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: 2007.07.06 14:28:42 -04'00'

Job Manager _____ Date _____

Lawrence E. Dudek
Digitally signed by Lawrence E. Dudek
DN: cn=Lawrence E. Dudek, c=US
Date: 2007.07.09 13:53:38 -04'00'

Responsible Line Manager _____ Date _____

Hutch Neilson
Digitally signed by Hutch Neilson
DN: CN = Hutch Neilson, C = US, O = PPPL
Date: 2007.07.09 15:06:32 -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: 2007.07.09 15:15:24 -04'00'

Engineering Department Head _____ Date _____

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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%)