NCSX Work Approval Form (WAF)

WBS Number: 36
WBS Title: Edge & Divertor Diagnostic Systems
Job Number: 3601
Job Title: Edge & Divertor Diagnostic Systems
Job Manager: Brent Stratton

Description:

This WBS element consists of diagnostics required to characterize the plasma edge and divertor regions. Quantities measured include the hydrogen recycling, the edge neutral pressure, the edge temperature and density profiles, the divertor radiated power, the divertor target temperature, and edge and divertor flows. This information is important in the understanding of edge transport and plasma wall interactions. A variety of diagnostic techniques will be used. This WBS is responsible for the vacuum interface, including windows, shutters, valves or electrical feedthrus. Responsibility also includes sensors, mounting structures and sensor cabling near the vacuum vessel. Sensor electronics and racks are also included. Other WBS units are responsible for field cabling and junction boxes, rack terminal blocks, rack AC power and grounding, and data acquisition hardware.

Schedule:

See Attached

Approvals:

Brent Stratton
Digitally signed by Brent Stratton
DN: cn=Brent Stratton, c=US
Date: 2007.08.03 09:12:48 -04'00'

Job Manager — Date

Lawrence E. Dudek
Digitally signed by Lawrence E. Dudek
DN: cn=Lawrence E. Dudek, c=US
Date: 2007.08.05 22:07:12 -04'00'

Responsible Line Manager — Date

James L Anderson
Digitally signed by James L Anderson
DN: cn=James L Anderson, c=US, o=PPPL, ou=NCSX, email=jlanders@pppl.gov
Reason: I am approving this document
Date: 2007.08.06 08:05:51 -04'00'

Project Manager — Date

Mike Williams
Digitally signed by Mike Williams
DN: cn=Mike Williams, o=PPPL, ou=Engineering, email=williams@pppl.gov, c=US
Date: 2007.08.06 08:46:58 -04'00'

Engineering Department Head — Date

NCSX June 2007 ETC
TABLE I - DESIGN LABOR

WBS Number: 36

WBS Title: Edge & Divertor Diagnostic Systems

Job Number: 3601

Job Title: Edge & Divertor Diagnostic Systems

Job Manager: Brent Stratton

Description: Visible TV camera wide angle view along one field period to show plasma shape. Will borrow camera from NSTX. Location will be one of the blanked-off neutral beam ports. Need to install an angled tube and 8" Conflat flange on NB port. Need to design and fabricate holder for camera. Will use same camera and window for e-beam mapping (WBS 38).

	$	Labor Hours							Basis of Estimate
Task Description	**M&S**	**EMEM**	**EMSM**	**EMTB**	**EEEM**	**EETB**	**EADM**	**RM2**	
Design System - angled port design for line-of-sight							80		**Based on similar designs for NSTX (much more complicated on NSTX)**
Fabricate angled view port				8		16			**Based on similar designs for NSTX - modified for NCSX design - estimate from Construction Manager**
Fabricate Camera Mount				40					**Based on similar designs for NSTX**
Install System				40					**Based on similar designs for NSTX**
Engineering Oversight		40							**Based on similar designs for NSTX**
Materials									
Window	$2,500								**Based on catalogue price from vendor - See Table V**
Misc Material/parts	$1,000								**Based on experiences on NSTX**
TOTAL	**$3,500**	**40**	**0**	**88**	**0**	**16**	**80**	**0**	

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TABLE II - Materials and Subcontracts

WBS Number: 36									
WBS Title: Edge & Divertor Diagnostic Systems									
Job Number: 3601									
Job Title: Edge & Divertor Diagnostic Systems									
Job Manager: Brent Stratton									
Materials and Subcontracts (M&S)									**Basis of Estimate**
		Material		**Labor**					
Description - inlcuded in Table I									

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TABLE III - Fabrication/Assembly Installation

WBS Number: 36														
WBS Title: Edge & Divertor Diagnostic Systems														
Job Number: 3601														
Job Title: Edge & Divertor Diagnostic Systems														
Job Manager: Brent Stratton														
In-house Fabrication and Assembly and Installation														
Included in Table I														

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TABLE IV - Uncertainty of Estimate and Residual Risk Assessment

WBS Number: 36
WBS Title: Edge & Divertor Diagnostic Systems
Job Number: 3601
Job Title: Edge & Divertor Diagnostic Systems
Job Manager: Brent Stratton

Uncertainty of the Estimate

	High	Medium	Low	Uncertainty of Estimate (%)	Comments/Other Considerations
Design Maturity	X			-5%/+10%	Standard design based on previous PPPL devices
Design Complexity			X		Very simple design used before
Other Comments:-					Time for leak checking welds not included in this estimate

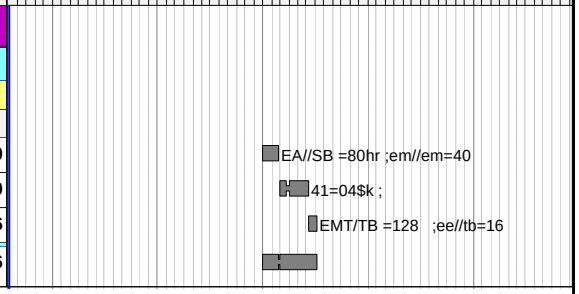
Note: High/Medium/Low uncertainty assessment from Job Manager. Uncertainty range based on AACEI recommended practice 18R-97 as amended for NCSX.

Residual Impacts

Job	Risk Description	Likelihood of Occurring	Mitigation Plan	Basis of estimate	Cost Impact Low	Cost Impact High	Schedule Impact Low	Schedule Impact High
NONE								

Notes:
[1] Low cost and schedule impacts are considered the minimum (0-percentile) impacts should the event occur.
High cost and schedule impacts are considered the maximum (100-percentile) impacts should the event occur
[2] Cost impacts should be entered as man-hours (by demographic) and M&S direct cost under basis of estimate.
Cost impacts should NOT include standing army costs which are separately calculated from the schedule impact
Project control is reponsible for quantifying the low and high cost impacts based on the labor hours and M&S identified
[3] The schedule impacts should be entered as the min and max impacts on the critical path.
If there is no critical path impact then the schedule entries should be zero.
[4] Likelihood of occurrence should be entered consistent with our risk classification methodology, i.e.
VL= Very Likely (P>80%), L=Likely (80%>P>40%), U=Unlikley (40%>P>10%), VU=Very Unlikely (P<10%), NC=Non-credible (P<1%)

Activity ID	MILE-stones (level 2 & 3)	Activity Description	Duration (work days	Baseline Start	Baseline Finish	Shifts	Total Float	% cmplt	Proposed Budgeted
36 - Edge and Divertor Diagnostics									
Job: 3601 - Edge Divertor Diagnostics-STRATTON									
361-001		Design Visible Camera sys	40	01OCT09*	25NOV09		51		17,054.80
361-015		Procure flange,window and material	65	30NOV09	10MAR10		51		5,012.00
361-016		fabricate and assemble Visible tv camera sys	20	11MAR10	07APR10		51		8,828.96
Subtotal			125	01OCT09	07APR10		51		30,895.76



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