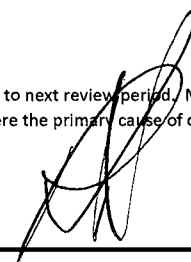
Monthly Summary (to include technical causes of VARs, Impacts) and Corrective Action(s):

Costs associated with soldering operations were incorrectly charged to 1304. They should have been charged to 1305. Charges will be corrected prior to next review period. Memo was sent to individuals who were incorrectly charging 1304. The new soldering system and soldering materials contibuted to the additional costs. Outside soldering consultant and development of soldering system were the primary cause of cost overruns.

Prepared by:  
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6/25/2012

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Date:

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5. Evaluation

1305 Ohmic Heating Coil

	Budget	Earned	Actuals	SV in \$	SV in %	CV in \$	CV in %	SPI	CPI
Cumulative:	2,760	2,993	3,793	233	8%	-800	-27%	1.08	0.79
	BAC	EAC	VAC in \$	VAC in %	TCPI to BAC	TCPI to EAC			
At Complete:	5,203	6,003	-800	-15%	1.57	1.00			

**Explanation of Variance/Description of Problem:**  
1305 covers not only the OH, but also the TF fabrication as well as all tooling and setup costs. Over costs were due to a number of activities. The coil manufacturing team (4) technicians have not been in production mode and their time was used doing some preparations and not efficiently productive toward the milestones. Other over run costs were tooling and cyanate resin that have exceeded the original budget. Additional lifting beams and transport cart had to be fabricated. Additional engineering costs to support activities were also not covered.

**Impact:**  
There is an impact to the overall schedule with the delay in receipt of TF conductors (1304). Once conductors begin to routinely arrive spending should be more consistent with plans.

**Corrective Action:**  
Tighter control of costing will have to be implemented.

*PROCESSED ECP-39 TO REFLECT INCREASED OVERSIGHT & SOLDERING TIME*  
*PERFORM BOTTOMS UP ESTIMATE OF FUTURE WORK, REVIEW, AND PROCESS ECP IF WARRANTED*

**Monthly Summary (to include technical causes of VARs, Impacts) and Corrective Action(s):**  
Costs to date have exceeded the initial estimates. Over runs in tooling and epoxy materials have contributed. In addition the ineffective use of technicians with the delay in TF conductors have also been a factor. Additional engineering support was needed to complete all of the preparations needed for production.

Prepared by: James H. Chrzanowski Date: 6/25/2012  
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(YYYYMMDI

2011 / 12 / 20

5. Evaluation

27/306 Inner PF coils

	Budget	Earned	Actuals	SV in \$	SV in %	CV in \$	CV in %	SPI	CPI
Cumulative:	404	265	387	-138	-34%	-122	-46%	0.66	0.68
	BAC	EAC	VAC in \$	VAC in %	TCPI to BAC	TCPI to EAC			
At Complete:	669	791	-123	-18%	1.44	1.00			

Explanation of Variance/Description of Problem:

Cost and schedule over runs are due to significant redesign of all (3) PF coil structures based on the latest analysis reports. This required additional Cad Design time.

*ANALYSIS*  
1

Impact:

None- coils are not to be procured until FY13.

Corrective Action:

Redesigns have been completed and drawings are being reviewed for final signoff.

Monthly Summary (to include technical causes of VARs, Impacts) and Corrective Action(s):

Due to the latest analysis reports, the support structures that surrounds and supports the Inner PF coils had to be redesigned. This involved a significant amount of cad designer time and efforts. The drawing have been finalized and are ready for approval. No impact on schedule since these coils are ot scheduled to be procured until FY13.

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6/22/2012

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5. Evaluation

1.1 / 1307 CS Casing Assembly

	Budget	Earned	Actuals	SV in \$	SV in %	CV in \$	CV in %	SPI	CPI
Cumulative:	613	600	786	-12	-2%	-186	-31%	0.98	0.76
	BAC	EAC	VAC in \$	VAC in %	TCPI to BAC	TCPI to EAC			
At Complete:	1,322	1,508	-186	-14%	1.35	1.00			

Explanation of Variance/Description of Problem:

The costs that were generated to oversee the contract with Martinez to fabricate the CS Casing were charged against 1307 instead of 1300 where all engineering oversight charges are captured.

Impact:

No impact

Corrective Action:

Future oversight charges will be charges to 1300.

*PROCESSED - 39 TO REFLECT INCREASED OVERSIGHT COST (WHICH NOW WILL BE CHANGED TO CA) 1300*

Monthly Summary (to include technical causes of VARs, Impacts) and Corrective Action(s):

The cost overrun was due to the engineering oversight charges for the fabrication of the CS casing being charged against the wrong charge number. All oversight charges should be charges to 1300. These cost will need to be moved to the 1300 job.

Prepared by:

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6/22/2012


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<b>5. Evaluation</b>										
13 / 3200 Water Cooling System Mods										
		Budget	Earned	Actuals	SV in \$	SV in %	CV in \$	CV in %	SPI	CPI
Cumulative:		74	68	38	-6	-8%	30	30%	0.92	
		BAC	EAC	VAC in \$	VAC in %	TCPI to BAC	TCPI to EAC			
At Complete:		195	182	14	7%	0.81	0.88			
<b>Explanation of Variance/Description of Problem:</b> Positive cost variance due the fact that the original design assumed replacement of water pumps; however, pump replacement was not necessary which led to less time being required for design.										
<b>Impact:</b> Other than the cost savings to the project there are no impacts.										
<b>Corrective Action:</b> No corrective action required at this time.										
<b>Monthly Summary (to include technical causes of VARs, Impacts) and Corrective Action(s):</b> A positive cost variance has been realized due to savings in system design. There are no corrective actions required at this time.										
<b>Prepared by:</b> MARTIN DENAULT		Digitally signed by MARTIN DENAULT DN: cn=MARTIN DENAULT, o=PPPL, ou=WELDING, email=mdenaull@pppl.gov, c=US Date: 2012.06.13 17:08:46 -04'00'			<b>Date:</b>		<b>Approved by:</b> 		<b>Date:</b> 6/26/12	

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**5. Evaluation**

	Budget	Earned	Actuals	SV in \$	SV in %	CV in \$	CV in %	SPI	CPI
Cumulative:	5	55	39	50	1050%	15	8%	11.50	139
At Complete:	79	64	15	19%	0.61	0.98			

**Explanation of Variance/Description of Problem:**  
The bakeout power supply was budgeted for \$50K; however, the supply was procured for \$33K yielding a significant savings and leading to a positive cost variance.

**Impact:**  
No impact other than the cost savings to the project.

**Corrective Action:**  
No corrective action required at this time for this positive variance.

**Monthly Summary (to include technical causes of VARs, Impacts) and Corrective Action(s):**  
Bake out supply has been procured well below the budget cost leading to a positive cost variance.

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**5. Evaluation**

**1.4 / 4500 MPTS WV MODIFICATION**

	Budget	Earned	Actuals	SV in \$	SV in %	CV in \$	CV %	SPI	CPI
Cumulative:	818	653	903	-164	-20%	-250	-38%	0.80	0.72
At Complete:	949	1,276	-327	-34%	6.44	0.79			

**Explanation of Variance/Description of Problem:**

The variance and description of problem remains the same as defined in the April 2012 version. The current variance includes more time used to produce the detail drawings than estimated which are not completed yet. In addition it was found necessary to design a fixture for the brazing step and eventual welding of diagnostic ports on the Bay L cap. Also added is the design of a vertically adjustable fixture to support the Bay L cap during installation. The overhead crane cannot provide this function.

**Impact:**

The cost and schedule variance has increased so that the current EAC=\$1300K. The Bay L cap and Bay FG plug fabrication is estimated to be completed in the August 2012 time frame with a month needed to clean and helium leak check both items. The installation of the NB 2 may impact the installation dates of the Bay L cap.

**Corrective Action:**

The priority for machining the Bay L cap has been upgraded in the PPPL machine shops. Machining has begun with a partial detail drawings issue.

*PERFORM BOTTOMS UP ESTIMATE OF FUTURE WORK AND PROCESS ECP IF NECESSARY*

**Monthly Summary (to include technical causes of VARs, Impacts) and Corrective Action(s):**

The variances prior to May 2012 cannot be remedied. The underlying cause was expansion of scope and a very over constrained design. The current cost variance is due to difficulty in fabrication and installation of Bay L, requiring fixtures to be designed and fabricated.

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