Amendment # 1
to the
Memorandum of Understanding

for Collaboration in the Construction of the CMS Detector
(comprising an "All-Silicon Tracker")

between

The EUROPEAN ORGANISATION FOR NUCLEAR RESEARCH,

hereinafter referred to as CERN, Geneva, as the Host Laboratory

on the one hand,

and

an Institution/Funding Agency of the CMS Collaboration

on the other hand.

Preamble

(a) The "Memorandum of Understanding for Collaboration in the Construction of the CMS Detector" (MoU, cf. RRB CMS-D 98-31) was approved by the CMS Resources Review Board (RRB) on 27 April 1998. It has been signed by all CMS funding agencies.

(b) In its Article 10, the MoU makes provision for amendments "… at any time by mutual agreement of its signatories or of their appointed successors. Any such amendments will be subject to the prior agreement of the RRB."

(c) The MoU defined the contributions for a Tracker comprising a Pixel Detector, a Silicon Tracker in its central region and a Micro-strip Gas Chamber (MSGC) Detector in its outer region. It further provided for the construction of the Tracker in two distinct stages: (1) a low-luminosity Tracker which could be built within the available funding, and (2) a high-luminosity Tracker, an upgrade of (1), as soon as the additional funds would be available.

(d) The CMS Collaboration has since proposed a revised design of the Tracker in which the MSGC detectors are replaced by Silicon detectors. This Tracker, referred to as an "All-Silicon Tracker" is now to be built in a single stage. On 15 June 2000, the CERN Research Board approved the new design.

(e) As a consequence, the technical responsibilities have had to be redistributed and the associated funding requirements redefined.

Amendment

(f) The present Amendment updates the MoU to be in accordance with the LHCC approval to build an "All-Silicon Tracker". It essentially replaces Annexes 9.2 A and 9.2 B of the MoU, all parts remaining valid as far these are not updated by the present Amendment.

(g) The responsibilities of the institutes concerned with the construction of the CMS Tracker is described in more detail in a separate document entitled "CMS Silicon Strip Tracker Project" (CMS RRB-D 2000-96). This document has been approved by the CMS Tracker Institution Board on 28 July 2000.

(h) The cost of the 'All-Silicon Tracker' is estimated to be 77.6 MCHF (in 2000 prices).

(i) The current funding is 73.4 MCHF. This includes a contribution of 3.2 MCHF from US-DOE, which can be expected if US_CMS cost and schedule performance allow.

(j) In order to cover the present shortfall of about 4.2 MCHF, about half of the counting room electronics is identified for staging if equivalent cost savings or additional funding can not be realized.

ANNEXES

Annex 1: Institutes in the Collaboration and Names of Their Contact Persons

Annex 9.2A: Deliverables to be provided by the Institutes for the Individual Sub-detectors (including Estimated Costs)

Annex 9.2B: Deliverables and Assigned Funding for the Individual Sub-detectors by Funding Agency (including Estimated Costs)

The European Organization for Nuclear Research (CERN)

and

declare that they agree on this Amendment to the Memorandum of Understanding

(as approved on 27 April 1998 by the CMS Resources Review Board,
with updated Annexes 1, 9.2 A and 9.2 B).

Done in Geneva, Switzerland

on _____

For CERN :

Roger Cashmore
(Director of Research)

Done in

on _____

For :

ANNEX 1

Institutes in the Collaboration and Names of Their Contact Persons

Country	Code	Institute	Contact Person
Armenia	AR1	Yerevan Physics Institute, Yerevan	Albert M. Sirunyan
Austria	AT1	Institut für Hochenergiephysik der OAW, Wien	Claudia-Elisabeth Wulz
Belarus	BY1	Byelorussian State University, Minsk	Nikolaï Shumeiko
	BY2	Research Institute for Nuclear Problems, Minsk	
	BY3	National Centre for Particle and High Energy Physics, Minsk	
	BY4	Research Institute of Applied Physical Problems, Minsk	
Belgium	BE1	Université Catholique de Louvain, Louvain-la-Neuve	Ghislain Gregoire
	BE2	Université de Mons-Hainaut, Mons	Philippe Herquet
	BE3	Université Libre de Bruxelles, Brussels	Catherine Vander Velde
	BE4	Universiteit Antwerpen (UIA), Antwerpen	Frans Verbeure
	BE5	Vrije Universiteit Brussel, Brussels	Walter Van Doninck
Bulgaria	BG1	Institute for Nuclear Research and Nuclear Energy, BAS, Sofia	Vladimir Genchev
	BG2	University of Sofia, Sofia	Leander Litov
[CERN]	CERN	CERN, European Organization for Nuclear Research, Geneva, Switzerland	Henrik Foeth
China	CN1	Institute of High Energy Physics, Beijing	Hesheng Chen
	CN2	University for Science and Technology of China, Hefei, Anhui	Hongfang Chen
	CN3	Peking University, Beijing	Yanlin Ye
Croatia	CR1	Technical University of Split, Split	Ivica Puljak
	CR2	University of Split, Split	Mile Dzelalija
Cyprus	CY1	University of Cyprus, Nicosia	Panos A. Razis
Estonia	EE1	Institute of Chemical Physics and Biophysics, Tallinn	Endel Lippmaa
Finland	FI1	Department of Physics, University of Helsinki, Helsinki	Jorma Tuominiemi
	FI2	Helsinki Institute of Physics, Helsinki	
	FI3	Department of Physics, University of Jyväskylä, Jyväskylä	
	FI4	Digital and Computer Systems Lab., Tampere Univ. of Technology, Tampere	Jarkko Niittylahti
	FI5	Dept. of Physics & Microelectronics Instrumentation Lab., Univ. of Oulu, Oulu	Tuure Tuuva
	FI6	Laboratory of Advanced Energy Systems, Helsinki Univ. of Techn., Helsinki	Pertti Aarnio
France	FR1	LPNHE, Ecole Polytechnique, IN2P3-CNRS, Palaiseau	Jean Badier
	FR2	Lab. d'Annecy-le-Vieux de Phys. des Particules, IN2P3-CNRS, Annecy-le-Vieux	Jean-Pierre Peigneux
	FR3	DSM/DAPNIA, CEA/Saclay, Gif-sur-Yvette	John Rander
	FR4	IReS Strasbourg, IN2P3-CNRS-ULP, LEPSI Strasbourg, UHA Mulhouse	Jean-Marie Brom
	FR5	Institut de Physique Nucléaire de Lyon, IN2P3-CNRS, Univ. Lyon I, Villeurbanne	Didier Contardo
Georgia	GE1	High Energy Physics Institute, Tbilisi State University, Tbilisi	Ramazi Kvatadze
	GE2	Institute of Physics Academy of Science, Tbilisi	Vladimir Roinishvili
Germany	DE1	Humboldt-Universität zu Berlin, Berlin	Thomas Hebbeker
	DE2	Institut für Experimentelle Kernphysik, Karlsruhe	Thomas Müller
	DE3	RWTH, I. Physikalisches Institut, Aachen	Stefan Schael
	DE4	RWTH, III. Physikalisches Institut A, Aachen	Hans Reithler
	DE5	RWTH, III. Physikalisches Institut B, Aachen	Günter Flügge
Greece	GR1	Institute of Nuclear Physics "Demokritos", Attiki	Anna Vayaki
	GR2	University of Athens, Athens	Leonidas Resvanis
	GR3	University of Ioánnina, Ioánnina	Frixos Triantis
Hungary	HU1	KFKI Research Institute for Particle and Nuclear Physics, Budapest	Gyorgy Vesztergombi
	HU2	Kossuth Lajos University, Debrecen	Laszlo Baksay
	HU3	Institute of Nuclear Research ATOMKI, Debrecen	Jozsef Molnar
India	IN1	Bhabha Atomic Research Centre, Mumbai	Sushil Kumar Kataria
	IN2	Panjab University, Chandigarh	Jatinder M. Kohli
	IN3	Tata Institute of Fundamental Research - EHEP, Mumbai	Som N. Ganguli
	IN4	Tata Institute of Fundamental Research - HECR, Mumbai	Narasimham S. Vemuri
	IN5	University of Delhi South Campus, New Delhi	Ram K. Shivpuri
Italy	IT01	Università di Bari, Politecnico di Bari e Sezione dell' INFN, Bari	Giuseppe Iaselli
	IT02	Università di Bologna e Sezione dell' INFN, Bologna	Antonio Rossi
	IT03	Università di Catania e Sezione dell' INFN, Catania	Renato Potenza
	IT04	Università di Firenze e Sezione dell' INFN, Firenze	Ettore Focardi
	IT05	Università di Genova e Sezione dell' INFN, Genova	Pasquale Fabbricatore
	IT06	Università di Padova e Sezione dell' INFN, Padova	Dario Bisello
	IT07	Università di Pavia e Sezione dell' INFN, Pavia	Sergio P. Ratti
	IT08	Università di Perugia e Sezione dell' INFN, Perugia	Giancarlo Mantovani
	IT09	Università di Pisa e Sezione dell' INFN, Pisa	Rino Castaldi
	IT10	Università di Roma I e Sezione dell' INFN, Roma	Marcella Diemoz
	IT11	Università di Torino e Sezione dell'INFN, Torino	Cristiana Peroni

Country	Code	Institute	Contact Person
Korea	KR01	Chonnam National University, Kwangju	Jae Yool Kim
	KR02	Dongshin University, Naju	
	KR03	Seonam University, Namwon	
	KR04	Wonkwang University, Iksan	
	KR05	Konkuk University, Seoul	June-Tak Rhee
	KR06	Korea University, Seoul	Sung Keun Park
	KR07	Cheju University, Cheju	June-Tak Rhee
	KR08	Chungbuk University, Chongju	
	KR09	Kangwon National University, Chunchon	
	KR10	Seoul National University of Education, Seoul	
	KR11	Kyungpook National University, Taegu	Dongchul Son
	KR12	Seoul National University, Seoul	Soo-Bong Kim
	KR13	Sungkyunkwan University, Suwon	
Pakistan	PK1	National Centre of Physics, Islamabad	Hafeez R. Hoorani
	PK2	Ghulam Ishaq Khan Institute of Engineering Sciences and Techn., Swabi	Jamil Ahmad
Poland	PL1	Institute of Experimental Physics, Warsaw	Jan Krolikowski
	PL2	Soltan Institute for Nuclear Studies, Warsaw	Maciej Gorski
Portugal	PT1	Laboratório de Instrumentação e Física Experimental de Partículas, Lisboa	Joao Varela
Russia	RU1	Institute for High Energy Physics, Protvino	Nicolai E. Tyurin
	RU2	Institute for Nuclear Research, RAS, Moscow	Viktor Matveev
	RU3	Institute for Theoretical and Experimental Physics, Moscow	Vladimir Gavrilov
	RU4	Moscow State University, Institute for Nuclear Physics, Moscow	Ludmila Sarycheva
	RU5	P.N. Lebedev Physical Institute, RAS, Moscow	Sergei Rusakov
	RU6	Petersburg Nuclear Physics Institute, RAS, St Petersburg	Alexei Vorobyov
[JINR]	JINR	Joint Institute for Nuclear Research, Dubna	Igor Golutvin
Slovak Republic	SK1	Slovak University of Technology, Bratislava	Jozef Lipka
Spain	SP1	Centro de Investigaciones Energéticas Medioambientales y Tecnólogicas, Madrid	Manuel Aguilar-Benitez
	SP2	Universidad Autónoma de Madrid, Madrid	Teresa Rodrigo
	SP3	Universidad de Oviedo, Oviedo	Teresa Rodrigo
	SP4	Instituto de Física de Cantabria (IFCA), CSIC-Univ. de Cantabria, Santander	Teresa Rodrigo
Switzerland	SW1	Institut für Teilchenphysik, Eidgenössische Technische Hochschule (ETH), Zürich	Hans Hofer
	SW2	Paul Scherrer Institut, Villigen	Quentin Ingram
	SW3	Universität Basel, Basel	Ludwig Tauscher
	SW4	Universität Zürich, Zürich	Claude Amsler
Turkey	TR1	Cukurova University, Adana	Gülsen Onengut
	TR2	Middle East Technical University, Ankara	Perihan Tolun
	TR3	Bogazici University, Dept. of Physics, Istanbul	Erhan Gülmez
Ukraine	UR1	Institute of Single Crystals of National Academy of Science, Kharkov	Vadym Lyubynskiy
	UR2	National Scientific Center, Kharkov Inst. of Physics and Technology, Kharkov	
	UR3	Kharkov State University, Kharkov	
United Kingdom	UK1	Brunel University, Uxbridge	Stephen J. Watts
	UK2	Imperial College, University of London, London	Geoffrey Hall
	UK3	Rutherford Appleton Laboratory, Didcot	Robert M. Brown
	UK4	University of Bristol, Bristol	Greg P. Heath
USA	US01	University of Alabama, Tuscaloosa, Alabama	Laszlo Baksay
	US02	Boston University, Boston, Massachusetts	Lawrence Sulak
	US03	University of California at Davis, Davis, California	Winston Ko
	US04	University of California at Los Angeles, Los Angeles, California	Katsushi Arisaka
	US05	University of California, Riverside, California	John G. Layter
	US06	University of California San Diego, La Jolla, California	James G. Branson
	US07	California Institute of Technology, Pasadena, California	Harvey Newman
	US08	Carnegie Mellon University, Pittsburgh, Pennsylvania	Thomas Ferguson
	US09	Fairfield University, Fairfield, Connecticut	David R. Winn
	US10	Fermi National Accelerator Laboratory, Batavia, Illinois	Dan Green
	US11	University of Florida, Gainesville, Florida	Guenakh Mitselmakher
	US12	Florida State University-HEPG, Tallahassee, Florida	Vasken Hagopian
	US14	University of Illinois at Chicago, (UIC) Chicago, Illinois	Mark Adams
	US15	The University of Iowa, Iowa City, Iowa	Yasar Onel
	US16	Iowa State University, Ames, Iowa	John Hauptman
	US17	Johns Hopkins University, Baltimore, Maryland	Chih-Yung Chien
	US18	Lawrence Livermore National Laboratory, Livermore, California	Craig R. Wuest
	US20	University of Maryland, College Park, Maryland	Andris Skuja
	US21	Massachusetts Institute of Technology, Cambridge, Massachusetts	Paraskevas Sphicas
	US22	University of Minnesota, Minneapolis, Minnesota	Roger Rusack
	US23	University of Mississippi, University, Mississippi	Jim Reidy
	US24	University of Nebraska-Lincoln, Lincoln, Nebraska	Gregory R. Snow
	US25	Northeastern University, Boston, Massachusetts	Steve Reucroft
	US26	Northwestern University, Evanston, Illinois	Bruno Gobbi
	US27	University of Notre Dame, Notre Dame, Indiana	Randal Ruchti
	US28	The Ohio State University, Columbus, Ohio	Ta-Yung Ling
	US29	Princeton University, Princeton, New Jersey	Pierre Piroué
	US30	Purdue University, West Lafayette, Indiana	Virgil E. Barnes
	US31	Rice University, Houston, Texas	Jabus Roberts
	US32	University of Rochester, Rochester, New York	Arie Bodek
	US33	Rutgers, the State University of New Jersey, Piscataway, New Jersey	Steve Schnetzer
	US34	University of Texas at Dallas, Richardson, Texas	Ervin J. Fenyves
	US35	Texas Tech University, Lubbock, Texas	Richard Wigmans
	US36	Virginia Polytechnic Institute and State University, Blacksburg, Virginia	Luke Mo
	US37	University of Wisconsin, Madison, Wisconsin	Don Reeder
Uzbekistan	UZ1	Institute for Nuclear Physics of the Uzbekistan Academy of Sciences, Ulugbek	Bekhzad S. Yuldashev

ANNEX 9.2 A

Deliverables to be provided by the Institutes for the individual Sub-detectors
(including Estimated Costs)

TRACKER

Ref	Deliverables	Cost Estimate	Institutes
2.1.01	Detectors (incl. Pre-series)	965	SW1 SW2 SW3 SW4 US17
2.1.02	Electronics (include. Engineering)	5,020	AT1 SW1 SW2 SW3 SW4 US03 US10 US17 US23 US26 US33 US35
2.1.03	Module Mechanics	1,010	SW1 SW2 SW3 SW4 US10 US26 US35
2.1.04	Support Structures & Assembly	480	SW1 SW2 SW3 SW4 US03 US10 US26 US30
2.1.05	Monitoring	110	SW2 US03 US23
2.1.06	Service Systems	655	SW1 SW2 SW3 SW4 US23
2.1	**Pixel Detectors**	**8,240**	**AT1 SW1 SW2 SW3 SW4 US03 US10 US17 US23 US26 US30 US33 US35**
2.2.01	Procurement of Sensors	20,770	AT1 BE1 BE2 BE3 BE4 BE5 CERN DE2 DE3 DE5 FI1 FI2 FI5 FR4 FR5 IT08 IT09 SW1
2.2.02	Capton	385	CERN
2.2.03	Frames	1,990	BE1 BE2 BE3 BE4 BE5
2.2.04	Pitch Adapters	480	BE1 BE2 BE3 BE4 BE5
2.2.05	FE Hybrid	1,845	FR4
2.2.06	Hybrid Support Plate	480	FR4
2.2.07	Tooling and Box	185	BE1 BE2 BE3 BE4 BE5 FR5 IT01 IT03 IT08
2.2.08	Interconnect Board	555	CERN DE3 IT01
2.2.09	Module Preseries	1,210	AT1 BE1 BE2 BE3 BE4 BE5 CERN DE2 DE5 FR4 IT01 IT03 IT04 IT06 IT08 IT09 IT11
2.2	**Silicon Detectors**	**27,900**	**AT1 BE1 BE2 BE3 BE4 BE5 CERN DE2 DE3 DE5 FI1 FI2 FI5 FR4 FR5 IT01 IT03 IT04 IT06 IT08 IT09 IT11 SW1**
2.3.01	Module Electronics	3,430	AT1 CERN IT06 UK1 UK2 UK3
2.3.02	Analogue Link	9,160	CERN DE2 DE3 DE5 FR4 FR5 IT01 IT03 IT04 IT06 IT08 IT09 IT11 US10
2.3.03	Digital Link	1,065	CERN US10
2.3.04	Analogue Optohybrid	1,025	DE3 DE5 IT08
2.3.05	Digital Optohybrid	170	CERN
2.3.06	FED	3,950	CERN DE2 DE5 FR4 FR5 UK2 UK3
2.3.07	CCU Module	260	CERN
2.3.08	FEC	725	AT1 CERN
2.3	**Electronics for Si Detectors**	**19,785**	**AT1 CERN DE2 DE3 DE5 FR4 FR5 IT01 IT03 IT04 IT06 IT08 IT09 IT11 UK1 UK2 UK3 US10**
2.4.01	Power Supplies	3,760	CERN IT04 IT11
2.4.02	Cables (installed)	4,730	CERN IT01 IT03 IT04 IT06 IT08 IT09 IT11 US10
2.4.03	Slow Control	660	CERN IT09
2.4	**Power Supplies for Si Detectors**	**9,150**	**CERN IT01 IT03 IT04 IT06 IT08 IT09 IT11 US10**
2.5.01	Inner Barrel	1,100	IT09
2.5.02	Inner Endcap	440	IT09
2.5.03	Outer Barrel	650	FI1 FI2
2.5.04	Outer Barrel Rods	1,250	FI1 FI2
2.5.05	Endcaps	440	DE2 DE3
2.5.06	Endcaps Petals	440	DE3
2.5.07	General Cooling	2,200	CERN US10
2.5.08	Integration (st, ts,…)	2,640	CERN
2.5	**Mechanical Structures & Cooling for Si Detectors**	**9,160**	**CERN DE2 DE3 FI1 FI2 IT09 US10**
2.6.01	Position Monitoring Systems	660	CERN DE3 IT01 IT03
2.6.02	Temperature Control	550	CERN IT09
2.6	**Monitoring for Si Detectors**	**1,210**	**CERN DE3 IT01 IT03 IT09**
2.7.01	Test Stands	1,200	AT1 BE1 BE2 BE3 BE4 BE5 CERN DE2 DE3 DE5 FR5 IT01 IT03 IT04 IT06 IT08 IT09 IT11
2.7	**Data Acquisition for Si Detectors**	**1,200**	**AT1 BE1 BE2 BE3 BE4 BE5 CERN DE2 DE3 DE5 FR5 IT01 IT03 IT04 IT06 IT08 IT09 IT11**
2.8.01	Installation Manpower	1,000	CERN IT01 IT03 IT04 IT06 IT08 IT09 IT11
2.8	**Installation of Si Detectors**	**1,000**	**CERN IT01 IT03 IT04 IT06 IT08 IT09 IT11**
2.	**Tracker**	**77,645**	**AT1 BE1 BE2 BE3 BE4 BE5 CERN DE2 DE3 DE5 FI1 FI2 FI5 FR4 FR5 IT01 IT03 IT04 IT06 IT08 IT09 IT11 SW1 SW2 SW3 SW4 UK1 UK2 UK3 US03 US10 US17 US23 US26 US30 US33 US35**

See Annex 1 for the abbreviations of the names of Institutes

ANNEX 9.2 B

Deliverables and Assigned Funding for the individual Sub-detectors by Funding Agency
(including Estimated Costs)

TRACKER

Cost Estimate Reference	Deliverables	Austria	Belgium	CERN	Finland	France-IN2P3	Germany	Italy	Switzerland		United Kingdom	USA		Totals Assigned Funding	Estimated Cost	Balance of Funding vs. Cost
									ETHZ/Universities	PSI		DOE	NSF			
2.1.01	Detectors (incl. Pre-series)								240	410			315	965	965	
2.1.02	Electronics (include. Engineering)	170							1,230	2,250		695	675	5,020	5,020	
2.1.03	Module Mechanics								260	460		290		1,010	1,010	
2.1.04	Support Structures & Assembly								110	140		230		480	480	
2.1.05	Monitoring									60		50		110	110	
2.1.06	Service Systems								160	280		215		655	655	
2.1	**Pixel Detectors**	**170**							**2,000**	**3,600**		**1,480**	**990**	**8,240**	**8,240**	
2.2.01	Procurement of Sensors	510	505	4,680	500	3,300	3,250	6,125	1,900					20,770	20,770	
2.2.02	Capton			385										385	385	
2.2.03	Frames		1,990											1,990	1,990	
2.2.04	Pitch Adapters		480											480	480	
2.2.05	FE Hybrid					1,845								1,845	1,845	
2.2.06	Hybrid Support Plate					475								475	480	-5
2.2.07	Tooling and Box		45			45		90						180	185	-5
2.2.08	Interconnect Board			200			200	140						540	555	-15
2.2.09	Module Preseries	50	300	75		75	300	400						1,200	1,210	-10
2.2	**Silicon Detectors**	**560**	**3,320**	**5,340**	**500**	**5,740**	**3,750**	**6,755**	**1,900**					**27,865**	**27,900**	**-35**
2.3.01	Module Electronics	370		180				930			1,950			3,430	3,430	
2.3.02	Analogue Link			2,280		410	1,010	4,550				900		9,150	9,160	-10
2.3.03	Digital Link			365								700		1,065	1,065	
2.3.04	Analogue Optohybrid						410	615						1,025	1,025	
2.3.05	Digital Optohybrid			170										170	170	0
2.3.06	FED			100		400	750				750			2,000	3,950	-1,950
2.3.07	CCU Module			255										255	260	-5
2.3.08	FEC	200		200										400	725	-325
2.3	**Electronics for Si Detectors**	**570**		**3,550**		**810**	**2,170**	**6,095**			**2,700**	**1,600**		**17,495**	**19,785**	**-2,290**
2.4.01	Power Supplies			230				1,660						1,890	3,760	-1,870
2.4.02	Cables (installed)			2,330				1,900				500		4,730	4,730	
2.4.03	Slow Control			460				200						660	660	
2.4	**Power Supplies for Si Detectors**			**3,020**				**3,760**				**500**		**7,280**	**9,150**	**-1,870**
2.5.01	Inner Barrel							1,100						1,100	1,100	
2.5.02	Inner Endcap							440						440	440	
2.5.03	Outer Barrel				650									650	650	
2.5.04	Outer Barrel Rods				1,250									1,250	1,250	
2.5.05	Endcaps						440							440	440	
2.5.06	Endcaps Petals						440							440	440	
2.5.07	General Cooling			1,100								1,100		2,200	2,200	
2.5.08	Integration (st, ts,...)			2,640										2,640	2,640	
2.5	**Mechanical Structures & Cooling for Si Detectors**			**3,740**	**1,900**		**880**	**1,540**				**1,100**		**9,160**	**9,160**	
2.6.01	Position Monitoring Systems			200			250	200						650	660	-10
2.6.02	Temperature Control			350				200						550	550	
2.6	**Monitoring for Si Detectors**			**550**			**250**	**400**						**1,200**	**1,210**	**-10**
2.7.01	Test Stands	50	100	100		200	200	550						1,200	1,200	
2.7	**Data Acquisition for Si Detectors**	**50**	**100**	**100**		**200**	**200**	**550**						**1,200**	**1,200**	
2.8.01	Installation Manpower			600				400						1,000	1,000	
2.8	**Installation of Si Detectors**			**600**				**400**						**1,000**	**1,000**	
2.	**Tracker**	**1,350**	**3,420**	**16,900**	**2,400**	**6,750**	**7,250**	**19,500**	**3,900**	**3,600**	**2,700**	**4,680**	**990**	**73,440**	**77,645**	**-4,205**