

**NCSX June 2007 ETC
TABLE I - DESIGN LABOR**

WBS Number: 21
WBS Title: Gas Fueling System
Job Number: 2101
Job Title: Fueling System
Job Manager: Bill Blanchard

Description:

The proposed fueling system consists of a gas delivery from a single gas cylinder and a gas injection portion consisting of one piezo electric pulse valve, one manual interface valve located at one of the upper P12 port covers. The pulse valve will be operated by a valve driver controlled by the NCSX computer system (greater than 50 T-l/sec fueling rate).

Task ID	K\$		Hours								Basis of Estimate	
	M&S		EMEM	EMSM	EMSB	EMTB	EASB	EEEM	EESM	EESB		EETB
Title I and II Design												
Preliminary Design / Management / Admin		32			24					24		
Drafting							8					
Final Design / Management / Admin		48			32					40		
Detail drawings							24					
Subtotal Title I & II Design		80	0	56	32	0	64	0	0	0		
Title III												
Oversight/Management	\$5.0K	16										
Procurement				8					8			
Fabrication				24	48							
Procedure and Installation		8		12	24				40			
Procedure and Testing		16		8					8			
Subtotal Title III	\$5.0K	40	0	52	72	0	0	56	0	0		

This is a relatively simple system that utilizes some existing parts/components already at PPPL. Estimate based on prior experience on similar systems (e.g., NSTX), adjusted for the simplicity of this system. Includes some P&ID drawings, weld drawings, fabrication drawings, two reviews (PDR & FDR) and installation and test procedures. Input from experienced engineers/personnel familiar with specific parts of this scope was used for estimates. Includes overall design and oversight, design activities (dwgs, support and bracket design, overall configuration of the system) and purchasing of components.

This effort includes procurement, fabrication/welding/assembly, installation, oversight, leak checking of the subsystems, procedures, refurbishment of legacy equipment as required and initial operation and testing.

M&S included function generator/valve driver and miscellaneous