NCSX Vacuum Pumping Systems

W. Blanchard

WBS 22 Manager

VACUUM PUMPING SYSTEM

Requirements

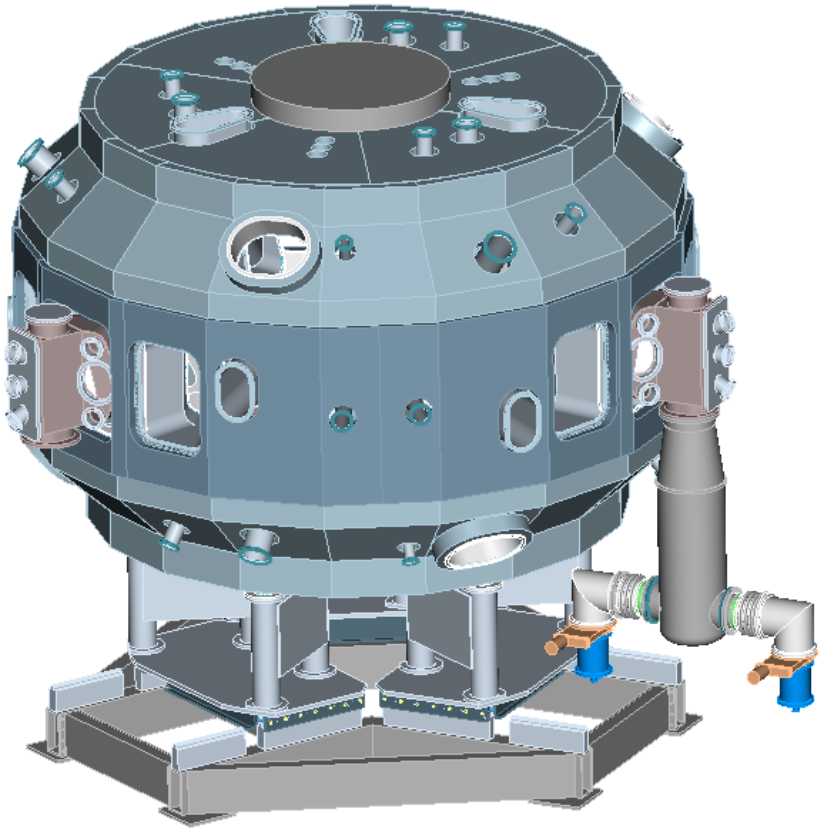
- **Minimum effective pumping speed of 1300 l/s**

Interfaces

- **Design consists of one pumping duct off of one NB transition piece and a vertical 24” duct**

Design Features

- **Two legacy 1500 l/s TMPs**
- **System monitored, controlled and interlocked using a PLC**
- **Differentially pumped RGA**



VACUUM PUMPING SYSTEM

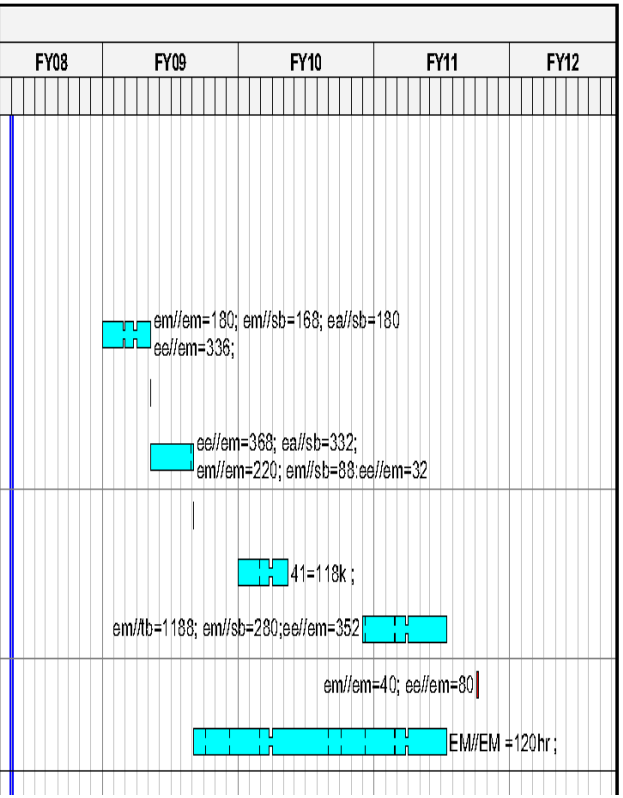
Task ID		$ M&S	Hours EMEM	EMSM	EMSB	EMTB	EAEM	EASB	EEEM	EESM	EESB	EETB
Title I and II Design												
Preliminary Design / Management / Admin												
	Engr Work Planning & Design		180									
	Design Hardware				80							
	Design PLC Controls								336			
	Testing Equipment				88							
	Drafting Support (Electrical)						160					
	Drafting Support (Mechanical)						20					
Final Design / Management / Admin												
	Engr Work Planning & Design		220									
	Mechanical Design				88							
	Design PLC Controls								336			
	Electrical Design								64			
	Electrical Design/Drafting							272				
	Drafting Support (Mechanical)							60				
Subtotal Title I & II Design			***400***	***0***	***256***	***0***	***180***	***332***	***736***	***0***	***0***	***0***
Title III												
	Engr Work Planning & Design		120									
	Maint/Repair Mech Pumps				80							
	Repair/Cal. Instrumentation				80							
	Electrical Installation					668						
	Fabricate/Install Hardware				120	520						
	Fabricate/Install PLC Controls								352			
	Integrated System Testing		40						80			
	Materials and Supplies	$ 118,000										
Subtotal Title III		***$ 118,000***	***160***	***0***	***280***	***1188***	***0***	***0***	***432***	***0***	***0***	***0***

Cost Estimate

* **Based on NSTX costs for system which is similar to the proposed NCSX design**
* **Input from engineers and personnel familiar with various parts of the project**

VACUUM PUMPING SYSTEM

Activity ID	MILE -STONE LEVEL	Activity Description	Duration (work days	SHIFTS	Forecast Start	Forecast Finish	Total Float	Cost to Complete
22 - Torus Vacuum Pumping Systems								
Job: 2201 - Vacuum Pumping Systems-BLANCHARD								
220-101		Preliminary Design	83		01OCT08*	05FEB09	361	126,871.80
220-105		PDR VPS	1		06FEB09	06FEB09	361	0.00
220-109		Final Design	80		09FEB09	01JUN09	361	147,786.60
220-113		FDR VPS	1		02JUN09	02JUN09	361	0.00
220-117		Procure PLC,Values,Hardware	87		01OCT09*	12FEB10	277	157,766.00
220-133		Fabrication and Assemble	154		01SEP10*	15APR11	50	205,043.31
220-137		Test VPS Hardware	3		05JUL11	07JUL11	1	21,609.20
220-116		Title III	463		03JUN09	13APR11	893	20,285.49



Project Schedule

- **Design in FY09, procurements in FY10 and fabrication/installation in FY11**

VACUUM PUMPING SYSTEM

Uncertainty of the Estimate							
		High	Medium	Low	Uncertainty Range (%)	Comments/Other Considerations	
	Design Maturity			X		There have been no design reviews therefore the design is not fixed.	
					-15%/+25%		
	Design Complexity			X		Anticipated to only require standard components	
	Other Comments:						

Risk Assessment: Low

Risk:
*** Equipment or component failure**

Mitigation:
*** All components outside of coils and cryostat and easily accessible**
*** Standard equipment and hardware**
*** Replacement parts for major components in-house**