

<b>SUBJECT:</b>	<b>FERMI RESEARCH ALLIANCE PROCEDURES PROJECT MANAGEMENT</b>	<b>NUMBER:</b>	12.PM-006
<b>RESPONSIBILITY:</b>	Office of Project Management Oversight	<b>REVISION:</b>	<u>54</u>
<b>APPROVED BY:</b>	Head, Office of Project Management Oversight	<b>EFFECTIVE:</b>	<u>03/09/12</u> <del>09/17/09</del>
<b>TITLE</b>	<b>Monthly Status Reporting</b>		

DRAFT FOR DISCUSSION

**1.0 PURPOSE**

This procedure defines the methods used to measure schedule progress on a monthly basis and report the actual performance compared to planned performance for a given period. This information is used to provide various reports required by management, the project, and the customer to manage projects, including those required to use the *FRA Earned Value Management System*.

**2.0 SCOPE**

This procedure describes the implementation of Earned Value Management for monthly status reporting and analysis. The monthly reporting process describes the project's method of reporting variances in cost and schedule. Internal and external reports will include comparison of the actual costs and work accomplished to the planned value of the work, derived from baseline plans generated during the planning and budgeting phase. Forecasts of future costs and schedule dates will be made, and corrective actions initiated when problems are identified.

Some projects may include labor effort at \$0 cost, if directed to do so by the customer. In order to do earned value management on this effort, analysis and reporting will be performed on hours for those resources. In the accounting system, actual hours for those resources will be accumulated at the chargeable task code level and brought into the cost processor. In the processes described in this procedure, the term "costs" will generally refer to both dollar costs and hours.

**3.0 RESPONSIBILITIES**

**3.1 Project Manager (PM) is responsible for**

- Reviewing variance reports and providing acceptance or required corrective action
- Reviewing and approving monthly status report draft
- Monitoring corrective action on a monthly basis
- Requesting the CAMs to develop a detailed, bottoms-up estimate for the remaining work to establish a new Estimate to Complete (ETC) for each Control Account (CA) and to establish a new Estimate at Completion (EAC) on at least a annual basis.
- Preparing and submitting a project Monthly Status Report (MSR) to the Customer and FRA Management
- Coordination and presentation of information at the monthly Project Management Group (PMG) meetings

**3.2 Project Controls (PC) is responsible for**

- Retrieving information from financial management system
- Requesting monthly status updates from CAMs
- Integrating the Resource Loaded Schedule (RLS) status information with actual costs and preparing earned value reports
- Preparing performance reports and distributing to CAMS
- Assisting PM to prepare and publish monthly status report

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- Analyzing ETC submitted by the CAMs
- Preparing and submitting a draft of project monthly status report to Project Manager for review and inclusion in monthly status report (MSR)
- Preparing and submitting monthly accruals to accounting

**3.3 Control Account Manager (CAM) is responsible for**

- Providing progress information to PC staff for input to the RLS for the monthly report
- Providing narrative input for monthly status report
- Analyzing cost and schedule variances
- Preparing variance reports and required corrective action plans
- Monitoring and reporting corrective action on a monthly basis
- Evaluate and update ETC when required

**4.0 PROCEDURE**

The sequence of activities involved in this procedure is illustrated in Appendix C. The sequential action steps are described in this section.

**4.1 Monthly Status Report Development**

The RLS for the Performance Measurement Baseline (PMB) shall be stated by the control account managers (CAM) for each reporting period, using objective measures, also known as performance measurement techniques. Once the RLS is stated, the information is used to calculate the Budgeted Cost of Work Performed (BCWP or earned value).

Project Controls downloads the current period's actual costs from the Fermilab financial management system and integrates it with schedule status information using the cost processor tool. Project Controls runs earned value reports, comparing actual costs on these reports to the reports generated from Fermilab financial management system, reconciling the project costs to the accounting system.

Finally, Project Controls prepares the cost performance reports (CPR) that are included in the monthly report provided to the Project Manager and CAMs for review and approval. The standard CPR formats shall be used. At a minimum, CPR1 at the control account level shall be produced for each accounting period. Other CPRs may be used as determined by the project manager, senior management, and the customer. See Appendix D for sample forms.

**4.2 CAM Variance Review and Analysis**

Project Controls provides cost performance reports to the CAMs showing status and variances for their assigned CAs, including both direct and indirect costs. The CAMs are to review the data in the CPRs for their CAs to assess actual progress and costs incurred compared to the baseline plan. The CAMs are to identify and analyze significant cost and schedule variances.

If variances exceed the defined thresholds, then the CAMs evaluate the variances, ascertain the cause and impact, and if required, propose corrective action to minimize any

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negative impact to the project. Variances may be related to direct costs, indirect costs, milestone float, or even a combination. Although the project does not control indirect costs, they should still be analyzed, reported, and monitored so that corrective actions may be taken and the impact to the Total Project Cost tracked on an ongoing basis.

The Variance Analysis Reporting thresholds are defined as the Red Thresholds in the table in section 4.3. The CAM is to prepare a Variance Analysis Report (VAR) when these thresholds have been triggered and submits the report to the Project Manager for review and acceptance (see CPR5 in Appendix D). After accepting the analysis, the Project Manager (or designee) will note any required corrective action on the Corrective Action Log (Appendix E). The corrective action log status shall be monitored and updated when necessary, at least on a monthly basis until the action is closed.

Variances shall be discussed at a monthly project meeting, so that corrective actions may be coordinated between the CAMs.

Schedule variances for in-kind work shall be reported in the monthly reports.

**4.3 Management Variance Analysis Report and Thresholds**

For management purposes a color-coded variance threshold report at the Control Account level will be produced by Project Controls for each reporting period. This report gives a more visual indication where management may need to concentrate their efforts in managing the project (see example in Appendix F).

The thresholds to be used in this report are color-coded as Green, Yellow or Red.

Green variances are small and may not warrant any actions.

Yellow variances are considered a warning that in future reporting periods the variance could trend into the red threshold range. These variances shall be analyzed to determine if corrective actions are required.

Red variances are considered significant. Red variances require Variance Analysis Reports to be generated per section 4.2 of this procedure.

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The threshold limits for each of the color-coded thresholds are noted in the following table.

<b>Variance Analysis Thresholds for Control Accounts</b>		
<b>Green Thresholds – Cost and Schedule Performance falling outside of yellow or red thresholds</b>		
<b>Yellow Thresholds</b>		
<b>Cost Variance Schedule Variance</b>	<b>Type</b>	<b>Threshold limit</b>
<b>Dollars</b>	Current Period	$\geq \pm 5\%$ to $< \pm 10\%$ and $\geq \$50K$
	Cumulative	$\geq \pm 5\%$ to $< \pm 10\%$ and $\geq \$100K$
<b>Hours</b>	Current Period	$\geq \pm 5\%$ to $< \pm 10\%$ and $\geq 350$ hrs
	Cumulative	$\geq \pm 5\%$ to $< \pm 10\%$ and $\geq 700$ hrs
<b>Red Thresholds</b>		
<b>Cost Variance Schedule Variance</b>	<b>Type</b>	<b>Threshold limit</b>
<b>Dollars</b>	Current Period	$\geq \pm 10\%$ and $\geq \$100K$
	Cumulative	$\geq \pm 10\%$ and $\geq \$200K$
<b>Hours</b>	Current Period	$\geq \pm 10\%$ and $\geq 700$ hrs
	Cumulative	$\geq \pm 10\%$ and $\geq 1400$ hrs

Note: This applies to SV% (Schedule Variance in %) or CV% (Cost Variance in %) and the SV or CV in \$ or hours.

The thresholds in the table above are the default project variance analysis reporting thresholds to be applied to all projects with the following exception. The customer, FRA management or the project may determine that based on a specific project requirements, risk level and budget value these thresholds need to be modified to more effectively manage the project. Any proposed change to the thresholds shall be presented to the Project Management Group (PMG) for concurrence. If the PMG concurs with the revised thresholds the project’s Project Management Plan (PMP) will be revised to include the project specific thresholds.

A narrative summary of the analysis of those variances that fall within the red thresholds is included in the monthly report.

**4.4 Customer Variance Analysis Report and Thresholds**

The customer variance analysis reporting thresholds are generally applied to a level higher than the control account (i.e., level 2 or 3 of the WBS); the level is agreed on by the customer and the project. A color-coded variance threshold report at the agreed upon level will be produced by Project Controls for each reporting period and included in the monthly report (see example in Appendix G).

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The threshold limits for each of the color-coded thresholds are noted in the following table.

<b>Customer Variance Analysis Report Thresholds</b>		
<b>Green Thresholds – Cost and Schedule Performance falling outside of yellow or red thresholds</b>		
<b>Yellow Thresholds</b>		
<b>Cost Variance Schedule Variance</b>	<b>Type</b>	<b>Threshold limit</b>
<b>Dollars</b>	Current Period	$\geq \pm 5\%$ to $< \pm 10\%$ and $\geq \$125K$
	Cumulative	$\geq \pm 5\%$ to $< \pm 10\%$ and $\geq \$250K$
<b>Hours</b>	Current Period	$\geq \pm 5\%$ to $< \pm 10\%$ and $\geq 875$ hrs
	Cumulative	$\geq \pm 5\%$ to $< \pm 10\%$ and $\geq 1750$ hrs
<b>Red Thresholds</b>		
<b>Cost Variance Schedule Variance</b>	<b>Type</b>	<b>Threshold limit</b>
<b>Dollars</b>	Current Period	$\geq \pm 10\%$ and $\geq \$250K$
	Cumulative	$\geq \pm 10\%$ and $\geq \$500K$
<b>Hours</b>	Current Period	$\geq \pm 10\%$ and $\geq 1750$ hrs
	Cumulative	$\geq \pm 10\%$ and $\geq 3500$ hrs

Note: This applies to SV% (Schedule Variance in %) or CV% (Cost Variance in %) and the SV or CV in \$.

The thresholds in the table above are the default customer variance analysis reporting thresholds to be applied to all projects with the following exception. The customer may determine that based on a specific project requirements, risk level and budget value these thresholds need to be modified to more effectively manage the project. Any proposed change to the thresholds will be presented to the Project Management Group (PMG) for concurrence. If the PMG concurs with the revised thresholds the project’s Project Management Plan (PMP) will be revised to include the project specific thresholds.

**4.5 Estimate to Complete (ETC) / Estimate at Completion (EAC)**

On a monthly basis while generating the MSR, the CAM shall review the ETC for the elements of their control account. The CAM will analyze the accuracy of the current ETC in this way: 1) if the current ETC does not accurately reflect the cost and schedule for the remaining work in the control account, and 2) the total cost of the difference from the current and projected ETC’s for the CA would exceed the project manager cost threshold for approving changes, then the ETC should be revised. The ETC shall take into consideration any cost or schedule variances to date, as well as estimates for pending changes and mitigation of known risks.

When the CAM determines that a new ETC is needed, they will develop a new estimate and submit it to the Project Manager. The Project Manager will review the new estimate and determine if he/she agrees with the new estimate. If the Project Manager does not

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concur with the estimate submitted he/she will discuss the estimate with the CAM and adjust it as appropriate. When the Project Manager approves a submitted estimate the Project Manager forwards the information to Project Controls and they update the schedule and cost processor to establish the new project EAC.

Two methods used to develop the EAC are manual and statistical methods. The results from using either one of these methods are to be evaluated to determine what most appropriately reflects the project's EAC. The Project Manager will decide when the EAC is to be updated manually to reflect the CAM's revised ETC.

On at least an annual basis, the project manager will request that all CAMs review their ETC, and submit a detailed, bottoms-up estimate for the remaining work to establish the EAC.

**4.6 Monthly Status Meetings**

The CAMs shall present status information on request at the monthly Project Management Group (PMG) meetings. Participants at the meeting will consider the impact and risks of reported variances on other areas of the project.

**4.7 Monthly Reporting Format**

The specific EVMS reporting format will be determined on a project-by-project basis and incorporate customer specific requirements. As a minimum, it will contain the data referenced in the FRA EVMS Description. Reporting will be at a level of the WBS agreed to by the customer (by DOE for DOE projects). The Project Manager shall prepare and submit a Project Monthly Status Report to the customer and the project sponsor, as well as for internal project distribution.

The report will contain, at a minimum, the standard CPR1 format, a narrative summary of the analysis of those variances that fall within the red thresholds, as well as a monthly management reserve and contingency summary.

An example MR and contingency summary is:

PMB	From CPR1	\$xxx,xxx.xx	
EAC	From CPR1		\$xxx,xxx.xx
MR	For known risks		\$xx,xxx.xx
TPC			\$yyy,yyy.yy
Contingency	For unknown risks = TPC-EAC-MR		\$zzz,zzz.zz

**4.8 Documents and Records**

Monthly Status Report documents and records generated as a result of implementing this procedure shall be maintained by the specific project. Project Controls is responsible for

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maintaining the records of data compiled to create monthly status reports in accordance with the project's configuration management plan.

**4.9 Schedule for Monthly Reporting Cycle**

In its Project Management Plan document each project must include a calendar for producing internal and external reports that allows for both quality checks and adjustments to the project plan. Typically external monthly reports are to be submitted to the customer no later than the last day of the month that follows the month in which the work was performed. The month in which the work was performed is also known as the reporting period. In order to meet this schedule, adjustments or validation of the RLS and ETC as well as processing of change requests must occur early in the cycle, most likely within the first 10 calendar days. Contract Performance Reports (CPRs) and Variance Analysis Reports (VARs) can then be produced and circulated to the project team and lab management for feedback before final submission to the customer.

**5.0 REFERENCES**

DOE Order 413.3BA, *Program and Project Management for the Acquisition of Capital Assets*  
FRA *Earned Value Management System Description*  
ANSI/EIA-748-B, *Earned Value Management Systems*

**6.0 APPENDICES**

- 12.PM-006A:** Appendix A: Signature Page and Revision History
- 12.PM-006B:** Appendix B: Acronyms and Glossary
- 12.PM-006C:** Appendix C: Monthly Status - Reporting Flowchart
- 12.PM-006D:** Appendix D: Cost Performance Reports - Sample
- 12.PM-006E:** Appendix E: Correction Action Log
- 12.PM-006 F:** Appendix F: Management Analysis Report - Sample
- 12.PM-006G:** Appendix G: Customer Analysis Report - Sample



**APPENDIX A  
SIGNATURE PAGE AND REVISION HISTORY**

This procedure approved by: \_\_\_\_\_ DATE \_\_\_\_\_

**Director, Office of Project Management and Oversight  
Fermi National Accelerator Laboratory  
Dr. L. E. Temple**

**TABLE OF REVISIONS**

Author(s)	Description	Revision	Date
	Initial Version	0	10/17/08
E. McCluskey	In Appendix B changed definition of Control Account and added definition for Control Account Manager. Added clarification on Variance Thresholds and Estimate at Completion.	1	12/09/08
D. Hoffer	Revised variance reporting from three month rolling average to current period. Sections 4.1 - 4.4 and Appendix D were revised to reflect this change and clarification of some wording.	2	01/22/09
E. McCluskey	Revised variance analysis thresholds. Added and clarified management and customer analysis reports. Added clarification on ETC/EAC.	3	03/27/09
E McCluskey	Included uncosted labor hours as measure for analysis and reporting; revised variance threshold tables to include hours as well new cumulative \$ amounts; noted requirement for contingency and MR summary in monthly report; replaced flowchart with Visio version	4	09/17/09
<u>M. Kaducak</u>	<u>Updated reference to DOE O 413.3A to DOE O 413.3B. Added Section 4.9 on calendar for monthly reporting cycle.</u>		



## APPENDIX B ACRONYMS AND GLOSSARY

**BCWP** — Budgeted Cost of Work Performed  
**CA** — Control Account  
**CAM** – Control Account Manager  
**CPI** — Cost performance Index  
**DOE** — Department of Energy  
**EAC** — Estimate at Completion  
**ETC** — Estimate to Complete  
**EVMS** — Earned Value Management System  
**MSR** — Monthly Status Report  
**PC** — Project Controls  
**PEP**— Project Execution Plan  
**PM** — Project Manager  
**PMB** — Performance Measurement Baseline  
**PMG** — Project Management Group  
**PMT** – Performance Measurement Technique  
**RAM** — Responsibility Assignment Matrix  
**RLS** — Resource Loaded Schedule  
**SPI** — Schedule Performance Index  
**WBS** — Work Breakdown Structure  
**WP** – Work Package

**Control Account (CA)** - A key management control point located at the natural intersection point of the WBS and the OBS, where functional responsibility for work is assigned. It represents the point at which budgets (resource plans) and actual costs are accumulated and compared to earned value for management control purposes.

**Control Account Manager (CAM)** – The member of the project team responsible for the performance defined in a Control Account and for managing the resources authorized to accomplish the tasks.

**Cost Performance Index (CPI)** - The ratio of earned value to actual costs (BCWP/ACWP); a value greater than one denotes favorable performance. CPI is often used to predict the magnitude of possible cost deviations from the baseline.

**Cost Variance in % (CV%)** – **The percent of the ratio of cost variance to earned value ((CV/BCWP) X 100)**

**Estimate at Completion (EAC)** - The latest revised cost estimate for a given work scope.

**Estimate to Complete (ETC)** - Estimate of costs to complete all work from a point in time to the end of the project.

**In Kind Work** – Work scope that is contributed by collaborators outside FRA, produces a physical deliverable, and is not included in the Total Project Cost. Scientific effort specifically as described in the “OHEP Policies to Ensure Compliance with DOE O413.3A,” is not considered in kind work.

**Performance Measurement Baseline (PMB)** - The collected key performance, scope, cost, and schedule parameters. The Performance Measurement Baseline defines the threshold and boundary conditions for a project.

**Performance Measurement Technique (PMT)** – A defined method of earning value in relation to the resources expended. Also known as Earned Value Methodology.

**Project Execution Plan (PEP)** - The plan for the execution of the project, which establishes roles and responsibilities and defines how the project will be executed. Every project implementing Earned Value management will have a unique project execution plan.

**Project Management Group (PMG)** Representatives of FRA's and the customer's management meets on a regular bases with the Project's management to review project status.

**Project Management Plan (PMP)** – The plan for management of the project by the project manager, which provides further details beyond the Project Execution Plan.

**Responsibility Assignment Matrix (RAM)** - A structure that relates the project organization structure to the work breakdown structure to help ensure that each element of the project's scope of work is assigned to a responsible individual.

**Schedule Performance Index (SPI)** - A schedule performance indicator relating work accomplished to the planned schedule (BCWP/BCWS). A value greater than one denotes favorable performance.

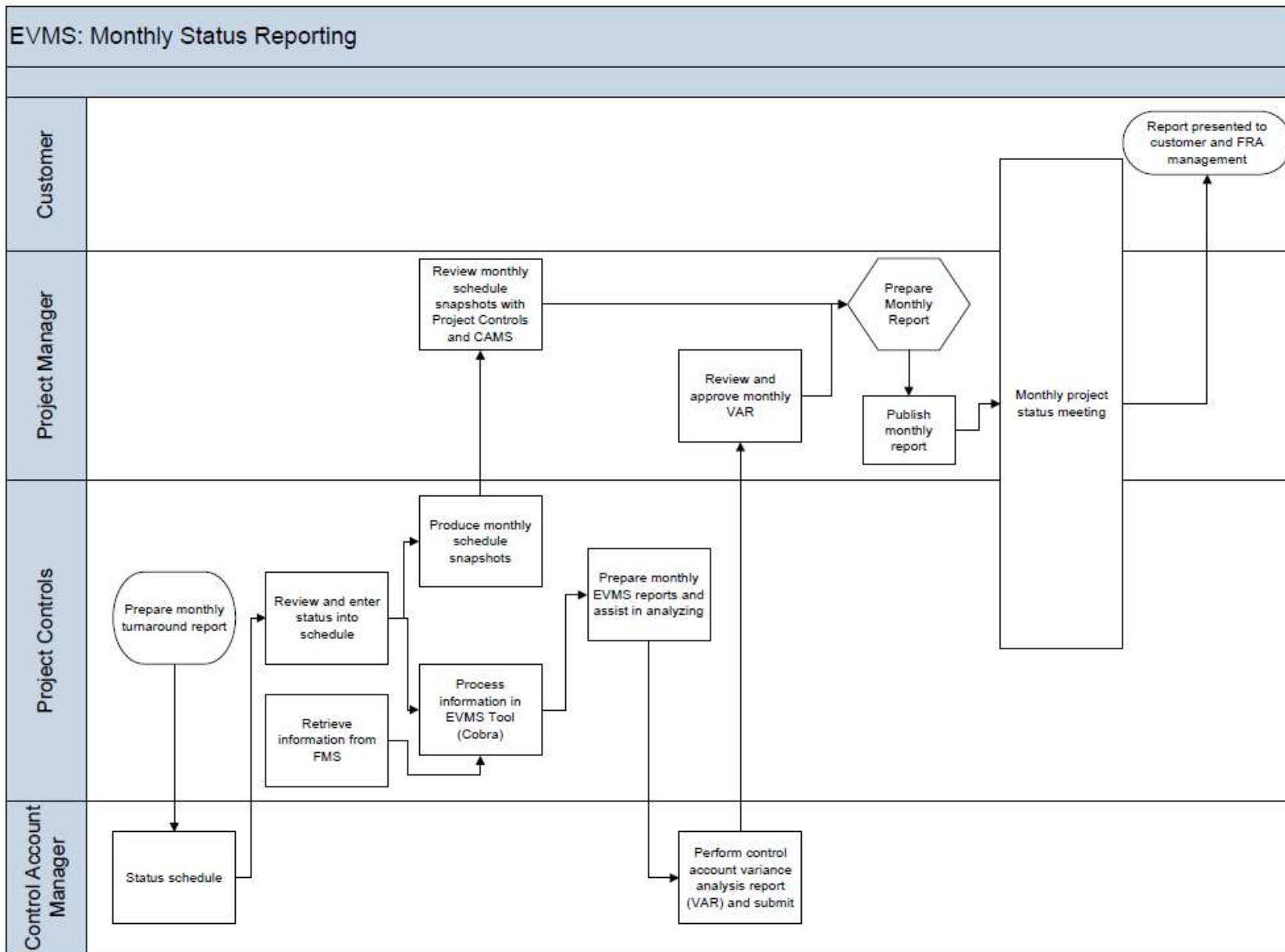
**Schedule Variance in % (SV%)** - **The percent of the ratio of schedule variance to budget ((SV/BCWS) X 100)**

**Uncosted Labor** – Labor accounted for in work package estimates, but at a \$0 rate in the budget. Such a rate may be used for scientific effort at the customer's direction.

**Work Breakdown Structure (WBS)** - A product-oriented grouping of project elements that organizes and defines the total scope of the project. The WBS is a multilevel framework that organizes and graphically displays elements representing work to be accomplished in logical relationships. Each descending level represents an increasingly detailed definition of a project component. Project components may be products or services. It is the structure and code that integrates and relates all project work (technical, schedule, and cost) and is used throughout the life cycle of a project to identify and track specific work scopes.

**Work Package (WP)** – A task or set of tasks performed within a control account. The work package is the lowest level activity to which resources are assigned.

## APPENDIX C Monthly Status Reporting Flowchart



**APPENDIX D Cost Performance Reports**

**CPR1**

CONTRACT PERFORMANCE REPORT FORMAT 1 - WORK BREAKDOWN STRUCTURE													
1. CONTRACTOR				2. CONTRACT				3. PROGRAM			4. REPORT PERIOD		
a. NAME				a. NAME				a. NAME Sample Project			a. FROM 01-Feb-2008 b. TO 29-Feb-2008		
B. PERFORMANCE DATA													
ITEM (1)	CURRENT PERIOD					CUMULATIVE TO DATE					AT COMPLETION		
	BUDGETED COST		ACTUAL COST	VARIANCE		BUDGETED COST		ACTUAL COST	VARIANCE		BUDGETED	ESTIMATED	VARIANCE
	WORK SCHEDULED	WORK PERFORMED	WORK PERFORMED	SCHEDULE	COST	WORK SCHEDULED	WORK PERFORMED	WORK PERFORMED	SCHEDULE	COST			
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(14)	(15)	(16)
<b>EQ DOE</b>													
1.3 Title I Fully burdened AY\$	63,546	61,156	36,733	(2,390)	24,423	219,019	145,073	161,960	(73,946)	(16,887)	320,302	337,189	(16,887)
2.3 Title II Fully burdened AY\$	95,440	109,061	105,777	13,621	3,284	561,688	582,399	582,955	20,711	(556)	1,216,518	1,219,287	(2,769)
3.3 Far Site Construction Fully burdened AY\$	35,570	30,013	29,888	(5,557)	125	167,816	143,905	151,672	(23,912)	(7,767)	560,022	579,514	(19,492)
4.3 Project Management Fully burdened AY\$	2,155	1,158	36,357	(997)	(35,199)	55,167	55,167	92,224	0	(37,057)	685,869	725,189	(39,320)
Funding Type Totals:	196,711	201,388	208,755	4,678	(7,366)	1,003,691	926,544	988,811	(77,147)	(62,267)	2,782,711	2,861,179	(78,468)
Undist. Budget											0	0	0
Sub Total	196,711	201,388	208,755	4,678	(7,366)	1,003,691	926,544	988,811	(77,147)	(62,267)	2,782,711	2,861,179	(78,468)
Management Resrv.											517,289		
Total	196,711	201,388	208,755	4,678	(7,366)	1,003,691	926,544	988,811	(77,147)	(62,267)	3,300,000		

**APPENDIX D Cost Performance Reports (continued)**

**CPR5**

CONTRACT PERFORMANCE REPORT								FORM APPROVED	
FORMAT 5 - EXPLANATIONS AND PROBLEM ANALYSES								OMB No. 0704-0188	
<b>1. CONTRACTOR</b>		<b>2. CONTRACT</b>			<b>3. PROGRAM</b>			<b>4. REPORT PERIOD</b>	
a. NAME		a. NAME			a. NAME			a. FROM (YYYYMMDD)	
b. LOCATION (Address and ZIP)		b. NUMBER			b. PHASE			b. TO (YYYYMMDD)	
		c. TYPE	d. SHARE RATIO	c. EVMS ACCEPTANCE (YYYYMMDD) YES					
<b>1.0.0 ANU CDR COSTS</b>									
	BCWS	BCWP	ACWP	SV in \$	SV in %	CV in \$	CV %	SPI	CPI
Current:									
Cumulative:									
	BAC	EAC	VAC in \$	VAC in %	CPI to BAC	CPI to EAC			
At Complete:									
Explanation of Variance/Description of Problem:									
Impact:									
Corrective Action:									
Monthly Summary (to include technical causes of VARs, Impacts) and Corrective Action(s):									
Prepared by:				Date:		Approved by:		Date:	



## APPENDIX F Management Analysis Report

Report Period: Feb-09																			
Control Account	Cur. Period BCWS (A\$)	BCWP (A\$)	ACWP (A\$)	SV (A\$)	SV (%)	CV (A\$)	CV (%)	SPI	CPI	Cumulative BCWS (A\$)	BCWP (A\$)	ACWP (A\$)	SV (A\$)	SV (%)	CV (A\$)	CV (%)	SPI	CPI	BAC (A\$)
<b>R&amp;D</b>																			
1.0.0 ANU CDR COSTS	0	0	0	0	0%	0	0%	1.00	1.00	18,830	0	0	0	0%	-18,830	-100%	1.00	0.00	0
1.0.1 RR Upgrades	457,056	100,207	121,072	-356,849	-78%	-20,865	-4%	0.22	0.83	1,324,028	1,154,549	1,233,813	-169,479	-13%	-79,264	-7%	0.87	0.94	5,248,866
1.0.2 M Upgrades	44,062	36,493	20,431	-7,569	-17%	16,063	37%	0.83	1.79	106,572	142,650	151,884	35,078	33%	-9,233	-6%	1.30	0.94	1,037,303
1.0.3 NUMI Upgrades	238,849	20,992	31,614	-217,857	-91%	-10,622	-4%	0.09	0.66	411,941	771,482	426,192	355,540	87%	345,290	85%	1.87	1.81	2,118,285
1.0.4 ANU Beam Physics	6,782	7,469	0	677	10%	7,469	100%	1.10	N/A	36,165	41,578	0	5,413	15%	41,578	100%	1.15	N/A	82,092
1.0.5 ANU Project Management	0	0	-1,373	0	0%	1,373	-100%	1.00	0.00	344,688	344,688	258,892	0	0%	88,006	25%	1.00	1.33	344,688
1.1 Site and Building R&D	0	0	40,234	0	0%	-40,234	-100%	1.00	0.00	2,274,519	2,274,519	1,686,483	0	0%	608,636	27%	1.00	1.36	2,274,519
1.2 Liquid Scintillator R&D	11,940	4,221	2,246	-7,719	-65%	19,78	17%	0.35	1.88	263,858	256,164	211,138	-7,694	-3%	45,025	17%	0.97	1.21	271,245
1.3 WLS Fiber R&D	25,303	87,109	100,842	61,807	244%	-19,833	-7%	3.44	0.86	172,208	234,014	260,922	61,807	36%	-28,907	-17%	1.36	0.90	340,909
1.4 PVC Extrusion R&D	81,085	0	19,829	-81,085	-100%	-19,829	-100%	0.00	0.00	1,006,723	938,211	974,916	-68,512	-7%	-38,708	-4%	0.93	0.98	1,348,394
1.5 PVC Module R&D	286,736	25,200	0	-261,535	-91%	25,200	9%	0.09	N/A	829,196	550,292	1,041,056	-278,004	-34%	-450,763	-55%	0.66	0.53	1,589,549
1.6 Electronics R&D	155,840	19,443	14,471	-136,397	-88%	4,972	3%	0.12	1.34	429,049	313,030	540,846	-116,018	-27%	-236,816	-55%	0.73	0.57	1,473,437
1.7 DAQ R&D	126,175	1,747	17,883	-124,428	-99%	-16,236	-13%	0.01	0.10	338,419	218,044	798,136	-121,872	-36%	-580,892	-173%	0.64	0.27	1,383,728
1.8 Detector Assembly R&D	280,125	13,117	38,482	-247,007	-88%	-29,368	-10%	0.05	0.36	1,270,768	878,968	1,733,144	-391,892	-31%	-854,178	-67%	0.69	0.51	2,850,906
1.9 Project Management R&D	0	0	0	0	0%	0	0%	1.00	1.00	9,184,127	9,184,127	9,359,785	0	0%	-175,658	-2%	1.00	0.98	9,184,127
<b>Construction</b>																			
2.0.1.1 Recycler Ring Modifications	25,264	2,347	1,033	-22,917	-91%	1,314	5%	0.09	2.27	25,264	2,347	1,033	-22,917	-91%	1,314	5%	0.09	2.27	7,916,804
2.0.1.2 Recycler Kicker System	164,666	4,207	344	-160,459	-97%	3,863	2%	0.03	12.22	164,666	4,207	344	-160,459	-97%	3,863	2%	0.03	12.22	7,910,714
2.0.1.3 Recycler Instrumentation	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	1,421,482
2.0.2.1 MI Modifications	1,637	0	-1,637	-100%	0	0	0%	0.00	1.00	1,637	1,395	0	-242	-15%	1,395	85%	0.85	N/A	373,332
2.0.2.2 MI RF Cavities	10,572	1,945	14,602	4,030	38%	-12,657	-120%	0.18	0.13	10,572	3,891	14,802	3,319	31%	-10,711	-100%	0.37	0.27	1,433,092
2.0.3.1 NuMI Primary Proton Beam	118,304	0	7,487	-118,304	-100%	-7,487	-100%	0.00	0.00	118,304	13,638	7,487	-102,663	-88%	6,149	5%	0.12	1.82	1,450,855
2.0.3.2 NuMI Target Hall Technical Components	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	1,634,201
2.0.3.3 NuMI Target Hall Infrastructure	0	22,148	8,835	22,148	100%	13,513	61%	N/A	2.56	0	22,148	8,835	22,148	100%	13,513	61%	1.00	2.56	1,716,959
2.0.3.4 NuMI Decay Pipe/Adron Absorber/Utilities	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	928,793
2.0.4 Project Management - ANU - Construction	67,852	67,852	24,936	0	0%	42,915	63%	1.00	2.72	274,403	274,403	250,793	0	0%	23,610	9%	1.00	1.09	5,159,684
2.1.1 Site Preparation Package	13,820	13,820	23,000	0	0%	-9,180	-66%	1.00	0.60	384,006	368,859	281,707	-17,147	-4%	85,152	23%	0.98	1.30	11,530,402
2.1.2 Far Detector Building	83,769	420,841	23,000	337,072	402%	397,841	475%	5.02	18.30	96,226	1,055,889	675,909	959,653	997%	379,979	36%	10.97	1.58	36,637,247
2.1.3 Site and Building Security	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	195,804
2.1.4 Management - Site and Building - Construction	15,653	0	-15,653	-100%	0	0	0%	0.00	1.00	15,653	0	0	-15,653	-100%	0	0%	0.00	1.00	171,599
2.10 Project Management - Nova Project - Construction	61,975	61,975	55,200	0	0%	6,775	11%	1.00	1.12	730,227	730,227	588,898	0	0%	141,330	19%	1.00	1.24	5,561,928
2.2.1 Mineral Oil	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	12,887,277
2.2.2 Pseudocumene	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	1,289,109
2.2.3 Waveshifters and Stadis 425	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	2,242,996
2.2.4 Blending	3,358	3,358	0	0	0%	3,358	100%	1.00	N/A	3,358	3,358	0	0	0%	3,358	100%	1.00	N/A	747,442
2.2.5 Transport - Liquid Scintillator	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	1,455,419
2.2.6 Management - Liquid Scintillator - Construction	1,854	1,854	0	0	0%	1,854	100%	1.00	N/A	1,854	1,854	0	0	0%	1,854	100%	1.00	N/A	93,772
2.3.1 Procurement - WLS Fiber	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	84,360
2.3.2 Production - WLS Fiber	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	9,958,779
2.3.3 Management - WLS Fiber - Construction	863	863	0	0	0%	863	100%	1.00	N/A	863	863	863	0	0%	863	100%	1.00	N/A	37,646
2.4.1 Procurement - PVC Extrusions	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	177,691
2.4.2 Extrusion Pre-Production	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	1,172,758
2.4.3 Extrusion Production	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	21,776,474
2.4.4 Production Quality Assurance and Extrusion Evaluation	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	605,199
2.4.5 Shipping & Handling - PVC Extrusions	71,296	0	-71,296	-100%	0	0	0%	0.00	1.00	71,296	0	0	-71,296	-100%	0	0%	0.00	1.00	782,062
2.4.6 Management - PVC Extrusions - Construction	8,637	1,402	0	-7,235	-84%	1,402	16%	0.16	N/A	8,637	1,402	0	-7,235	-84%	1,402	16%	0.16	N/A	781,816
2.5.1 End Seats	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	1,798,372
2.5.2 Optical Connector Production	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	118,077
2.5.3 Module Production	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	7,603,656
2.5.4 Management - PVC Modules - Construction	12,092	12,092	0	0	0%	12,092	100%	1.00	N/A	61,067	61,067	0	0	0%	61,067	100%	1.00	N/A	785,531
2.6.1 APD Module Production	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	6,288,235
2.6.2 Readout - FEB	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	2,610,747
2.6.3 Readout Infrastructure	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	2,905,067
2.6.4 Management - Electronics - Construction	751	751	0	0	0%	751	100%	1.00	N/A	751	751	0	0	0%	751	100%	1.00	N/A	39,179
2.7.1 DAQ Software	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	778,265
2.7.2 DAQ Hardware	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	2,100,306
2.7.3 Integration - DAQ	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	441,042
2.7.4 Detector Control System	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	204,894
2.7.5 Management - DAQ - Construction	213	213	0	0	0%	213	100%	1.00	N/A	213	213	0	0	0%	213	100%	1.00	N/A	7,464
2.8.1 Near Detector Site Preparation	25,555	4,814	46,427	-20,740	-81%	-41,613	-164%	0.19	0.10	25,555	68,056	46,427	40,501	157%	19,629	77%	2.58	1.42	3,578,374
2.8.2 Mechanical Construction and Installation - Near Detector Ass	0	0	0	0	0%	0	0%	1.00	1.00	0	0	0	0	0%	0	0%	1.00	1.00	492,573
2.8.3 Liquid Scintillator Filling Equipment - Near Detector Assemb	0	0	0	0	0%	0	0%</												



## APPENDIX G Customer Analysis Report

Report Period: Dec-08												
WBS Level 2	Current Period					Cumulative						
	BCWS (AY\$)	BCWP (AY\$)	ACWP (AY\$)	SPI	CPI	BCWS (AY\$)	BCWP (AY\$)	ACWP (AY\$)	SV (AY\$)	CV (AY\$)	SPI	CPI
<b>R&amp;D</b>												
1.0 ANU R&D	11,282	148,680	34,144	13.18	4.35	1,469,499	2,239,748	1,763,926	770,249	475,822	1.52	1.27
1.1 Site and Building R&D	35,558	16,001	265,893	0.45	0.06	2,203,404	2,274,519	1,493,436	71,115	781,083	1.03	1.52
1.2 Liquid Scintillator R&D	8,436	8,436	2,441	1.00	3.46	243,482	243,507	200,578	25	42,929	1.00	1.21
1.3 WLS Fiber R&D	12,635	11,149	28,816	0.88	0.39	146,905	143,189	159,848	-3,716	-16,659	0.97	0.90
1.4 PVC Extrusion R&D	0	6,198	12,405	N/A	0.50	925,639	931,837	948,616	6,198	-16,780	1.01	0.98
1.5 PVC Module R&D	0	3,239	128,231	N/A	0.03	540,108	512,507	1,020,264	-27,600	-507,757	0.95	0.50
1.6 Electronics R&D	0	2,748	17,600	N/A	0.16	273,209	286,484	523,098	13,275	-236,614	1.05	0.55
1.7 DAQ R&D	0	2,053	1,593	N/A	1.29	214,243	216,297	778,955	2,053	-562,658	1.01	0.28
1.8 Detector Assembly R&D	50,788	21,031	81,415	0.41	0.26	919,841	865,571	1,628,883	-54,270	-763,312	0.94	0.53
1.9 Project Management R&D	0	0	0	1.00	1.00	9,184,127	9,184,127	9,359,813	0	-175,686	1.00	0.98
<b>Construction</b>												
2.0 ANU Construction	0	1,167	30,671	N/A	0.04	206,551	221,354	214,470	14,804	6,885	1.07	1.03
2.1 Site and Building	13,820	474,404	46,000	34.33	10.31	368,823	768,167	865,617	399,344	-97,450	2.08	0.89
2.10 Project Management - Nova Project - C	61,975	61,975	39,585	1.00	1.57	606,278	606,278	491,909	0	114,369	1.00	1.23
2.2 Liquid Scintillator	0	0	0	1.00	1.00	0	0	0	0	0	1.00	1.00
2.3 WLS Fiber	0	0	0	1.00	1.00	0	0	0	0	0	1.00	1.00
2.4 PVC Extrusions	0	0	0	1.00	1.00	0	0	0	0	0	1.00	1.00
2.5 PVC Modules	12,092	12,092	0	1.00	N/A	36,882	36,882	0	0	36,882	1.00	N/A
2.6 Electronics	0	0	0	1.00	1.00	0	0	0	0	0	1.00	1.00
2.7 DAQ	0	0	0	1.00	1.00	0	0	0	0	0	1.00	1.00
2.8 Near Detector Assembly	0	0	0	1.00	1.00	0	61,242	0	61,242	61,242	N/A	N/A
2.9 Far Detector Assembly	8,492	8,492	0	1.00	N/A	27,930	27,930	4,692	0	23,238	1.00	5.95
<b>R&amp;D SubTotal (WBS 1.0-1.9)</b>	<b>118,698</b>	<b>219,534</b>	<b>572,538</b>	<b>1.85</b>	<b>0.38</b>	<b>16,120,458</b>	<b>16,897,786</b>	<b>17,877,417</b>	<b>777,328</b>	<b>-979,631</b>	<b>1.05</b>	<b>0.95</b>
<b>Construction SubTotal (WBS 2.0-2.9)</b>	<b>96,380</b>	<b>558,131</b>	<b>116,256</b>	<b>5.79</b>	<b>4.80</b>	<b>1,246,463</b>	<b>1,721,853</b>	<b>1,576,687</b>	<b>475,390</b>	<b>145,166</b>	<b>1.38</b>	<b>1.09</b>
<b>Project Total</b>	<b>215,078</b>	<b>777,665</b>	<b>688,794</b>	<b>3.62</b>	<b>1.13</b>	<b>17,366,921</b>	<b>18,619,638</b>	<b>19,454,104</b>	<b>1,252,718</b>	<b>-834,465</b>	<b>1.07</b>	<b>0.96</b>