

## NCSX Work Approval Form (WAF)

**WBS Number: 19**

**WBS Title: Stellarator Core Management and Integration**

**Job Number: 1901**

**Job Title: Stellarator Core Management and Integration**

**Job Manager: Mike Cole**

**Description:**

WBS 191 (Stellarator Core Management) - This effort covers general management and oversight for the Stellarator Core. It is assumed to be half time for the duration of the project. This is a Level of Effort task. WBS 192 (Stellarator Core Integration and Global Analysis) - This effort covers design integration activities for the Stellarator Core, including global Pro-E models and drawings for the Stellarator Core, Pro-Intralink database maintenance of all drawings and CAD models, analyses common to all of WBS 1, and design criteria documents. This is a level of effort task.

**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 Number: 19**  
**WBS Title: Stellarator Core Manafgement and Integration**  
**Job Number: 1901**  
**Job Title: Stellarator Core Manafgement and Integration**  
**Job Manager: Mike Cole**

**Description:**

*WBS 191- This effort covers general management and oversight for the Stellarator Core. It is assumed to be half time for the duration of the project.*

Task ID	HOURS				Basis of Estimate
	2007	2008 thru 2010	2011		
<p><b>Description:</b>  <b>WBS 191 (Stellarator Core Management) - This effort covers general management and oversight for the Stellarator Core. It is assumed to be half time for the duration of the project. This is a Level of Effort task.</b></p>					
Labor - Composite of ORNL Engineer / Designer	488 1170 dependent upon schedule			Brad at 15% and Mike at 50%	
Travel	3,000 6,000 6,000				
<p><b>Description:</b>  <b>WBS 192 (Stellarator Core Integration and Global Analysis) - This effort covers design integration activities for the Stellarator Core, including global Pro-E models and drawings for the Stellarator Core, Pro-Intralink database maintenance of all drawings and CAD models, analyses common to all of WBS 1, and design criteria documents. This is a level of effort task.</b></p>					
Labor - Composite of ORNL Engineer / Designer	638 1530 dependent upon schedule			Assumed 0.3 my/yr for a design integration designer and 0.55 my/yr for an engineer. Based on an ORNL manyear of 1800 hours.	
Travel	3,000 3,000 3,000			Assumed 2 trips/per of the designer and engineer	

Title III is shown in WBS 73 reference 2505hrs  
 see spreadsheet title 3 estimate for fpa and machine assy

**NCSX June 2007 ETC**  
**TABLE II- Materials and Subcontracts**

**WBS Number: 19**  
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**Job Manager: Mike Cole**

<b>Materials and Subcontracts (M&amp;S)</b>						<b>Basis of Estimate</b>
<b>Description:</b>						
<b>WBS 191 - Management and Integration - no M&amp;S</b>						
<b>WBS 192 - Stellarator Core Integration and Global Analysis</b>						
<b>Worksheet for FY2007 to 2009</b>						
	no.	cost ea/yr	yrs	% to NCSX	total	
<b>Software</b>						
Pro-E licenses	6	\$3,330	4	60%	\$47,952	Based on actual FY 2007 maint costs
ANSYS maintenance	1	\$8,743	4	60%	\$20,983	Based on FY 2003 maint costs
IPA maint.	1	\$2,005	4	60%	\$4,812	Based on FY 2003 maint costs
Rhino	1	\$500	4	60%	\$1,200	Based on FY 2003 maint costs
Corel Draw	1	\$600	4	60%	\$1,440	Based on FY 2003 maint costs
misc software	1	\$1,500	4	60%	\$3,600	Based on historical costs
<i>subtotal, software</i>					\$79,987	
<b>Hardware</b>						
Workstations	6	\$2,500	4	60%	\$36,000	based on replacement every two years
Printer / Plotter maint.	2	\$1,200	4	60%	\$5,760	based on historical maint. Costs
<i>subtotal, hardware</i>					\$41,760	
<b>Total Purchased Software/Hardware</b>		<b>\$20,378.00</b>	<b>Per Year</b>		<b>\$121,747</b>	

**NCSX June 2007 ETC**  
**TABLE III - Fabrication and Assembly**

**WBS Number: 19**

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**Job Title: Stellarator Core M**

**Job Manager: Mike Cole**

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**In-house Fabrication and Assembly and Installation**

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Description: N/A

NCSX June 2007 ETC

TABLE IV - Uncertainty of Estimate and Residual Risk Assessment

WBS Number: 19

WBS Title: Stellarator Core Manafgement and Integration

Job Number: 1901

Job Title:

Job Manager: Mike Cole

Uncertainty of the Estimate

	<u>High</u>	<u>Medium</u>	<u>Low</u>	<u>Uncertainty of Estimate (%)</u>	<u>Comments/Other Considerations</u>
Design Maturity			X		LOE - estimates based on recent experiences on NCSX
Design Complexity			X	-10%/+20%	LOE - estimates based on recent experiences on NCSX
Other Comments:					Work highly dependent of MC winding and FPA activities - as they are delayed/improved, this job follows.

Residual Risks

	<u>Risk</u>	<u>Likelihood of Occurring (%)</u>	<u>Mitigation Stgrategies</u>	<u>Consequence if Occurs</u>	
				<u>Cost</u>	<u>Schedule</u>
NONE					

Activity ID	MILEstones (level 2 & 3)	Activity Description	Duration (work days)	Baseline Start	Baseline Finish	Shifts	Total Float	% cmplt	Proposed Budgeted							
										FY07	FY08	FY09	FY10	FY11	FY12	
<b>19 - Stellarator Core Management and Integration</b>																
<b>Job: 1901 - Stellarator Core Mngtt&amp;Integr-COLE</b>																
<b>191 - Stellarator Core Management &amp; Oversight</b>																
1901-07		WBS 191 FY07	LOE	106*	01MAY07*	28SEP07	1	1,249	LOE	77,380.44	cole=.50 fte nelson=.15 fte ; 35=05\$k ;					
1901-08		WBS 191 FY08	LOE	249*	01OCT07*	29SEP08	1	1,000	LOE	208,453.58	cole=.50 fte nelson=.15 fte ; 35=06\$k ; ornl41=20.38k					
1901-09		WBS 191 FY09	LOE	247*	01OCT08*	28SEP09	1	752	LOE	221,094.09	cole=.50 fte nelson=.15 fte ; 35=06\$k ; ornl41=20.38k					
1901-10		WBS 191 FY10	SA LOE	248*	01OCT09*	30SEP10	1	502	LOE	229,029.48	cole=.50 fte nelson=.15 fte ; 35=06\$k ; ornl41=20.38k					
1901-11		WBS 191 FY10	LOE	79*	01OCT10*	31JAN11	1	423	LOE	95,379.48	cole=.50 fte nelson=.15 fte ; 35=06\$k ; ornl41=20.38k					
<b>192 - Stellarator Core Integration &amp; Analysis</b>																
1902-07		WBS 192 FY07		106*	01MAY07*	28SEP07	1	1,249	LOE	84,180.68	ornlem=.55; orn l dsnr=.3 ornl35=3k					
1902-08		WBS 192 FY08		249*	01OCT07*	29SEP08	1	1,000	LOE	199,924.56	ornlem=.55; orn l dsnr=.3 ornl35=3k					
1902-09		WBS 192 FY09		247*	01OCT08*	28SEP09	1	752	LOE	210,949.08	ornlem=.55; orn l dsnr=.3 ornl35=3k					
1902-10		WBS 192 FY10		248*	01OCT09*	30SEP10	1	502	LOE	219,015.60	ornlem=.55; orn l dsnr=.3 ornl35=3k					
1902-11		WBS 192 FY10		79*	01OCT10*	31JAN11	1	423	LOE	74,333.10	ornlem=.55; orn l dsnr=.3 ornl35=3k					
Subtotal				932	01MAY07	31JAN11	1	423	LOE	1,619,740.09						