



**EVMS
Certification
Surveillance
Review**

**Corrective Action Plan
February 2012**

JSA-JLab EVMS Surveillance Review Summary

“During the week of November 14, 2011, the Department of Energy (DOE)/Office of Science (SC) conducted an Earned Value Management System (EVMS) surveillance review of Jefferson Science Associates, Thomas Jefferson National Laboratory (JSA-JLAB) in Newport News, Virginia. The review was led by the Office of Project Assessment (OPA) with committee members from the Office of Fusion Energy Sciences (FES), OPA, Office of Engineering and Construction Management (OECM), the Office of Environmental Management (EM), Brookhaven National Laboratory (BNL), and the Princeton Plasma Physics Laboratory (PPPL).

The focus of the review was to ensure that JSA-JLAB continues to implement its contract-wide certified EVMS in accordance with the ANSI/EIA-748B guidelines across all applicable DOE Order 413.3B capital asset projects.

The review was conducted in accordance with the OPA Earned Value Management System Surveillance Guide.

The Committee identified two Corrective Action Requests (CARs) and six Continuous Improvement Opportunities (CIOs).”

In addition to the two CARs, the first three CIOs (*) require follow up with the Office of Project Assessment.

CAR – 1

Control Account Plan – Data contained in Primavera (P6) does not include the detailed schedule and budget information as defined within the Project Controls System Manual (PCSM). JSA-JLAB should ensure that as a minimum, the CAP contains a time-phased budget, work definition and schedule (including resource planning), and can be appended to the Work Authorization Document (WAD).

Recommendation:

At a minimum, recommend the CAP include scope of work definition (found in the WBS dictionary), a schedule (including resource planning), and a time-phased budget. Upon approval, the CAP may be appended to the Work Authorization Document (WAD). This confirms the agreement between the CAM and the PM to accomplish this plan and provides authorization to proceed with work. Also, the contents of the CAP should be documented in JSA's system description.

JSA Corrective Action

JSA will revise the PCS Manual (including examples) to define the Control Account Plan as a combination of the pertinent WBS Dictionary element, schedule, resource listing, and budget profile; and that the CAP will be appended to the relevant Work Authorization Document. (See Attachment 1)

CAR-2

Schedule Integrity – The subcontractor's schedules are not integrated into the project schedules. All capital asset projects must be able to produce a critical path schedule; neither of the projects reviewed can run the true critical path. The projects must be able to demonstrate horizontal and vertical integration of the schedule.

Recommendation:

The 12 GeV project schedule needs to be reviewed for schedule integrity. Project schedule integrity is necessary in order to ensure the schedule accurately represents all the project work scope and activity sequencing, to determine the correct forecast of schedule start and finish dates for all activities, milestones, and project early start finish dates. A review of all activities and logic will ensure that the project schedule provides an effective and valuable management tool for assessing and analyzing schedule progress; and will ensure that the project schedule represents the true critical path and near critical activities to assist project management in effectively managing the project schedule. The review team is not requesting that the projects change their approach, at this time, to integrate the subcontractor schedules into the project schedule. However, the team recommends that the projects evaluate and report to the review team what schedule improvement can be made with the current projects to: remove constraints that prevent critical path analysis from being performed, use Primavera P6 to calculate and report the critical path on a regular basis, and integrate subcontractor schedule and schedule updates into the project schedule. On future projects, the recommendation is to consider full implementation of the above improvements so that the entire project schedule (at the activity level) represents the full scope of work, and is logically linked to generate an accurate project critical path needed to manage the project.

JSA Corrective Action

To ensure schedule integrity on future projects, JSA will revise the scheduling section of the JSA Project Control System Manual to state that subcontract schedules should be integrated with the main project schedule in order to accurately determine the critical path. The revision will also state that discrete work activities should be used to determine the schedule critical path. (See Attachment 2)

For the current 12 GeV Upgrade and TEDF projects, JSA will conduct a critical path analysis using their P6 schedules with the constraints and LOE activities removed. 12 GeV and TEDF subcontractor schedules will not be integrated into their respective project P6 schedules but are routinely evaluated as stand-alone schedules. Subcontractor schedules are represented in the P6 schedules as pegpoint activities which are tracked on a monthly basis.

CIO-1*

Training – Some Control Account Manager (CAM) responses were tentative and lacked an understanding of the EVMS process. Recommend more prescriptive, periodic, and interactive EVMS training including continuous refresher training.

Recommendation:

Periodic and formalized EVMS training should be established. The training program would provide initial and refresher training and, as required, customized EVM training for established CAMs and PMs, as well ‘on-boarding’ training for new CAMs and PMs. Training should cover all EVMS areas, including variance analysis writing, variance analysis review and approval process, change control process, EAC calculations and the selection of appropriate earned value techniques.

JSA Corrective Action

JSA will ensure that all future project CAMs have taken at least the EVMS portion of the JLab Project Management Qualification course and received appropriate one-on-one EVMS training. JSA will continue to conduct an annual EVMS refresher course for all management personnel involved in active JSA projects. JSA will revise the Introduction section of the JSA Project Control System Manual to reflect these training requirements. (See Attachment 3)

CIO-2*

Work Breakdown Structure – As stated in the PCSM, for DOE projects, the WBS Level 2 segments will normally be funding types. The standard expectation is that the WBS should be a product-oriented structure. Implement a product-oriented WBS on all future capital asset projects and revise in the System Description.

Recommendation:

Implement a product-oriented WBS on all future capital asset projects and revise in the system description.

JSA Corrective Action

All future JSA projects employing an EVMS will have a product-oriented WBS. JSA will revise the WBS section of the JSA Project Control System Manual to indicate that project WBSs will be organized as product-oriented. (See Attachment 4)

CIO-3*

Work Authorization Documents – Project Managers (PM)/CAMs cannot approve their own WADs. CAR (corrected on site during review) System Description requires updating.

Recommendation:

The WADs for which the Project Manager is also the CAM, the Project Manager should signoff as the CAM and have the Project Director or functional line management signoff where the Project Manager normally would.

JSA Corrective Action

JSA will revise the Work Authorization section of the JSA Project Control System Manual to indicate that project managers cannot authorize their own work, but must be signed by his/her supervisor. (See Attachment 5)

CIO-4/5/6

JSA will also implement the recommendations for CIO-4/5/6.

Corrective Action Plan Attachments

Atch 1 – Project Control System Manual Revision for Control Account Plan and Example

Atch 2 – Project Control System Manual Revision for Subcontractor Schedule Integration and Critical Path

Atch 3 – Project Control System Manual Revision for Training

Atch 4 – Project Control System Manual Revision for Work Breakdown Structure

Atch 5 – Project Control System Manual Revision for Work Authorization Document

Attachment 1

JSA Project Control System Manual

303 Control Account Plan Development

- A. With any budget targets provided by the Project Manager, the Control Account Manager can start to develop his/her Control Account Plan. The Control Account Plan represents the Control Account Manager's strategy for accomplishing the project work within the control account. Along with the work scope defined in the WBS dictionary, the Control Account Plan also includes a detailed schedule, a resource plan, and a time-phased budget (See Exhibit 6). The Control Account Plan will be appended to the Work Authorization Document described in Section 400. This collective documentation will express the agreement between the Control Account Manager and the Project Manager to accomplish this plan and provides authorization to proceed with work.
- B. A control account will normally consist of multiple work packages and possibly planning packages. To develop an initial resource-loaded schedule, the Control Account Manager can use the Work Package Development Excel spreadsheet (Exhibit 7) to produce a detailed schedule and resource plan for each required work package. The Control Account Manager develops work activities to divide the work package into discrete manageable and measurable segments of work for the purpose of developing plans and determining progress. Each activity is sequenced in a manner that provides logical support for the project schedule.
- C. With the work activities identified in the Work Package Development spreadsheet, the Control Account Manager estimates the resources (labor, expenses, and procurements) and the quantity (hours, dollars) required to accomplish the work activities. Labor resources are estimated according to various cost element categories, such as Plant Engineer, Mechanical Engineer, and Scientist, etc. Expense estimates are prepared for such items as supplies and materials, travel, and consulting. Labor and expense estimates are assigned to the month/fiscal year during which they will be used or expended. Estimates for procurements are also made and are assigned to the month/fiscal year in which payment is anticipated to occur. Nominally, the cost estimates are entered in current year direct dollars. Once the resources have been identified and their costs estimated, a schedule of the work activities is developed with start dates, activity durations, and activity predecessors. Data from the Work Package Development spreadsheet is used to develop the initial Detail Schedule within the Schedule Management System as discussed in Section 301.2 Schedule Development. Schedule and cost data is imported by the Cost Management System where burden and escalation financial factors are applied. The resultant product is the time-phased budget portion of the Control Account Plan.
- D. One essential product of the Control Account Plan is the identification of the types and levels of labor resources that must be provided by each functional organization supplying labor to the project. Summary reports showing labor requirements in support of work scope as documented in the Control Account Plans are prepared by Project Management & Integrated Planning and used by senior project management to assure the availability of such personnel when needed.

- E. At this stage in the planning process, three project baselines have been established: the technical baseline, the schedule baseline, and the cost baseline. The technical baseline, organized around a WBS framework, describes the desired configuration, performance, and characteristics of the project and establishes the project's mission, technical objectives, and functional requirements. The required work activities to satisfy the project's mission need are logically linked in a schedule baseline integrating the entire work scope while reflecting all programmatic constraints. The cost baseline is based on validated cost estimates developed for the project work scope and ensures resources for labor, services, subcontracts, and materials are established at the requisite levels. In total, these three baselines produce the integrated project baseline. The approved Control Account Plans that form the integrated project baseline represent the life-cycle budget plan for accomplishing all of the project work scope.

- F. The integrated project baseline lays the foundation through which project objectives can be achieved and progress can be managed and monitored during project execution. Data that form the integrated project baseline are recorded in an integrated cost/schedule database using the Cost and Schedule Management Systems. These systems share the data to produce a resource-loaded schedule and time-phased budget plan.



Jefferson Science Associates, LLC

12 GeV Control Account Plan

WBS 1.4.2.1 Hall B Magnets



Thomas Jefferson National Accelerator Facility

12 GeV Upgrade

WBS DICTIONARY

Revisions	
CR #	Date

WBS Number 1.4.2.1	WBS Element Construction Hall B CLAS Superconducting Magnets: Torus and Solenoid
Technical Content (including Processes)	
<p>Torus Magnet: This WBS element includes design, engineering, and fabrication of 6 flat panels of superconducting coils with polar angle coverage from 5 degrees to 40 degrees and azimuthal acceptance from 50% at 5 degrees to more than 90% at 40 degrees. The $\int Bdl > 3 \text{ Tm}$ @ 5 degree and about 0.5 Tm at 40 degrees. Coil cryostat width front face is about 10 mm.</p> <p>Solenoid Magnet: This WBS element includes design, engineering, and fabrication of the superconducting solenoid with 5 Tesla central field with aperture of 0.78 m and opening angle of 80 degrees in the forward direction. The field uniformity in the target area is better than 10^{-4} in cylinder 0.07 x 0.03m for polarized target operation. The outer dimensions are diameter of about 2m and length of about 1.8 m. It consists of the main coil and compensating coil to minimize the stray field at the detectors location.</p>	
Resource Type Summary	
<ul style="list-style-type: none"> • Design/Mechanical/Electrical Engineers • Design/Mechanical/Electrical Technicians • Senior Scientist • Senior Staff • Procurements • Travel • Machine Shop 	
Deliverables	
<ul style="list-style-type: none"> • Torus Magnet • Solenoid Magnet 	

WBS 1.4.2.1 Budget Plan (Burdened/Escalated Cost \$)

		Fiscal Year	Fiscal Period													2013	2014	Totals	
Basis	Task	2009	2010	2011	2012														
					1	2	3	4	5	6	7	8	9	10	11	12			
Base	12 GEV UPGRD.4.2.1	136,478.80	839,303.23	2,685,972.36	35,729.14	658,089.54	206,240.18	121,817.93	235,656.98	86,123.10	35,636.16	328,333.10	33,939.18	745,653.10	576,633.45	207,631.19	671,477.73	192,410.71	7,797,125.87

Activity ID	Activity Name	Start	Finish	Ori Dur	Physical % Complete	Budgeted Labor Units	Budgeted Labor Cost	Budgeted Material Cost	Budgeted Nonlabor Cost	Budgeted Total Cost	Total Float	FY2009				FY2010				FY2011				FY2012				FY2013				FY2014				FY2015			
												FQ1	FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4
1.4.2 CONSTRUCTION HALL B		Oct-01-08	Sep-30-14	1487.0d		26014.1d	\$993,441.58	\$23,529,860.70	\$63,491.58	\$1,186,793.87	495.0d																												
1.4.2.1 MAGNET		Jan-02-09	Mar-31-14	1300.0d		1690.0d	\$662,891.70	\$6,750,000.00	232,932.88	\$7,645,824.58	523.0d																												
1.4.2.1.1 TOROIDAL MAGNET		Jan-02-09	May-31-13	1096.0d		1085.0d	\$447,708.89	\$4,750,000.00	167,888.21	\$5,365,597.09	188.0d																												
14211004	Torus Vend Comp Dsgn & Fab FY09 Original Labor Initial	Jan-05-09	Aug-31-09	167.0d	0%	197.7d	\$78,291.17	\$0.00	\$0.00	\$78,291.17	381.0d																												
14211004A	Torus Vend Comp Dsgn & Fab FY09 Original Labor Final	Sep-01-09	Sep-30-09	21.0d	0%	24.9d	\$9,845.07	\$0.00	\$0.00	\$9,845.07	303.0d																												
14211004B	Torus Vend Comp Dsgn & Fab FY10 Original Labor	Oct-01-09	Dec-29-09	57.0d	0%	67.5d	\$27,573.32	\$0.00	\$0.00	\$27,573.32	303.0d																												
14211009E	Torus FY09 Travel	Jan-02-09	Sep-30-09	189.0d	0%	0.0d	\$0.00	\$0.00	\$6,086.21	\$6,086.21	0.0d																												
14211010	Torus Vend Coil Winding Original Labor FY10	Jan-05-10	Sep-30-10	188.0d	0%	230.2d	\$93,670.67	\$0.00	\$0.00	\$93,670.67	300.0d																												
14211010a	Torus Vend Coil Winding Original Labor FY11	Oct-01-10	Dec-29-10	57.0d	0%	69.8d	\$29,305.74	\$0.00	\$0.00	\$29,305.74	300.0d																												
14211010E	Torus FY10 Travel	Oct-01-09	Sep-30-10	248.0d	0%	0.0d	\$0.00	\$0.00	\$8,240.89	\$8,240.89	0.0d																												
14211011E	Torus FY11 Travel	Oct-01-10	Sep-30-11	248.0d	0%	0.0d	\$0.00	\$0.00	\$8,503.77	\$8,503.77	0.0d																												
14211012E	Torus FY12 Travel	Oct-03-11	Sep-28-12	247.0d	0%	0.0d	\$0.00	\$0.00	\$8,775.04	\$8,775.04	0.0d																												
14211015	Torus Vend Compnts Fab Original Labor FY10	Jan-05-10	Sep-30-10	188.0d	0%	117.8d	\$48,666.81	\$0.00	\$0.00	\$48,666.81	300.0d																												
14211015a	Torus Vend Compnts Fab Original Labor FY11	Oct-01-10	Dec-29-10	57.0d	0%	35.7d	\$15,225.06	\$0.00	\$0.00	\$15,225.06	300.0d																												
14211020	Torus Vend Contract Support Labor FY11	Jan-05-11	Sep-30-11	188.0d	0%	121.6d	\$52,303.48	\$0.00	\$0.00	\$52,303.48	297.0d																												
14211020a	Torus Vend Contract Support Labor FY12	Oct-03-11	Dec-29-11	57.0d	0%	36.9d	\$16,363.14	\$0.00	\$0.00	\$16,363.14	297.0d																												
14211025	Torus Delivery Installn & Check-out Original Labor	Jan-05-12	Dec-21-12	245.0d	0%	183.0d	\$76,464.40	\$0.00	136,282.30	\$212,746.70	294.0d																												
14211030	Vend Fab Torus - Completion of System Requirements Review (SRR)	Sep-04-09	Oct-30-09	40.0d	0%	0.0d	\$0.00	\$112,000.00	\$0.00	\$112,000.00	208.0d																												
14211035	Vend Fab Torus - Completion of Preliminary Design Review	Sep-04-09	Dec-30-09	76.0d	0%	0.0d	\$0.00	\$274,000.00	\$0.00	\$274,000.00	208.0d																												
14211040	Vend Fab Torus - Superconductor Production	Sep-04-09	Jan-29-10	96.0d	0%	0.0d	\$0.00	\$262,000.00	\$0.00	\$262,000.00	208.0d																												
14211040A	Vend Fab Torus - Superconductor Production Reverse Entry per CR10-044	Mar-01-10	Mar-01-10	1.0d	0%	0.0d	\$0.00	(\$262,000.00)	\$0.00	(\$262,000.00)	188.0d																												
14211040B	Vend Fab Torus - Superconductor Production Revised Delivery per	Mar-01-10	Oct-29-10	172.0d	0%	0.0d	\$0.00	\$262,000.00	\$0.00	\$262,000.00	189.0d																												
14211040C	Vend Fab Torus - Solder Stabilizer Production	Nov-02-09	Apr-29-11	367.0d	0%	0.0d	\$0.00	\$70,000.00	\$0.00	\$70,000.00	316.0d																												
14211045	Vend Fab Torus - Completion of Preliminary Design Review and	Sep-04-09	Feb-26-10	115.0d	0%	0.0d	\$0.00	\$324,000.00	\$0.00	\$324,000.00	188.0d																												
14211045A	Vend Fab Torus - Completion of Preliminary Design Review and	Mar-01-10	Mar-01-10	1.0d	0%	0.0d	\$0.00	(\$324,000.00)	\$0.00	(\$324,000.00)	188.0d																												
14211045B	Vend Fab Torus - Completion of IDR Revised Delivery per CR10-044	Mar-01-10	Oct-29-10	172.0d	0%	0.0d	\$0.00	\$108,000.00	\$0.00	\$108,000.00	224.0d																												
14211045C	Vend Fab Torus - Completion of FDR Revised Delivery per CR10-044	Mar-01-10	Jan-31-11	229.0d	0%	0.0d	\$0.00	\$108,000.00	\$0.00	\$108,000.00	224.0d																												
14211045D	Vend Fab Torus - Completion Manufacturing Readiness	Mar-01-10	Jan-31-11	229.0d	0%	0.0d	\$0.00	\$108,000.00	\$0.00	\$108,000.00	224.0d																												
14211050	Vend Fab Torus - Design and Construction of Prototype Coil (Full Size)	Nov-02-09	Jan-31-11	304.0d	0%	0.0d	\$0.00	\$203,000.00	\$0.00	\$203,000.00	188.0d																												
14211050A	Vend Fab Torus - Testing of Prototype Coil (Full Size)	Nov-02-09	Mar-31-11	346.0d	0%	0.0d	\$0.00	\$203,000.00	\$0.00	\$203,000.00	188.0d																												
14211050Ab	Vend Fab Torus - Stability Model Coil test	Nov-02-09	Apr-29-11	367.0d	0%	0.0d	\$0.00	\$55,409.00	\$0.00	\$55,409.00	230.0d																												
14211050Ac	Vend Fab Torus - UG&GUG Duties	Nov-02-09	Feb-28-11	323.0d	0%	0.0d	\$0.00	\$101,459.00	\$0.00	\$101,459.00	230.0d																												
14211050Ad	Vend Fab Torus - Coil Case Plates-Mill run Phase 2 Funding	Nov-02-09	Mar-31-11	346.0d	0%	0.0d	\$0.00	\$41,532.00	\$0.00	\$41,532.00	230.0d																												
14211050AdA	Vend Fab Torus - Coil Case Plates-Mill run Phase 3 Funding	Nov-01-10	Mar-31-11	99.0d	0%	0.0d	\$0.00	\$22,799.00	\$0.00	\$22,799.00	230.0d																												
14211051	Vend Fab Torus - Coil Case Plates-CNC machining	Nov-01-10	Aug-31-11	206.0d	0%	0.0d	\$0.00	\$56,225.00	\$0.00	\$56,225.00	230.0d																												
14211051a	Vend Fab Torus - He tracing Tube - OFHC	Nov-01-10	Aug-31-11	206.0d	0%	0.0d	\$0.00	\$16,291.00	\$0.00	\$16,291.00	230.0d																												
14211051b	Vend Fab Torus - Torus Vac Vessel Plate-Mill run	Nov-01-10	Aug-31-11	206.0d	0%	0.0d	\$0.00	\$125,000.00	\$0.00	\$125,000.00	230.0d																												
14211051c	Vend Fab Torus - Nitrogen tracing tube	Nov-01-10	Aug-31-11	206.0d	0%	0.0d	\$0.00	\$7,425.00	\$0.00	\$7,425.00	230.0d																												
14211051d	Vend Fab Torus - Torus Vac Vessel Plate-CNC machining	Nov-01-10	Aug-31-11	206.0d	0%	0.0d	\$0.00	\$100,000.00	\$0.00	\$100,000.00	230.0d																												

■ Remaining Work
 ■ Critical Remaining Work
 ■ Actual Work
 Baseline 11/30/05
 ■ % Complete
◆ Remaining Milestone
 ◆ Critical Milestone
 ◆ Actual Milestone
◆ Baseline Milestone
 Summary

WBS 1.4.2.1 Resource Summary (Direct \$)

WBS 1.4.2.1						
WBS Name: Hall B Magnets						
		FY2011	FY2012	FY2013	FY2014	Period Total
	Cost	\$2,658,803.87	\$3,212,352.77	\$663,563.67	\$187,800.86	\$6,722,521.16
PRCRMNT<\$50K 60NOESC PROCUREMENT<\$50K 60 NO ESCALATION	Units					0
	Cost	\$50,000.00	\$161,000.00	\$584.58	\$38,415.42	\$250,000.00
PRCRMNT>\$50K 69NOESC PROCUREMENT>\$50K 69 NO ESCALATION	Units					0
	Cost	\$2,432,400.00	\$2,719,600.00	\$612,614.56	\$149,385.44	\$5,914,000.00
ELEC DES ELEC DES	Units	18.1d	21.4d	5.9d		45.5d
	Cost	\$7,104.60	\$8,650.50	\$2,391.49		\$18,146.59
ELEC ENG ELEC ENG	Units	22.2d	12.9d	1.2d		36.2d
	Cost	\$12,126.51	\$7,262.78	\$668.16		\$20,057.45
ELEC TECH ELEC TECH	Units	12.3d	16.1d	1.2d		29.6d
	Cost	\$4,217.55	\$5,696.77	\$417.88		\$10,332.20
MECH DES MECH DES	Units	48.5d	55.7d	4.7d		108.9d
	Cost	\$18,123.98	\$21,450.70	\$1,824.56		\$41,399.24
MECH ENG MECH ENG	Units	70.9d	75.6d	9.5d		155.9d
	Cost	\$38,518.82	\$42,399.10	\$5,311.95		\$86,229.87
MECH TECH MECH TECH	Units	165.3d	211.9d	17.8d		394.9d
	Cost	\$56,952.32	\$75,321.32	\$6,312.29		\$138,585.94
OFFICE (admn supprt) OFFICE	Units	1.1d				1.1d
	Cost	\$254.29				\$254.29
SCIENTIST SCIENTIST	Units	30.3d	14.6d	1.2d		46.0d
	Cost	\$16,563.48	\$8,250.12	\$668.63		\$25,482.23
SKILLED TRADE SKLLD TRADE	Units	6.0d	7.5d	1.9d		15.4d
	Cost	\$1,556.16	\$2,007.63	\$506.80		\$4,070.60
VISTNG USERS VISTNG USERS	Units	26.6d	36.9d			63.4d
	Cost	\$3,978.63	\$5,705.44			\$9,684.07
EXPNS MACHINE SHOP MSHOP	Units					0.0d
	Cost		\$137,458.32	\$32,262.75		\$169,721.07
EXPNS TRAVEL TRAVEL	Units					0.0d
	Cost	\$17,007.54	\$17,550.08			\$34,557.62

Attachment 2

JSA Project Control System Manual 301.2 Schedule Development

D. Detail Schedule

The baseline milestones schedule, populated with the intermediate milestones, serves as the framework to add work activities and detail milestones to the project schedule. The detail schedule is developed from scheduling information generated by the Control Account Managers (see Section 303 Control Account Plan Development for the Work Package Development Excel spreadsheet tool). PM&IP incorporates the schedule information within the Schedule Management System and builds a comprehensive schedule that includes the sequence, start and finish dates and duration of every work activity required to complete the project. Any work package requiring procurement of subcontract work should incorporate relevant subcontractor schedule milestones and activities into the project detail schedule to ensure that accurate schedule analysis can be accomplished. The resulting detail schedule contains all project milestones, the work activities, and the logical ties between the various schedule elements. With the appropriate discrete activity interdependencies, the longest path through the schedule (referred to as the “critical path”) can be determined representing the project network path with the least amount of total float.

Attachment 3

JSA Project Control System Manual

100 Introduction

- F. Training: All JSA personnel responsible for management functions on projects requiring an Earned Value Management System must be EVMS trained at the appropriate level to their roles and responsibilities. When first associated with a project, JSA Project Managers and Control Account Managers must, as a minimum, read the current version of this JSA Project Control System Manual and complete the EVMS portion of the Jefferson Lab Project Management Qualification curriculum. These individuals may also be required to receive one-on-one EVMS training from Project Management & Integrated Planning and read additional EVMS reference materials as identified by project-specific requirements. Annual refresher training for those management personnel involved in active JSA projects is required.

Attachment 4

JSA Project Control System Manual

202.1 WBS Development

The project WBS is a product-oriented decomposition of the project (Exhibit 1) and is organized in multiple levels of increasing detail. WBS Level 1 is the entire project and represents the total responsibility assigned to the Project Manager. (Note: Each Jefferson Lab project using an Earned Value Management System will be assigned a JSA Enterprise Project Structure code. This code will represent the Level 1 WBS number element for the project.) At WBS Level 2, the overall project is subdivided into major segments that define the key deliverables and usually includes a project management element. The depth of a WBS is dependent upon the size and complexity of the project and the level of detail needed to plan and manage it. Additional levels of the WBS can be included as needed to extend the WBS to a level of detail necessary to reflect the complexity of the work scope. Not all legs of the WBS must be composed of the same number of levels. Each WBS element is assigned a unique WBS number. The WBS number is used to accumulate and report performance measurement data (cost estimates, budgets, earned value, and actual costs) and to summarize data at higher WBS levels. Performance measurement data are derived directly from entry-level data collected or prepared at the appropriate level of the WBS.



Exhibit 1. WBS Example

Project Name:					Project Funding Type:	
Technology & Engineering Development Facility					Capital Line Item Funding	
WBS Level					WBS Title	WBS Number
1	2	3	4	5		
X					TEDF Project	1.
	X				Project Planning	1.1
		X			Conceptual Planning	1.1.1
		X			Planning	1.1.2
	X				Engineering and Design	1.2
		X			Design Services	1.2.01
		X			Pre-Construction Services	1.2.02
		X			Pre-Construction Project Management	1.2.03
	X				Construction	1.3
		X			Conventional Facilities Construction	1.3.1
			X		Civil/Site and Early Procurements	1.3.1.1
			X		TED Building Construction	1.3.1.2
			X		TL Building Construction	1.3.1.3
			X		TL Renovation	1.3.1.4
		X			Furnished Furniture/Equipment	1.3.2
			X		TED Furniture/Equipment	1.3.2.1
			X		TL Furniture/Equipment	1.3.2.2
			X		TL Ren Furniture/Equipment	1.3.2.3
		X			Construction Management Services	1.3.3
			X		Construction Management	1.3.3.1
				X	TED Construction Management	1.3.3.1.1
				X	TL Construction Management	1.3.3.1.2
				X	TL Ren Construction Management	1.3.3.1.3
			X		Commissioning	1.3.3.2
				X	TED Commissioning	1.3.3.2.1
				X	TL Commissioning	1.3.3.2.2
				X	TL Ren Commissioning	1.3.3.2.3
			X		A-E Support	1.3.3.3
				X	TED A/E Support	1.3.3.3.1
				X	TL A/E Support	1.3.3.3.2
				X	TL Ren A/E Support	1.3.3.3.3
		X			Project Management	1.3.4

Attachment 5

JSA Project Control System Manual 401 Work Authorization Process

- B. To authorize the expenditure of effort and budget for a control account, the Project Manager will issue a Work Authorization Document (WAD) (Exhibit 10) to the Control Account Manager at the appropriate period in the project schedule. The WAD contains the control account information, a list of associated work packages, approval signatures, and acceptance signature of the Control Account Manager. (Note: The Project Manager cannot sign and approve a WAD for any Control Account where he/she is the CAM. The Project Manager's supervisor must be the approval authority.) The signed WAD empowers the Control Account Manager to implement the Control Account Plan.