	NCSX Work Approval	Form (WAF)
lob Numb lob Title: (: Central I&C Systems	
escription:		
	The central process control system will provice interface to all engineering subsystems and he synchronization between two or more operating conversion resources. It will support current a mimic displays, machine state archival, and perfectly NCSX. It will be designed using the Experiment (EPICS)	nigh-energy systems. It will provide the ing machines at PPPL using shared power and historical trending, alarm logging, process control and monitoring functions fo
Schedule:	See Attached	
Approvals:		
	Job Manager	Date
	Responsible Line Manager	Date
	Project Manager	Date
	Engineering Department Head	Date

NCSX June 2007 ETC TABLE I - DESIGN LABOR

WBS N	Number: 52												
WRST	itle: Central I&C Systems	+			 								
	me central lac systems	-						ļ					
	umber: 5201	ļ											
Job Ti	tle: Central I&C Systems												
Job Ma	anager: Paul Sichta												
D	1			1	1								
Descript		ļ							ļ				
Title I and													
				4	•		FY07\$K	•	·	•			
Activity ID	Activity Description	41MS	43MS/CC	48MS	37STK	35 Trvl	ECEM	ECTB	EMTB	EASB	EEEM	EETB	Basis of Estimate
					***************************************			***************************************					Originally manhours estimate based on NSTX experience. However, this estimate has been updated to reflect experience of experieince on other similar networking installation projects.
52-10	Preliminary Design						40						***************************************
52-20	Final Design						40						
52-30	Procurement	\$18K	\$17K		\$3K		20						
52-40	EPICS Programming - Base						80						
52-50	EPICS Programming - VDCT db editor						40						
52-60	IOC Programming - MDSplus data & events OPC - EPICS/PLC Interface		\$2K	,		\$2K	120 160						
52-70 52-80		-	\$ZK			\$∠K	80						
52-80	Appl. Program Programming - misc.						100						
52-90	Installation						40		240	120			
52-100	Test						40		240	120			
02 110	1000						10						
	Subtotal Job 5201	\$18K	\$19K	\$0K	\$3K	\$2K	720	100	240	120	0	0	
					<u> </u>			<u> </u>					
	M&S Details:	K\$					of M&S Es						
	Travel/training					ence and o					<u> </u>		
	NTC web cam (4)					parts for							
	PC - appl. TBD (2)					f parts for						ļ	
	Linux soft IOC (2) OPC client & server HW/SW/TRNG (for T/C)					parts for						ļ	
	EPICS server (use NSTX)					f parts for l							
	EPICS server (use NSTX)					parts for l						-	
	misc					parts for							
	Total M&S	\$42.0K		recent pu	i cilascu U	. parts 101	INDIA allu	Ciliei iau	α ວ ເ. α ປ ເ	are projec			
	Total mac	Ψ72.UI\		†				<u> </u>					
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NCSX June 2007 ETC TABLE II - Materials and Subcontracts

WBS Number: 52	
WBS Title: Central I&C Systems	
Job Number: 5201	
Job Title: Central I&C Systems	
Job Manager: Paul Sichta	
Materials and Subcontracts (M&S)	Basis of Estimate
Materials and Subcontracts (M&S) Description:	Basis of Estimate
. ,	Basis of Estimate
Description:	Basis of Estimate
Description:	Basis of Estimate

NCSX June 2007 ETC TABLE III - Fabrication/Assembly Installation

WBS Number: 52					
WBS Title: Central I&C Systems					
Job Number: 5201					
Job Title: Central I&C Systems					
Job Manager: Paul Sichta					
In-house Fabrication and Assembly a	nd Install	ation			
See Table I					

NCSX June 2007 ETC TABLE IV - Uncertainty of Estimate and Residual Risk Assessment

WBS Number: 52													
WBS Title: Central	I&C Systems	s											
Job Number: 5201	iae eyeteiii												
Job Title: Central Id	&C Systems												
Job Manager: Paul													
oob manager: r aar	Ololita												
Uncertainty of the Estima	ate.												
Oncertainty of the Estima	iic				Uncertainty								
		<u>High</u>	Medium	Low	Range (%)				Co	mments/Ot	her Consi	derations	
Design Maturity			Х			PDR, some	e mo	re design	needed to finalize.				
Davis Osmalasia					-10%/+15%	(NOTY							
Design Complexity				Х	Duplication	on of NSTX	arcr	itecture					
Note: High/Medium/Low unce	rtainty assessment	from Job M	anager. Unc	ertainty ran	ge based on AACEI recor	nmended p	ract	ice 18R-97	as amended for NCS	SX.			
	,												
										1			
Residual Impacts													
										Coot In		Cabadula	Immont
					Likelihood of					Cost Ir	npact	Schedule	Impact
Job	Risk Descrip	otion			Likelihood of Occurring Mitig	ation Plan		Bas	sis of estimate	Cost Ir	npact High	Schedule Low	Impact High
Job	Risk Descrip	otion				ation Plan		Bas	sis of estimate				
	Risk Descrip	otion				ation Plan		Bas	sis of estimate				
Job	Risk Descrip	otion				ation Plan		Bas	sis of estimate				
Job	Risk Descrip	otion				ation Plan		Bas	sis of estimate				
Job NONE Notes:					Occurring Mitig			Bas	sis of estimate				
Job NONE Notes: [1] Low cost and schedule	impacts are consid	lered the mi			Occurring Mitig	ccur.		Bas	sis of estimate				
None Notes: [1] Low cost and schedule High cost and schedule	impacts are considerimpacts are considerinpacts are considerimpacts are considerimpacts are considerimpacts are considerimpacts are considerimpacts are considerinpacts lered the mi	aximum (100	0-percentile	Occurring Mitig	ccur.		Bas	sis of estimate					
None Notes: Il Low cost and schedule High cost and schedule Cost impacts should be	impacts are conside impacts are conside entered as man-ho	lered the mi dered the m burs (by der	aximum (100 nographic) a	0-percentile and M&S dir	Occurring Mitig	ccur.		Bas	sis of estimate				
NONE Notes: [1] Low cost and schedule High cost and schedule [2] Cost impacts should be Cost impacts should N	impacts are conside impacts are conside entered as man-hoo	lered the mi dered the m ours (by der garmy costs	aximum (100 nographic) a s which are	0-percentile and M&S dir separately o	Occurring Mitig	ccur. nt occur stimate. lule impact			sis of estimate				
NONE Notes: Il Low cost and schedule High cost and schedule Cost impacts should be Cost impacts should N Project control is repor	impacts are conside impacts are conside entered as man-ho OT include standing insible for quantifying should be entered as	lered the mi dered the m ours (by der g army costs g the low ar s the min ar	aximum (100 nographic) as s which are nd high cost nd max impa	0-percentile and M&S dir separately o impacts ba acts on the	npacts should the event o) impacts should the ever ect cost under basis of exalculated from the schedused on the labor hours an	ccur. nt occur stimate. lule impact			sis of estimate				
NONE Notes: Il Low cost and schedule High cost and schedule Cost impacts should be Cost impacts should be Project control is repor The schedule impacts s	impacts are conside impacts are conside entered as man-ho OT include standing insible for quantifying should be entered at the impact then the s	lered the mi dered the m ours (by der g army costs g the low ar s the min ar schedule en	aximum (100 nographic) as which are sold high cost and max impatries should	0-percentile and M&S dir separately or impacts bacts on the obe zero.	Occurring Mitig	ccur. nt occur stimate. lule impact			sis of estimate				
NONE Notes: Il Low cost and schedule High cost and schedule Cost impacts should be Cost impacts should N Project control is repor Il The schedule impacts so If there is no critical pa Likelihood of occurrence	impacts are consider impacts are considered as man-horomorphisms and the standing and the standing and the standing should be entered as the impact then the soce should be entered.	lered the mi dered the m ours (by der g army costs g the low ar s the min ar chedule en d consisten	aximum (100 nographic) as which are nd high cost nd max impa tries should t with our ri	0-percentile and M&S dir separately of impacts ba acts on the of be zero. sk classifica	Occurring Mitig pacts should the event o) impacts should the ever ect cost under basis of exalculated from the sched sed on the labor hours are critical path.	ccur. nt occur stimate. lule impact nd M&S ide	ntifie	ed					
NONE Notes: Il Low cost and schedule High cost and schedule Cost impacts should be Cost impacts should N Project control is repor Il The schedule impacts so If there is no critical pa Likelihood of occurrence	impacts are consider impacts are considered as man-horomorphisms and the standing and the standing and the standing should be entered as the impact then the soce should be entered.	lered the mi dered the m ours (by der g army costs g the low ar s the min ar chedule en d consisten	aximum (100 nographic) as which are nd high cost nd max impa tries should t with our ri	0-percentile and M&S dir separately of impacts ba acts on the of be zero. sk classifica	Occurring Mitig	ccur. nt occur stimate. lule impact nd M&S ide	ntifie	ed					
NONE Notes: Il Low cost and schedule High cost and schedule Cost impacts should be Cost impacts should N Project control is repor Il The schedule impacts so If there is no critical pa Likelihood of occurrence	impacts are consider impacts are considered as man-horomorphisms and the standing and the standing and the standing should be entered as the impact then the soce should be entered.	lered the mi dered the m ours (by der g army costs g the low ar s the min ar chedule en d consisten	aximum (100 nographic) as which are nd high cost nd max impa tries should t with our ri	0-percentile and M&S dir separately of impacts ba acts on the of be zero. sk classifica	Occurring Mitig pacts should the event o) impacts should the ever ect cost under basis of exalculated from the sched sed on the labor hours are critical path.	ccur. nt occur stimate. lule impact nd M&S ide	ntifie	ed					

Activity ID	MILE- stones (level 2 & 3)	Activity Description	Duration (work days	Baseline Start	Baseline Finish	Shifts	Total Float	% cmplt	Proposed Budgeted	FY07	FY0	3	FY09	FY10	FY11	FY
2 - Cent	,	entation & Control														
	&C Systems-S															
R52-10	Prelimina	ary Design	30	02MAR09*	10APR09		49		6,203.60				■EC//	EM =40hr ;		
R52-11	PDR		0		10APR09		49		0.00							
R52-20	Final Des	sign	60	13APR09	07JUL09		49		6,203.60				E	EC//EM =40hr ;		
R52-21	FDR		0		07JUL09		49		0.00					7		
R52-30	Procurer	ment	30	08JUL09	18AUG09		49		33,500.80					EC//EM =20hi 43=17 ; 41=1	r;37=03 ; 18\$k;	
R52-40	EPICS P	rogramming - Base	10	19AUG09	01SEP09		49		12,407.20					■ EC//EM =80h		
R52-50	EPICS P	rogramming - VDCT db editor	30	02SEP09	14OCT09		229		6,273.87					■EC//EM =40	Ohr ;	
R52-60	IOC Prog	gramming - MDSplus data & events	30	02SEP09	14OCT09		229		18,821.60					■EC//EM =12	20hr ;	
R52-70	OPC - E	PICS/PLC Interface	90	02SEP09	20JAN10		49		28,002.44					EC//EM 35=02\$	=160hr ; 43=02 k ;	2 ;
R52-80	Appl. Pro	ogramming-T/C	30	21JAN10	03MAR10		49		12,828.80					■EC//E	M =80hr ;	
R52-90	Program	ming - misc.	90	04MAR10	09JUL10		49		16,036.00						EC//EM =100hr	;
R52-100	Installati	on	60	15APR10	09JUL10		49		49,987.20		EC//E	M =40h B =120h	; EC//TB ir ; EM//TE	=100 ; 3 =240hr ;		
R52-110	Test		14	12JUL10	29JUL10		49		6,414.40						EC//EM =40hr ;	;
Subtotal			354	02MAR09	29JUL10		49	İ	196,679.51					7		