

## MEMORANDUM

Date : 4-04-07

To : Members of the LHCb RRB  
 From : A. Smith  
 Subject : Category A M&O Status

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**Closing Report for the 2006 budget**

LHCb announced at the last RRB that it was expected that the spending on the Category A M&O budget would be close to the budgeted figure by the end of the year. The total spent is indeed very close to the budget despite the General Services line being considerably over spent. The overspend on this line arises mainly from two sources. Transport costs were considerably higher than had been expected and some of the Cooling and Ventilation charges for 2005 were paid at the start of 2006. The spending in 2006 is summarized in table 1. Further details are given in appendix 1 where figures are given for the main items covered by each main heading below. The power will be billed this year.

**Table 1 : Outcome of Category A M&O spending for 2006**

Category A M&O Outcome for LHCb Items	2006 Budget kCHF	Spending kCHF	Difference kCHF
Detector related costs	392	389	3
Secretariat	166	154	12
On-Call communications	5	5	0
CORE Computing	0	0	0
On-line Computing	350	287	63
Test Beams	45	50	-5
Laboratory Operations	45	33	12
General Services	475	545	-70
<b>Total</b>	<b>1478</b>	<b>1463</b>	<b>15</b>
Power	100		

Grand Total

1578

## Current Status 2007 budget

During the RRB of October 2006, the budget for Category A M&O for this year was approved at the level of 2,222 kCHF with the power cost estimated to be 600 kCHF in addition and shared amongst all institutes but only charged to NMS. At the end of February, spending on the M&O budget stood at 60 kCHF and contributions received for 2007 amounted to 362 kCHF. This is in line with previous experience as the major items to be covered are for services whose invoices are only expected to arrive later in the year. We believe that this year's spending will be closely aligned to the budget.

## Preliminary Category A Budget for 2008

Although the estimated budget for 2008 was examined to take into account trends in the spending of previous years it will be re-examined before being presented to the Scrutiny Group later this year. This revision is unlikely to make a large change to the total figure. The budget amounts to 2,325 kCHF for Category A not including the expected power bill which was previously estimated at 903 kCHF but has been reduced to 250 kCHF in line with the present LHC schedule. As only NMS contribute to the power costs these are listed separately in table 2 below which gives the estimated amount per item.

**Table 2 : Proposed Category A Budget for 2008**

Estimated Category A M&O Costs for LHCb Items	2008 kCHF
□	□
Detector related costs	986
Secretariat	192
On-Call communications	12
CORE Computing	0
On-line Computing	705
Test Beams	30
Laboratory Operations	40
General Services	360
<b>Total</b>	<b>2325</b>
□	□
<b>Power</b>	<b>970</b>

**Grand Total** 3295

The total for M&O without power represents an increase of just over 100 kCHF from the 2007 budget. The main change is in on-line computing where the increase is due to LAN and processor maintenance or replacement. This item will be closely examined by the Scrutiny Group who have requested a list of the main hardware on-line components. The general service costs has been reduced by further reductions to crane/transport costs.

The power estimate has been revised for changes in the cost per MWh, and may need further revision once the LHC schedule for 2008 is better defined.

The sharing is based on the names, and hence numbers, of PhD equivalent physicists and engineers that have been provided by all LHCb institutes. This list is continuously updated but will be fixed for the 2008 sharing late this summer. The current numbers are given in table 3 along with the resulting sharing of the contributions to the proposed 2008 budget.

**Table 3 : Sharing of the proposed budgets.**

FUNDING AGENCY □	PhD Equivs	% PhD Equivs.	2008 Share	Power Share	Total Cat A plus Power
BRAZIL	14	3.86%	89,669	37,410	127,080
CERN	52	14.33%	333,058	□	
CHINA	3	0.83%	19,215	8,017	27,231
FRANCE IN2P3	48	13.22%	307,438	□	□
GERMANY BMBF	11	3.03%	70,455	□	□
GERMANY MPG	7	1.93%	44,835	□	□
ITALY INFN	53	14.60%	339,463	□	□
NETHERLANDS	15	4.13%	96,074	□	□
POLAND	13	3.58%	83,264	□	□
ROMANIA	4	1.10%	25,620	10,689	36,309
RUSSIA	32	8.82%	204,959	36,230	241,189
SPAIN	17	4.68%	108,884	□	□
SWITZ Lausanne	10	2.75%	64,050	□	□
SWITZ Zurich	6	1.65%	38,430	□	□
UK	68	18.73%	435,537	□	□
UKRAINE	4	1.10%	25,620	10,689	36,309
USA NSF	6	1.65%	38,430	15,183	53,613
<b>TOTAL</b>	<b>363</b>	<b>100.00%</b>	<b>2,325,000</b>	<b>118,218</b>	□

## CORE Software Manpower

The CORE computing software manpower needs have been estimated for 2008, and it is expected that the required support will be found as voluntary contributions from collaborating institutes that can be likened to Category B M&O. The current estimate is that the requirement in 2008 will be identical to this year, namely for 36.9 FTEs, and that this will drop to a lower figure in 2009. In March there were still 4.15 FTEs missing for this year but solutions were being sought and LHCb still hopes to avoid having this item partially met by service personnel on Category A. More work on the estimates for 2008 will be performed before the autumn RRB.

## Cat A forecast for later years

The forecast budgets for the years 2009 till 2011 are given below in table 4, As LHCb expects to be in stable operation during this period the forecast budgets are essentially identical.

**Table 4 : Budget forecasts for 2009-11**

Estimated Category A M&O Costs for LHCb Item	2009 kCHF	2010 kCHF	2011 kCHF
□	□	□	□
Detector related costs	978	978	978
Secretariat	195	200	200
On-Call communications	9	9	9
CORE Computing	0	0	0
On-line Computing	740	740	740
Test Beams	25	25	25
Laboratory Operations	35	35	35
General Services	328	328	328
<b>Total</b>	<b>2310</b>	<b>2315</b>	<b>2315</b>
Power	970	970	970
Grand Total	3280	3285	3285

## Category B Status

As stated at previous meetings, LHCb will mainly start to need Cat B funds from 2008 onwards although a few detectors already planned for Cat B in 2006 and 2007.

In LHCb we regard it as the responsibility of each detector collaboration to arrive at their own agreed and preferred method of sharing. The tables below should be regarded as preliminary. They are the ones presented last autumn for 2007 with only the Muon and RICH data, given in bold, updated for 2008.

**Table 5. Category B estimates for 2008**

<b>Cat B 2008</b>	<b>TOTALS</b>
VELO	126
<b>RICH</b>	<b>197</b>
ST	83
OT	34
CALO	340
<b>MUON</b>	<b>229</b>
TRIGGER	60.3
DAQ	270
ECS	70

**Table 6. Category B sharing for 2008**

<b>Detector</b>	<b>Cat B cost for 2008 in kCHF</b>					
	<b>Totals</b>					
<b>MUON</b>	<b>229</b>	<b>Italy</b> <b>160</b>	<b>CERN</b> <b>46</b>	<b>Russia</b> <b>23</b>		
<b>RICH</b>	<b>197</b>	<b>Italy</b> <b>15.5</b>	<b>CERN</b> <b>15.5</b>	<b>UK</b> <b>166</b>		
<b>STR</b>	83	<i>Kiev</i> 4.15	<i>Lausanne</i> 21.58	<i>MPI</i> 21.58	<i>Santiago</i> 14.11	<i>Zurich</i> 21.58
<b>L0 Trigger</b>	60.3	<i>France</i> 48.24	<i>Italy</i> 12.06			
<b>DAQ</b>	250	<i>CERN</i> 250				

## Appendix 1

### Partial list of the main items paid on Cat A M&O 2006

<b>Main Heading</b>	<b>Sub-item</b>	<b>Spend 2006 kCHF</b>
<b>Detector related</b>	<b>Cooling</b>	<b>95</b>
	<b>Gas</b>	<b>70</b>
	<b>Electronics pool</b>	<b>107</b>
	<b>Beam pipe</b>	<b>97</b>
	<b>UPS</b>	<b>2</b>
	<b>Safety</b>	<b>7</b>
	<b>Secretariat</b>	<b>Sec. Assistance</b>
<b>Economat</b>		<b>9</b>
<b>Printing</b>		<b>4</b>
<b>On-line computing</b>	<b>System management</b>	<b>221</b>
	<b>Hardware</b>	<b>67</b>
<b>Test beams</b>	<b>Operation</b>	<b>10</b>
	<b>Gas</b>	<b>40</b>
<b>Laboratory</b>	<b>Assembly areas</b>	<b>2</b>
	<b>Instruments</b>	<b>24</b>
<b>General services</b>	<b>Transport</b>	<b>260</b>
	<b>Survey</b>	<b>30</b>
	<b>Elect+Cooling+Vent</b>	<b>189</b>