US LHC Accelerator Project	Baseline Change Request
BCR Number	8
WBS	1.1.1.3.1.1-5 Heat Exchanger Test
Title	Increase in Cost of Heat Exchanger Test
Change Control Level	2
Originator	T. Nicol and J. Kerby
Date	15 Feb 1999

Description of change

Originally the heat exchanger test was to be of a short, full cross section model, tested in a CERN test stand. Now the test will include:

1. A full length, full scale model of the heat exchanger.
2. A helium vessel to simulate volume of helium in the magnet.
3. A distribution feedbox for connection to the CERN test facility.
4. A return can to route utilities back to the CERN test facility.

Reason for change

Research at CERN has indicated the need to test a full-length heat exchanger (HXTU) to enable the helium flow to fully develop and to test the effect of the elevation change along a triplet due to the slope of the tunnel. The CERN test also indicated the importance of simulating the full helium volume present in the magnet. The full-length heat exchanger instrumented to detect the effect of the slope of the tunnel and helium volume in the magnet, require that the feedbox and end can be more complex than originally planned. All of the CERN test stands will be in use during the scheduled testing of the heat exchanger; therefore a new connection to the CERN cryogenic system is necessary. This requires a feedbox and return can to be provided along with the test article.

Impact on other sub-systems

None

Impact on cost

	Materials	Labor	Total
Revised HXTU Estimate	$592,663	$0	$592,663
Original HXTU Estimate	$61,200	$30,004	$91,204
Difference	$531,463	($30,004)	$501,459
G&A (Mts:18.24%,Lbr:39.78%)	$96,939	($11,936)	$85,003
Total Cost Impact	$628,402	($41,940)	$586,462

The revised estimate is based on actual costs or costs committed through February 1999, plus an engineering estimate of $150,000 for the feedbox module and $10,000

for a pre-cooler heat exchanger for the feedbox. Both items will be purchased from outside vendors.

Impact on cost (cont.)

Details of the cost impact analysis are presented on the table on the following page. Points to note are:

1. Nearly all of the cost impact has already occurred. The February 99 actual costs are 70% of the estimate.
2. FNAL Assembly labor, inspection and welding are not required because vendors will supply all of the components.
3. Anticipated purchases of $150,000 and $10,000 are included in the estimate.
4. Shipping costs of $10,000 for the HXTU and $5000 for the feedbox are included in the estimate.
5. All costs shown in the table are before the addition of G&A.

Impact on schedule

The HXTU will be delivered for test in the fall of 1999, and tested thereafter depending on the availability of the CERN test facility. No schedule impact is expected for either the cryostat or the magnets.

Other impacts (ES&H, etc.)

None

Change Control Board recommendation (if required)

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WBS	Description	Baseline Cost	Feb 99 Actuals	Estimate	Difference
1.1.1.3.1.1	HXTU (Heat Exchanger Test Unit) purchase orders w/o G&A	$51,000	$301,652	$301,652	($250,652)
	HXTU Feedbox purchase orders w/o G&A		$20,750	$180,750	($180,750)
	HXTU Turnaround Can purchase orders w/o G&A		$42,811	$42,811	($42,811)
	HXTU other materials w/o G&A		$52,450	$52,450	($52,450)
1.1.1.3.1.2	HXTU Shipping purchase orders w/o G&A	$10,200		$15,000	($4,800)
1.1.1.3.1.3	Heat Exchanger Test Unit Assy Labor w/o G&A	$18,102		$0	$18,102
1.1.1.3.1.4	Heat Exchanger Test Unit Inspection w/o G&A	$5,407		$0	$5,407
1.1.1.3.1.5	Heat Exhcanger Test Unit Welding w/o G&A	$6,495		$0	$6,495
	Total Heat Exchanger Test Unit	$91,204	$417,663	$592,663	($501,459)

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Approvals

A. Zlobin, WBS 1.1.1 Level 3 Manager — 03/23/99 Date

J. Kerby, FNAL LHC Laboratory Project Manager — 03/22/99 Date

J. Strait, Change Control Board Chair — 26 Mar 99 Date

J. Strait, US LHC Accelerator Project Manager — 26 Mar 99 Date

J. Yeck, DOE LHC Project Manager — 26 Mar 99 Date

Not Required
Director, DOE Division of High Energy Physics — Date