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(see Excel spreadsheet in the CD-ROM of this RFP for embedded notes)

EQUIPMENT DESCRIPTION AND FIELD INTERFACES	Process Piping Connections				Utility Piping Connections			
	Description	Size	Type	Material	Description	Size	Type	Material
Compressor Skid w/ Motor Control Center	Gas Inlet	6"	150# Flange	CS	Cooling Water In	4"	150# Flange	CS
	Gas Outlet	4"	300# Flange	CS	Cooling Water Out	4"	150# Flange	CS
	HP Bypass	2"	300# Flange	CS				
	LP Byapss	2"	300# Flange	CS				
	Gas Make-up	1"	SW	CS				
	Oil Return	3/4"	SW	CS				
Oil Removal System Skid	Gas Inlet	4"	300# Flange	CS	Instrument Air	3/4"	NPT	CS
	Gas Outlet	4"	300# Flange	CS				
	Gas to Storage	1"	SW	CS				
	Oil Return	3/4"	SW	CS				
Buffer Storage Tank	Gas In/Out	2"	300# Flange	SS				
	Relief Valve	3"	300# Flange	SS				
Refrigerator Cold Box	Warm Gas In	3"	300# Flange	SS	Cold Box Vacuum	4"	ISO Flange	SS
	Warm Gas Out	6"	150# Flange	SS	Vacuum Header	1"	SW	CS
	Cold Gas In	2 x 15	Bayonet	SS	Chilled Water In	3/4"	150# Flange	CS
	Cold Gas Out	2 x 15	Bayonet	SS	Chilled Water Out	3/4"	150# Flange	CS
	Vent Header	1"	SW	SS	Instrument Air	3/4"	NPT	CS
Refrigerator Control Panel								
Vacuum/Turbomolecular Pump System	CB Vacuum	4"	ISO Flange	SS				
	CB Vacuum Hdr.	1"	SW	SS				
Heat Exchanger Module	H ₂ In 1	1"	BW	SS	Helium Guard	12"	ISO Flange	SS
	H ₂ Out 1	1"	BW	SS	Vacuum Jacket	10"	Lip-Welded	SS
	H ₂ In 2	1"	BW	SS	Instrument Air	3/4"	NPT	CS
	H ₂ Out 2	1"	BW	SS				
	H ₂ In 3	1"	BW	SS				
	H ₂ Out 3	1"	BW	SS				

Attachment 1. Proposed Equipment Availability Dates (shown in CY)

Proposed Equip'mt On Site Dates	Prop. Date	Finish Date	2002			2003				2004			
			Second	Third	Fourth	First	Second	Third	Fourth	First	Second	Third	Fourth
(rev. 1/18)													
<i>Note: This chart lists the expected delivery of equipment to the site.</i>													
Package 1: Monolith Assembly/Installation (WBS 1.6.4, 1.6.5)													
Target-to-hot cell liner	1/1/02												
Core vessel drain line	1/11/02												
Inner support cylinder	3/1/03					◆							
Lower inner/outer vessel shielding	3/1/03					◆							
Outer support cylinder	3/1/03					◆							
Bulk shield-bottom blocks	7/1/02		◆										
Shield under proton beam window	6/1/03						◆						
Ring plates	10/1/02			◆									
Package 5A: Moderator Systems - Helium Refrigeration System (WBS 1.6.2)													
Cold box	2/1/03					◆							
Compressor skid w/ motor control center	2/1/04									◆			
Oil removal system	2/1/04									◆			
Helium piping (furnished by fridge manufacturer)	2/1/04									◆			
Helium buffer tank	5/1/04										◆		
Heat exchanger module	2/1/04									◆			
Package 6: Target Utilities System (WBS 1.6.6)													
Tasks for Target Building Utilities													
Proton beam window delay tank (TK-1512)	12/1/02			◆									
Moderators/inserts CW delay tank (TK-2011)	12/1/02			◆									
Reflector plug CW delay tank (TK-2511)	12/1/02			◆									
Proton beam window G/L sep. tank (SEP-1500)	12/1/02			◆									
Moderators/inserts G/L sep. tank (SEP-2000)	12/1/02			◆									
Reflector plug G/L sep. tank (SEP-2500)	12/1/02			◆									
Hg cooling loop G/L sep. tank (SEP-1020)	12/1/02			◆									
Hg heat exchanger (HX-1050)	1/15/03				◆								
Proton beam window/target shroud heat exchanger (HX-1530)	1/15/03				◆								
Moderators/inserts/PBW box heat exchanger (HX-2041)	1/15/03				◆								
Reflector plugs heat exchanger (HX-2541)	1/15/03				◆								
Hg loop ion exchange column (IX-1040A/B)	2/1/03				◆								
Proton beam window/target shroud ion exchange column (IX-1550A/B)	2/1/03				◆								
Moderators/inserts/PBW box ion exchange column (IX-2020A/B)	2/1/03				◆								
Reflector plugs ion exchange column (IX-2560A/B)	2/1/03				◆								
Hg cooling loop filters (FLT-1010 & 1011)	1/15/03				◆								
Proton beam window/target shroud filters (FLT-1540 & 1541)	1/15/03				◆								
Moderators/inserts/PBW box filters (FLT-2050 & 2051)	1/15/03				◆								
Reflector plugs filters (FLT-2520 & 2521)	1/15/03				◆								
Hg cooling loop pumps (P1000A/B)	12/30/02				◆								
PBW/target shroud cooling loop pumps (P1520A/B)	12/30/02				◆								
Moderators/inserts/PBW box cooling pumps (P2030A/B)	12/30/02				◆								
Reflector plugs cooling pumps (P2530A/B)	12/30/02				◆								
Cooling water bellows seal valves													
159 manual valves	2/1/03				◆								
9 manual-remote valves	2/1/03				◆								

Section E
Solicitation No.: F5-2681-02-RFP02-1044
Target Building General Construction

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(see Excel spreadsheet in the CD-ROM of this RFP for embedded notes)

OFFLOAD AND INSTALL MAJOR EQUIPMENT ITEMS	Crane Operator Hours	Rigger Hours	Millwright Hours	Laborer Hours	Painter Hours
Compressor Skid w/ Motor Control Center					
Offload and set					
Inspect, unpack and clean					
Level, anchor and grout					
Oil Removal System Skid					
Offload and set					
Inspect, unpack and clean					
Level, anchor and grout					
Buffer Storage Tank					
Offload and set					
Inspect, unpack and clean					
Level and anchor					
Refrigerator Cold Box					
Offload and set					
Inspect, unpack and clean					
Level, anchor and grout					
Install Seller furnished operating deck and stairs					
Refrigerator Control Panel					
Offload, set and level					
Inspect, unpack and clean					
Vacuum/Turbomolecular Pump System					
Offload, set and level					
Inspect, unpack and clean					
Connect high vacuum system to cold box shell					
Heat Exchanger Module					
Offload and set					
Inspect, unpack and clean					
Level, anchor and grout					
Vacuum Jacketed Piping (Seller Supplied)					
Offload					
Inspect, unpack and clean					
Warm Interconnecting Piping (Seller Supplied)					
Offload					
Inspect, unpack and clean					

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(see Excel spreadsheet in the CD-ROM of this RFP for embedded notes)

INSTALL FIELD PIPING	Pipe Fitter Hours	Welder Hours	Test / QA Technician Hours	Laborer Hours	Painter Hours
Refer to Air Liquide Drawing No. C1098 F 001 A1					
Sub-Contractor Furnished and Installed Piping					
Compressor Piping					
Install, support & test compressor bypass piping					
Install, support & test He make-up piping from buffer storage tank					
Install, support & test cooling water piping					
Install, support & test oil return piping from oil removal system					
Oil Removal System Piping					
Install, support and test He return piping to buffer storage tank					
Cold Box Piping					
Install, support & test vent piping					
Install, support & test chilled water piping					
Install, support & test instrument air piping					
Vacuum System Piping					
Install, support & test piping to CB vacuum header					
Heat Exchanger Module					
Install, support & test instrument air piping					
CM Furnished / Sub-Contractor Installed Piping					
Compressor Piping					
Install, support & test Seller furnished inlet piping from cold box					
Install, support & test Seller furnished outlet piping to OR system					
Oil Removal System Piping					
Install, support & test Seller furnished outlet piping to cold box					
Buffer Storage Tank					
Install relief valve assembly					
Vacuum Jacketed Piping from Cold Box to Exchanger Module					
Install, support & test VJ supply piping to exchanger module					
Inner line					
Vacuum jacket					
Install, support and test VJ return piping from exchanger module					
Inner line					
Vacuum jacket					

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INSTALL FIELD PIPING	No. of Pieces Shipped	Pipe Size, IPS	Pipe O.D. Inches	Pipe Schedule	Pipe Material	Design Pressure psig	Approx. Linear Feet	Number of Valves
Refer to Air Liquide Drawing No. C1098 F 001 A1								
Sub-Contractor Furnished and Installed Piping								
Compressor Piping								
Install, support & test compressor bypass piping	N/A	2	2.375	SCH 40	CS	350	8	1
Install, support & test He make-up piping from buffer storage tank	N/A	1	1.315	SCH 40	CS	350	58	1
Install, support & test cooling water piping	N/A	4	4.500	SCH 40	CS	150	82	0
Install, support & test oil return piping from oil removal system	N/A	3/4	1.050	SCH 40	CS	150	30	0
Oil Removal System Piping								
Install, support and test He return piping to buffer storage tank	N/A	1	1.315	SCH 40	CS	350	10	1
Cold Box Piping								
Install, support & test vent piping	N/A	1	1.315	SCH 10S	SS	150	25	0
Install, support & test chilled water piping	N/A	3/4	1.050	SCH 40	CS	150	50	2
Install, support & test instrument air piping	N/A	3/4	1.050	SCH 40	CS	150	25	2
Vacuum System Piping								
Install, support & test piping to CB vacuum header	N/A	1	1.315	SCH 40	CS	150	10	0
Heat Exchanger Module								
Install, support & test instrument air piping	N/A	3/4	1.050	SCH 40	CS	150	20	2
CM Furnished / Sub-Contractor Installed Piping								
Compressor Piping								
Install, support & test Seller furnished inlet piping from cold box	9	6	6.625	SCH 10S	SS	150	170	N/A
Install, support & test Seller furnished outlet piping to OR system	2	4	4.500	SCH 10S	SS	350	22	N/A
Oil Removal System Piping								
Install, support & test Seller furnished outlet piping to cold box	9	3	3.500	SCH 10S	SS	350	160	N/A
Buffer Storage Tank								
Install relief valve assembly		3	3.500	SCH 10S	SS	350	1	N/A
Vacuum Jacketed Piping from Cold Box to Exchanger Module								
Install, support & test VJ supply piping to exchanger module								
Inner line	2	2	2.375	SCH 10S	SS	150	40	N/A
Vacuum jacket		4	4.500	SCH 10S	SS	150	40	N/A
Install, support and test VJ return piping from exchanger module								
Inner line	2	2	2.375	SCH 10S	SS	150	39	N/A
Vacuum jacket		4	4.500	SCH 10S	SS	150	39	N/A

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	Approx. Number of Elbows	Approx. Number of Flanges	Approx. Number of Tees	Approx. Number of Reducers	No. of Welded Joints	No. of Mechanical Joints	Linear Inches of Pipe Weld	No. of Pipe Supports
INSTALL FIELD PIPING								
Refer to Air Liquide Drawing No. C1098 F 001 A1								
Sub-Contractor Furnished and Installed Piping								
Compressor Piping								
Install, support & test compressor bypass piping	2	2	0	0	6	4	45	1
Install, support & test He make-up piping from buffer storage tank	3	2	1	2	22	2	104	3
Install, support & test cooling water piping	8	4	0	0	20	4	283	3
Install, support & test oil return piping from oil removal system	6	0	0	0	14	0	50	2
Oil Removal System Piping								
Install, support and test He return piping to buffer storage tank	2	0	0	2	12	0	50	0
Cold Box Piping								
Install, support & test vent piping	4	0	0	0	10	2	42	2
Install, support & test chilled water piping	12	0	0	0	26	4	86	2
Install, support & test instrument air piping	4	0	0	0	10	4	33	2
Vacuum System Piping								
Install, support & test piping to CB vacuum header	4	0	0	0	10	2	42	1
Heat Exchanger Module								
Install, support & test instrument air piping	4	0	0	0	10	4	33	2
CM Furnished / Sub-Contractor Installed Piping								
Compressor Piping								
Install, support & test Seller furnished inlet piping from cold box	N/A	N/A	N/A	N/A	8	2	166	9
Install, support & test Seller furnished outlet piping to OR system	N/A	N/A	N/A	N/A	1	2	15	1
Oil Removal System Piping								
Install, support & test Seller furnished outlet piping to cold box	N/A	N/A	N/A	N/A	8	2	88	9
Buffer Storage Tank								
Install relief valve assembly	N/A	N/A	N/A	N/A	2	1	22	0
Vacuum Jacketed Piping from Cold Box to Exchanger Module								
Install, support & test VJ supply piping to exchanger module								
Inner line	N/A	N/A	N/A	N/A	1 Field Joints	2 Bayonets	48	3
Vacuum jacket	N/A	N/A	N/A	N/A				
Install, support and test VJ return piping from exchanger module								
Inner line	N/A	N/A	N/A	N/A	1 Field Joints	2 Bayonets	48	3
Vacuum jacket	N/A	N/A	N/A	N/A				

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INSTALL FIELD WIRING	Electrician Hours	Instrument Technician Hours	Laborer Hours		
Compressor Skid w/ Motor Control Center					
Install, support & test 4160 volt wiring/conduit to MCC					
Install, support & test instrument wiring/conduit					
Refrigerator Cold Box					
Install, support & test 480 volt wiring/conduit to 7.5 kW heater					
Install, support & test 230 volt wiring/conduit to utility heaters					
Install, support & test 120 volt control power wiring/conduit					
Install, support & test instrument wiring/conduit					
Refrigerator Control Panel					
Install, support & test 120 volt control power wiring/conduit					
Install, support & test instrument wiring/conduit					
Vacuum/Turbomolecular Pump System					
Install, support & test 230 volt power wiring/conduit					
Install, support & test instrument wiring/conduit					
Heat Exchanger Module					
Install, support & test instrument wiring/conduit					



Picture #1 - Typical Compressor w/ MCC Mounted on Skid



Picture #3 - Typical Compressor - Note Inlet Piping



Picture #2 - Compressor Anchored and Grouted to Concrete S



Picture #4 - Typical Compressor - Note Holes in Frame Rail



Picture #5 - Typ. Oil Removal Skid Anchored & Grouted



Picture #6 - Typ. Cold Box w/ Vacuum Skid - Note CB Support Saddles



Picture #7 - Typical High Vacuum Skid (w/ Diffusion Pump)