Cost Center: 9417 — Revision for FDR 060911R1
Job Number: 5001-5008
Job Title: 9417
Job Manager: S. Ramakrishnan

NSTX CENTER STACK UPGRADE - PS CHANGES 130kA part capability 8 parallels -------060710 nopf

1. TF WILL BE PULSED AT 129.778kA FOR 7.6 SECONDS EVERY 2400 SECONDS

							Duration days	Start date	Finish date	Mult	Qty	excl factor	Qnty	Units	M&S Qty	M&S Units	M&S Unit Cost ($k/unit)	M&S Cost ($K)	M&S Spare Units	M&S Spare Cost ($K)	Design/ Procurement EEEM (md)	Design/ Procurement Dm (md)	Installation EEEM (md)	Installation EESM (md)	Installation EETB (md)	Installation SC ($K)	Commissioning EEEM (md)	Commissioning EESM (md)	Commissioning EETB (md)	Line Total ($K)	Names of req'd skills if known	Basis of Estimate Category	% Cont'cy	Total with contingency
51- AC Power	**$167.810**																																	
	511- Experimental AC Power	$167.8																																
			Grounding		*Misc. grounding*	*design/install grd.*	*5*	4/1/2012	4/30/2012	*1*		*1*			*1*	*lot*	*1.000*	*30.00*		*1*	*8*	*20*	*1*	*2*	*5*	*40*	*1*	*2*	*2*	124.8	Ramkri	2	10	137.2
			D-site Pulsed AC Power Distribution		Lockouts/protection/reactivate	activate	8	4/1/2012	4/30/2012	1		1			1	lot	5.000	5.00			3	3	2	8	10		3	3	5	43.1	Ramakri	2	10	47.4
52 - AC/DC Converters	**$48.085**																																	
	521 - Reactivation Converters	$48.1								1		1																						
			Coil Power Supplies	*Transrex PS Maintenance*	*Reactivation*	*activate*	*10*	4/1/2012	4/30/2012	*1*		*1*			*12*	*PSS*	*1.000*	*12.00*	*1.000*	*1.000*	*1*	*1*					*5*	*10*	*20*	48.1	Ramkri	2	10	52.9
53 - DC Systems	**$2,549.022**																																	
	531-FCPC DC Changes	$2,549.0																																
	531.1 PF1a Changes	$252.2																																
			NSTX PF1a Changes	Design & Supervision		design	30	4/1/2012	8/1/2012	1		1									10	20	5	5	5		5	5	10	68.7	Ramkri	2	10	75.5
			NSTX PF1a Changes	Task of removing Ripple reactors & Recabling		remove reactors	5	4/15/2012	5/15/2012	1		1					1.000	*1.00*			3	4	2	5	20	50	1	1	2	94.1	Ramkri	4	30	122.3
			NSTX PF1a Changes	**task of TF reactor enclosures**		**build enclosure**	**10**	**5/15/2012**	**6/15/2012**	**1**		**1**					**1.000**	**5.00**			**4**	**4**	**2**	**15**	**30**	**25**	**1**	**1**	**2**	**89.5**	**connoley**	**4**	**30**	**116.3**
531 - FCPC TF DC Systems	$1,077.2																																	
	531.2- TF Changes	$1,077.2																																
			TF DC Changes FCPC	Design & Supervision		design	60	6/15/2012	6/15/2013	1		1									40	40	5	5	15		5	5	10	135.7	Ramkri	2	15	156.1
				Materials & Installation	***1000MCM 5kV Cable For PSS***	***procure cable***	***5***	***9/1/2011***	***5/1/2012***	***1***	***48***	***1***	***150***	***ft/PSS***	***6000***	***ft***	***0.030***	***180.00***			***5***	***5***								***223.7***	***Ramkri***	***6-Apr***	***15***	***257.2***
					Cable Tray in FCPC	tray procure	5	12/1/2011	5/1/2012	1		1			150	ft	0.050	7.50			2	2								13.5	Ramkri	2	15	15.5
					Install Tray in FCPC	tray install	5	6/15/2012	7/15/2012	1		1			150	ft	0.100	15.00			2	2								22.3	Ramkri	2	15	25.7
			NSTX TF Power cabling changes	**Task of NSTX TF PS cabling changes**		**cable install**	**90**	**4/15/2012**	**12/15/2012**	**1**		**1**						**10.00**			**40**	**4**	**2**	**5**	**120**	**440**	**1**	**1**	**2**	**682.0**	**Ramkri**	**4**	**15**	**784.3**
	531.3- Removing cabling	**$649.3**	**Removing cabling**	**Misc**		**cable remove**	**20**	**4/15/2012**	**12/15/2012**	**1**		**1**						**5.00**			**40**	**4**	**2**	**5**	**80**	**440**	**1**	**1**	**2**	**649.3**	**Ramkri**	**4**	**15**	**746.7**
		-$64.8	**Copper scrap value**	**Misc**		**cable remove**	**20**	**4/15/2012**	**12/15/2012**	**1**		**1**						**-55.00**												**-64.8**	**Ramkri**	**4**	**-15**	**-55.1**
	531.4 DC Reactors	$375.4	DC Reactors for TF & OH	Design & Specification		design		4/15/2011	12/15/2011	1		1									6	10								17.8	Ramkri			17.8
				Procurement OH Reactors		*procure reactor*		*9/15/2011*	*2/15/2012*	*1*		*1*			*2*	*units*	*50.000*	100.00												117.8	Ramkri	6	15	135.5
				TF reactor Installation		install reactor		6/15/2012	7/15/2012	1		1											5	10	10	20	3	5	5	62.7	Viola			62.7
				OH Reactor Installation		install reactor		6/15/2012	7/15/2012	1		1				2	20.000	40.00					5	10	5	80	3	5	5	177.1	Viola	6	15	203.7
	531.5 TA Cabling Changes	**$107.4**	**Transition area cabling PF/CHI**	**Misc**		**work in TA**		**9/15/2012**	**12/15/2012**	**1**		**1**			**1**		**7.000**	**7.00**			**3**	**15**	**2**	**10**	**40**	***30***	**1**	**1**	**2**	**107.4**	**Ramkri**	**2**	**20**	**128.9**
533- TA-NTC DC Systems	$152.2																																	
		$152.2																																
	533.1 PCTS Changes		**PCTS Changes**	**PCTS Changes**		**work on PCTS**		**9/15/2012**	**12/15/2012**	**1**		**1**			**1**		**15.000**	**15.00**			**3**	**15**	**2**	**10**	**40**	***60***	**1**	**1**	**2**	**152.2**	**Ramkri**	**2**	**20**	**182.6**
54 - Control & Protection Systems	**$1,683.969**																																	
	541 - Electrical Interlocks	$682.0																																
				Design		design		4/1/2012	8/1/2013	1		1			1	units	2.000	2.00			8	16		5	15	40				91.8	Zhao/Ramkri	2	10	100.9
				Controls		procure controllers		8/15/2012	12/15/2012	1		1			1	units	98.000	98.00			180	40		5	120					487.9	Zhao	4	20	585.5
				Install interlocks/cabling		Install		12/1/2012	4/1/2013	1		1			1	units	2.000	2.00			5	10		5	15	35				76.0	Zhao/Ramkri	4	15	87.4
				Test Modified NSTX HCS		HCS testing		4/1/2013	6/1/2013	1		1															5	5	20	26.3	Zhao/Ramkri	2	15	30.2
	542 - Kirk Key Interlocks	$75.8																																
				Kirk Keys		kirk key changes		4/1/2013	6/1/2013	1		1			1	lot	15.000	15.00			5	10	2	5	15		5	5	15	75.8	Ramkri/Baker	4	15	87.2
	543 - Real Time Control	$165.5																																
				Develop Control Algorithms		algorithm develp		1/1/2013	6/1/2013	1		1									120									165.5	Neumeyer	2	20	198.6
	545 - Instrumentation	$563.0																																
			DC Current Transducers (DCCTs)					*4/1/2012*	*6/15/2012*	1		1			2	units	70.000	140.00			5	10	4	8	20		3	3	15	227.6	Ramkri	6	15	261.8
			DC Current Transducers (DCCTs)					*4/1/2012*	*6/15/2012*	1		1			8	units	10.000	80.00			5	10	4	8	20		3	3	15	156.9	Ramkri	6	15	180.5
			Signal Conditioning & Associated Cabling					4/1/2012	8/1/2013	1		1			1	lot	9.000	9.00			15	10	5		20	80	10	5	5	178.5	Mozulay/Ramkri	4	15	205.2
	546 - Coil Analog Protection	$197.6																																
			Overload Protection & Associated Cabling(TF)					4/1/2012	8/1/2013	*1*		*1*			5	units	*4.000*	*20.00*	*1.000*	*4.000*	*50*	*30*	*10*	*20*	*20*		*10*	*4*	*10*	197.6	Mozulay/Ramkri	2	25	247.0
55 - System Design and Integration	**$669.718**																																	
	551 - System Design	$500.7																																
			Design Drawings & Drawings changes , as-builts	New drawings & Misc. updates				4/30/2010	4/15/2014	1		1									90.00	70.00								190.7	Ramkri	2	10	209.7
				Analysis				7/1/2009	7/1/2010	1		1									70					15				114.2	Ramkri			
			CDR Power system	All power systems				12/1/2009		1		1									15.00	15.00								34.9	Ramkri	2	10	38.4
			PDR Power system	All power systems				6/25/2010		1		1									15.00	15.00								34.9	Ramkri	2	10	38.4
			FDR 1	PF1a				12/15/2010		1		1									15.00	15.00								34.9	Ramkri	2	10	38.4
			FDR 2	TF/OH				4/15/2011		1		1									15.00	15.00								34.9	Ramkri	2	10	38.4
			Calculations	Calculations - documentation				4/30/2010	4/15/2014	1		1									15.00					30				56.0	Neumeyer	2	10	61.6

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1. TF WILL BE PULSED AT 129.778kA FOR 7.6 SECONDS EVERY 2400 SECONDS

																	M&S				*Design/ Procurement*		*Installation*				*Commissioning*			*Line Total*	Names of req'd skills if known	Basis of Estimate Category	% Cont'cy	Total with contingency	
							Duration	Start date	Finish date	Mult	Qty	excl factor	Qnty	Units	Qty	Units	Unit Cost	Cost	Spare Units	Spare Cost	EEEM	Dm	EEEM	EESM	EETB	SC	EEEM	EESM	EETB						
							days										(k$/unit)	($K)		($K)	(md)	(md)	(md)	(md)	(md)	($K)	(md)	(md)	(md)	($K)					
	552 - System Testing	$169.0																																		
			Procedures PTPs, ISTPs	New Procedures						1		1									15.00	15.00								34.9	Ramkri/Baker	2	10	38.4	
				DC Circuit Hipots and impedance Measurements						1		1															3		8	9.5	Ramkri/Baker	2	10	10.4	
				Electrical Interlock Testing						1		1															3		8	9.5	Ramkri/Baker	2	10	10.4	
				Kirk Key Interlock Testing						1		1															2		3	4.8	Ramkri/Baker	2	10	5.2	
				Instrumentation Test & Calibration						1		1															2		2	4.1	Ramkri/Baker	2	10	4.5	
				Real Time Control System Testing						1		1															3		3	6.1	Ramkri/Baker	2	10	6.8	
				Coil Protection System Testing						1		1									15						3		3	26.8	Ramkri/Baker	2	10	29.5	
				Coil Power Supply Dummy Load Testing						1		1			10	PS							5		20		20	10	20	73.3	Ramkri/Baker	2	10	80.6	
			TOTALS															743.50		$6	828	430	65	146	645	$1,385	103	76	196	**5118.6**				**5808.8**	13.5
																	M&S -->	875.84		6.000	1141	409	90	176	431	$1,632	142	92	130.95936	5124.6					