

NCSX June 2007 ETC
TABLE II- Materials and Subcontracts

WBS Number: 161
WBS Title: LN2 Distribution System
Job Number: 1601-161
Job Title: LN2 Distribution System
Job Manager: Paul Goranson

Materials and Supplies

Description:

This effort covers procurement of materials for the LN2 distribution system by fixed price subcontract.

Basis of Estimate

Assumptions:

outside engr rate = 120 \$ per hour
 outside fab rate = 60 \$ per hour
 outside inspection/technician rate = 80 \$ per hour

Based on recent experiences on NCSX and UT work being done at MDL
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Purchased parts:

coolant line pigtails from coils to manifolds \$18,480 see notes below
 Insulating Jumper hoses \$4,320
 Manifolds for cooling lines \$6,612
 valves \$6,000 see notes below
 other hardware \$23,200
 Thermocouples \$0 included in job 1431 for the modular coil fabrication

See Worksheet Below
See Worksheet Below
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subtotal, purchased parts **\$58,612**

Worksheet:

coolant line pigtails from coils to manifolds

Average length of pigtail

	Total	3 ft TF	Modular	PF1	PF2	PF3	PF4	PF5	PF6
No. of coils	48		18	18	2	2	2	2	2
circuits per coil at header		18							
total circuits	168	18	144	1	1	1	1	1	1
Total number of pigtails	336			8	0.5	0.5	0.5	0.5	0.5
Cost per pigtail, with fittings	\$55								
Total cost of pigtails	\$18,480								
Number of MC coil insulating break jumper hoses and end fittings	144								
cost per jumper	30								
total cost of jumpers	\$ 4,320								
total cost of all lines									

Based on recent purchases for NCSX and UT at MDL
Based on recent purchases for NCSX and UT at MDL

Manifolds for cooling lines

Assume 1 pair of 1.5 inch manifolds for each field period, one above and one below the midplane inside the PF5 coil
 Each manifold will have 1/3 of the required cooling connections plus 25% spare
 The manifolds will connect via vertical pipes to the supply system below the cryostat

avg toroidal perimeter of field period	16 ft
avg vertical height of connection lines	9 ft
no of header pairs	3
cost of tubing	\$15 per foot, 316 SS
cost per field period	\$2,232
total number of coolant connections, all headers	840
cost per connection	\$5
cost of nipples for all manifolds	\$4,200
welding consumables	\$200 total
no. connections for supply piping	6 2 connections per manifold
cost per connection	\$30
cost for supply piping connections	\$180
total matl cost for manifolds	\$6,612

Based on recent purchases for NCSX and UT at MDL

Flow control hardware

no. of circuits	24
Valves	\$250 ea
no. of valves	24 one for each pf and 1f coil circuit at manifold
Total cost for valves	\$6,000
flow control orifice at manifold	\$50 ea
no of orifice units	144 one for each MC coil circuit
Total cost for orifice	\$7,200
Other misc items	\$10,000
total hardware	\$23,200

Based on recent purchases for NCSX and UT at MDL

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Thermocouples

Number 0 ea
 Thermocouple cost each, with connector 68 \$ each
 total for thermocouples \$0

Included in Job 1431
Based on recent purchases for NCSX and UT at MDL

TOTAL