

E.O. Lawrence Berkeley National Laboratory
GRETINA MONTHLY PROGRESS REPORT
August, 2005

I. DEPUTY CONTRACT PROJ. MGR. ASSESSMENT

1. TECHNICAL AND PROGRAMMATIC PROGRESS AND ACCOMPLISHMENTS

- GRETINA representatives of the mechanical team went to the National Superconductor Cyclotron Laboratory (NSCL) to survey the beam line area assigned to GRETINA. The team is investigating the impact of a possible change in the support structure to optimize the efficiency of GRETINA at NSCL.
- Canberra/Eurisys responded our Request For Quotation. We are reviewing their response and procurement is preparing the procurement package. We are still planning to achieve the Level 2 milestone, Award Detector Module Contract in FY05 - Q4.
- The requirement document for the electronics system is completed and is pending review.
- LBNL has published a new version of PUB3000, Chapter 8, Electrical Safety. We are reviewing the document.

2. ACTIONS

N/A

3. COST AND SCHEDULE STATUS

3.1 VARIANCE ANALYSIS AND PROJECT COST PERFORMANCE REPORTS

	<u>Sched</u>	<u>k\$ Act</u>	<u>Variance</u>
MIE Design	1,442.1	1,276.2	165.9
MIE Phase A	1,368.0	- 0 -	1,368.0
OPC	1,178.1	1,161.2	16.9

Variance Statement:

Actual costs shown include accruals for Detector Design of \$159k and Liens totaling \$46k.

Project Impact:

These variances do not impact the MIE completion.

Corrective Action:

For MIE Phase A, we are in constant contact with LBNL Procurement and monitoring the progress on the procurement of first detector module. Award is anticipated by mid-September. For the rest, no action needed. Costs for detector design and LN System work will be recorded/accrued when received.

3.2 MILESTONE STATUS

Level	Milestone Description	Schedule Date	Completion Date
1	CD-2A Approve Performance Baseline Range /CD-3A Approve Start of Construction for Long Lead-time Items	FY05 –Q3	June/05
2	Award Detector Module Contract	FY05 – Q4	
2	Design and Drawings of Mechanical Support Structure Complete	FY06 – Q1	
3	Preliminary Design of Mechanical Support Structure Complete	April/05	May/05
3	Detector Module Drawings Complete	April/05	June/05
3	Detector Module Procurement Specifications Complete	April/05	June/05
3	Electronic Requirement Document Complete	Aug/05	
3	Computing Systems Requirement Document Complete	Aug/05	May/05
3	Quarter Sphere Design Complete	Sept/05	

3.3 PROJECT CRITICAL PATH ANALYSIS

The critical path continues to be the production and delivery of the Detector Modules. Placement of the order for the first detector is anticipated to be Sept/2005.

II. DETAIL SUBSYSTEM STATUS

A. WBS 1.1. Mechanical

WBS 1.1.2 Mechanical Design

Technical Progress/Accomplishments

GRETINA representatives of the mechanical team went to the National Superconductor Cyclotron Laboratory (NSCL) to survey the beam line area assigned to GRETINA. They reported their visit in the "MSU NSCL Site Visit Notes & Action Items", available in DocDB. The team returned convinced that GRETINA will fit the site. An important point identified in the visit is that, with the current LBNL design, the aluminum structure of the quarter spheres would interfere with the downstream quad magnet tank. A list of configuration and design options has been developed and we are presently studying these options. Also, an improved and possibly cheaper installation/removal tool concept came from the meeting.

Significant Issues/Actions

The mechanical team is investigating the impact of a possible change in the support structure to optimize the efficiency of GRETINA at NSCL.

WBS 1.1 Variance Analysis (Cumulative To-date) (\$k)

<u>Sched</u>	<u>Act</u>	<u>Variance</u>
364.0	302.3	61.7

Variance Discussion

The final design of the quarter spheres is progressing slower than originally scheduled. However, this delay does not impact the completion of the project.

B. WBS 1.2 Detector Module

WBS 1.2.1 Procurement

Technical Progress/Accomplishments

N/A

Significant Issues/Actions

Canberra/Eurisys responded our Request For Quotation. We are reviewing their response and procurement is preparing the package. The “Buy American Act’ forms were sent to the DOE office in Chicago for review and approval.

WBS 1.2.2 Test/Characterize Module 1

Technical Progress/Accomplishments

We continue to characterize the Triplet detector module with a radioactive source and the scanning table.

Significant Issues/Actions

N/A

WBS 1.2 Variance Analysis (Cumulative To-date) (\$k)

	<u>Sched</u>	<u>Act</u>	<u>Variance</u>
Design	391.7	298.8	92.9
Phase A	1,368.0	- 0 -	1,368.0

Variance Discussion

Detector Engineering and Test efforts have run lower cost than planned to-date. Phase A schedule reflects the planned award of the first Detector Module.

C. WBS 1.3 Electronics

WBS 1.3.1 Requirement Document

Technical Progress/Accomplishments

The requirement document is completed and we will schedule the review of the document. We will schedule the review for September (instead of August, as originally planned).

Significant Issues/Actions

N/A

WBS 1.3 Variance Analysis (Cumulative To-date) (\$k)

<u>Sched</u>	<u>Act</u>	<u>Variance</u>
9.2	8.4	0.8

Variance Discussion

N/A

D. WBS 1.4 Computing Systems

WBS 1.4.1 Requirement document

Technical Progress/Accomplishments

The computing requirement document was finalized and reviewed.

Significant Issues/Actions

N/A

WBS 1.4 Variance Analysis (Cumulative To-date) (\$k)

<u>Sched</u>	<u>Act</u>	<u>Variance</u>
9.1	6.1	3.0

Variance Discussion

We completed the present work without spending all funds budgeted for this task.

E. WBS 1.6 Project Management

WBS 1.6.1 Management

Technical Progress/Accomplishments

- We received the quotation from Canberra/Eurisys for the detector modules. For more details, refer to Section B.
- We are working in specifying in more details the Event Processing (WBS 1.4.2.4) portion of the Computing System schedule. The Event Processing has a part that is R&D, and when we did the original schedule we decided to wait until we had a better understanding of this processing to specify in more details this portion of the schedule. We are doing this now. Observe that the total effort (and estimated cost) for this WBS will remain the same.

Significant Issues/Actions

The procurement of the first detector module will be delayed. LBNL Procurement decided to generate a new RFQ, and it took time to complete the package. Presently we expect to place the order by middle of September (instead of middle of July).

WBS 1.6.2 General Project Expenses

Technical Progress/Accomplishments

N/A

Significant Issues/Actions

N/A

WBS 1.6 Variance Analysis (Cumulative To-date) (\$k)

<u>Sched</u>	<u>Act</u>	<u>Variance</u>
648.9	651.1	(2.2)

Variance Discussion

N/A

E. WBS 1.7 Environment, Safety and Health

WBS 1.7.1

Technical Progress/Accomplishments

LBNL has published a new version of PUB3000, Chapter 8, Electrical Safety. We are reviewing the document.

Significant Issues/Actions

N/A

WBS 1.7 Variance Analysis (Cumulative To-date) (\$k)

<u>Sched</u>	<u>Act</u>	<u>Variance</u>
19.2	9.4	9.8

Variance Discussion

The schedule anticipates costs for an ES&H review that has been handled in the normal process of divisional oversight. Thus, some of the costs associated with this task have not been incurred.

III. Research and Development Status

Mechanical

- The Prototype II (P2) detector-to-scanning-table adapter has been fabricated and is attached to P2. We expect to collect all require data from the Triplet by the end of September, and we will be able to start using the scanning table to scan P2.
- The mechanical team is estimating the price to duplicate our scanning table. We also need an estimate for the cost of encoders for the X & Y slides and for motorizing/encoding the rotary table.

Computing Systems

- We are working in a detail plan to complete the R&D portion of the Computing Systems in time for the DOE annual review.
- Procurement of the prototype processor farm is being reviewed.
- The EPICS-based data acquisition system is being tested.
- The last CES CPU board was ordered and we received one back from repair. These boards will be used to build a prototype of the DAQ.

Electronics

We continue the work on the cables and connectors to interconnect the detector module to the digitizer cards.

- a) We have selected connectors to interconnect the detector module with the digitizer cards. We procured a few samples of the connectors.
- b) We have laid out a board to accommodate these connectors and we are getting ready to test the custom-made cable and connector assembly.

Significant Issues/Actions

N/A

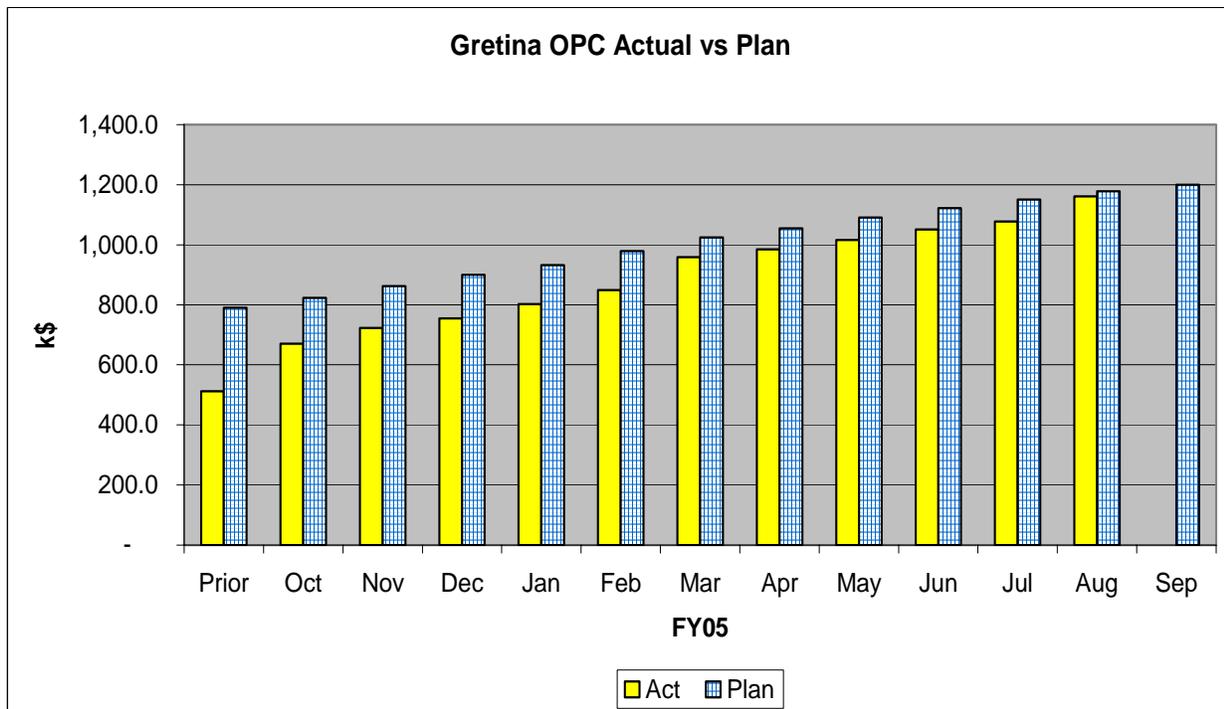
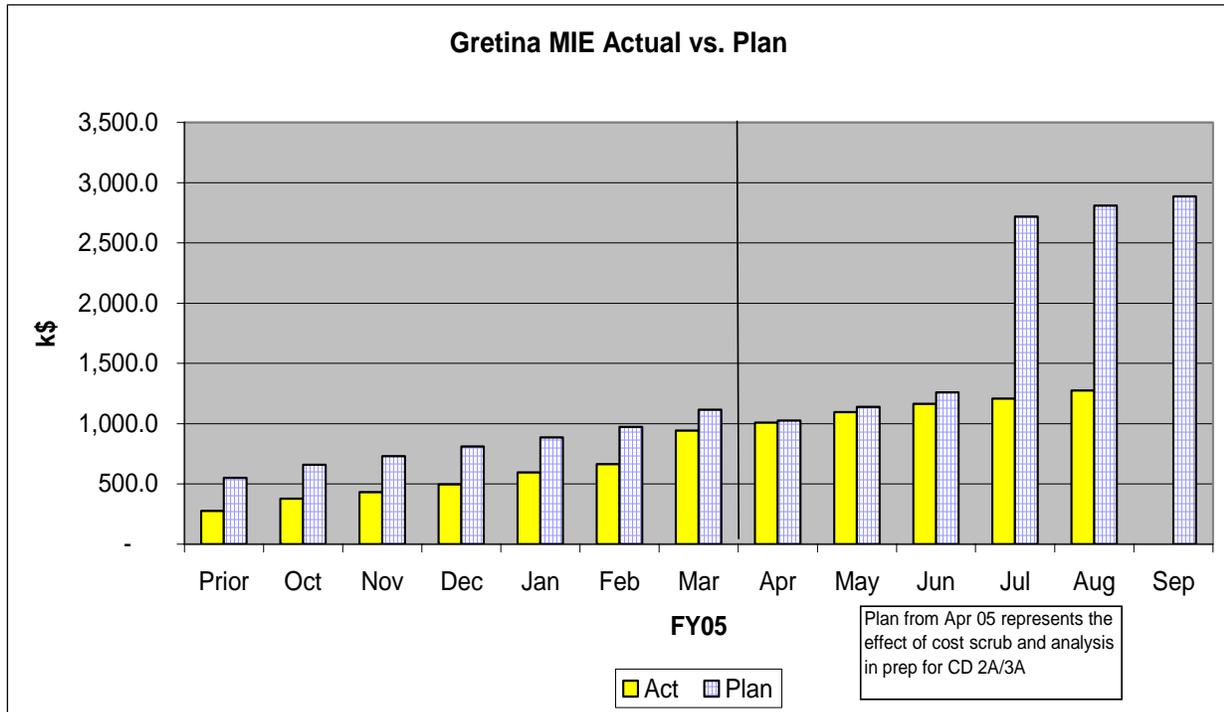
R&D Variance Analysis (Cumulative To-date) (\$k)

<u>Sched</u>	<u>Act</u>	<u>Variance</u>
1,178.1	1,161.2	16.9

Variance Discussion

N/A

IV. Cost Chart



The above charts compare project-to-date budgeted cost with actual for the FY05 time period

GRETINA Schedule August 2005

ID	Work Breakdown Ref	Task Name	% Complete	Start	Finish	2005				2006				2007				2008			
						Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1
1	1	GRETINA	19%	3/1/04	9/16/10																
2		Lvl 1: CD-1	100%	3/1/04	3/1/04																
3	1.1	Mechanical	28%	3/1/04	4/3/08																
4	1.1.1	Requirement document	100%	3/1/04	3/26/04																
5		Lvl 3: Mech Req Doc Complete	100%	3/26/04	3/26/04																
6	1.1.2	Design	53%	6/1/04	1/17/06																
7		Lvl 4: Start Mech design	100%	6/1/04	6/1/04																
8	1.1.2.1	Support structure	73%	6/15/04	11/9/05																
9		Define requirements/spec	100%	6/15/04	7/13/04																
10		Conceptual Design	100%	8/2/04	5/13/05																
11		General Conceptual Design	100%	8/2/04	11/30/04																
12		Split Hemisphere	100%	12/1/04	2/16/05																
13		Rotation System	100%	12/1/04	2/16/05																
14		Translating Structure	100%	12/1/04	2/16/05																
15		Site Interface	100%	12/1/04	2/16/05																
16		Complete Conceptual Design	100%	3/1/05	5/2/05																
17		Lvl 3: Conceptual Design Review Complete	100%	5/13/05	5/13/05																
18		Final design & Drawings	45%	2/9/05	11/9/05																
19		General Final Design	100%	2/9/05	3/31/05																
20		Quarter Spheres	44%	4/1/05	11/9/05																
21		Geometry and Layout	75%	4/1/05	5/5/05																
22		FEA	65%	5/5/05	5/23/05																
23		Specify Manufacturing Processes	60%	5/23/05	6/1/05																
24		Wedge Plates	60%	6/1/05	6/20/05																
25		Hexapod Interface Hub	60%	6/20/05	7/12/05																
26		Grounding and Electrical Isolation	30%	7/12/05	7/28/05																
27		Telephone Poles	35%	7/28/05	8/16/05																
28		Alignment Target Balls	75%	8/16/05	8/23/05																
29		QuarterSphere Links	60%	8/23/05	9/14/05																
30		Lvl 3: Quartersphere Design Complete	0%	9/14/05	9/14/05																
31		Fabrication Prints	0%	9/14/05	11/9/05																
32		Quarter Spheres	0%	9/14/05	10/24/05																
33		Grounding and Electrical Isolation	0%	10/24/05	11/1/05																
34		Telephone Poles	0%	11/1/05	11/9/05																
35		Translation and Rotation	39%	4/1/05	10/4/05																
36		Layout	100%	4/1/05	4/29/05																
37		Tee Platform	20%	4/29/05	6/6/05																
38		Bearing Housing	20%	6/6/05	6/20/05																
39		Axles	10%	6/20/05	7/26/05																
40		Lower Strut Clips	40%	7/26/05	8/29/05																
41		Upper strut clips	30%	8/29/05	9/9/05																
42		RR Car mods - dwg & descr.	20%	9/9/05	9/23/05																
43		Strut drawing (tabulated)	100%	9/23/05	10/4/05																
44		Design Review	0%	10/12/05	11/9/05																
45		Lvl 2: Complete Design and Drawings of Mech Support Structure	0%	12/22/05	12/22/05																

GRETINA Schedule August 2005

ID	Work Breakdown Ref	Task Name	% Complete	Start	Finish	Gantt Chart															
						2005				2006				2007				2008			
						Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	
133	1.2.2	Test/Characterize Module 1	46%	3/1/04	12/18/06																
134	1.2.2.1	Detector Engineering and Test	41%	10/1/04	12/22/05																
135		Detector Engineer (FY05)	100%	10/1/04	1/11/05																
136		Detector Eng ETC	15%	1/11/05	8/16/05																
137		Detector Engineer (FY06)	0%	10/3/05	12/22/05																
138		Detector Testing	100%	10/1/04	2/28/05																
139		Detector Testing ETC	25%	3/1/05	12/22/05																
140	1.2.2.2	Develop test procedures and apparatus	100%	3/1/04	12/10/04																
141		Develop test procedures	100%	3/1/04	4/23/04																
142		Lvl 4: Detector Test Procedures Complete	100%	4/23/04	4/23/04																
143		Develop test software	100%	4/26/04	9/29/04																
144		Determine energy and time resolution	100%	4/26/04	5/21/04																
145		Noise analysis	100%	5/24/04	6/21/04																
146		Pulse shape analysis	100%	6/22/04	7/20/04																
147		Compare with simulation	100%	7/21/04	8/17/04																
148		Interfaces	100%	8/18/04	9/29/04																
149		Lvl 4: Detector Test Software Complete	100%	9/29/04	9/29/04																
150		Assemble test apparatus	100%	9/30/04	10/13/04																
151		Tests and performance characterization	100%	10/14/04	12/10/04																
152		Lvl 2: Detector Test Procedures and Apparatus Complete	100%	12/10/04	12/10/04																
153	1.2.2.3	Develop database	32%	7/1/04	9/29/05																
154		Define database requirements	100%	7/1/04	7/15/04																
155		Define backup and recovery	100%	7/16/04	8/12/04																
156		Select and procure package	100%	8/13/04	9/10/04																
157		Customize System	100%	9/13/04	10/8/04																
158		Contine support	0%	3/1/05	9/29/05																
159	1.2.2.4	Test/characterize Module 1	0%	7/18/06	12/18/06																
160		Detector acceptance test	0%	7/18/06	8/14/06																
161		Test/characterize detectors with source	0%	8/15/06	10/10/06																
162		Test/characterize detectors with beam	0%	10/11/06	12/7/06																
163		Review test results	0%	12/8/06	12/18/06																
164		Lvl 2: Complete Mod 1 Acceptance Test	0%	8/14/06	8/14/06																
165	1.2.3	Test/Char Mod 2 thru 7	0%	8/15/06	9/9/09																
207	1.3	Electronics	18%	7/28/04	8/13/08																
208	1.3.1	Requirement document	95%	7/28/04	7/15/05																
209		Lvl 3: Elec Req. Doc Complete	0%	7/15/05	7/15/05																
210	1.3.2	Electronics Prototype	0%	10/3/05	10/6/06																
211	1.3.2.1	System Architecture	0%	10/3/05	10/28/05																
212	1.3.2.3	Digital signal processing module	0%	10/31/05	9/6/06																
228	1.3.2.4	Cables	0%	10/31/05	1/24/06																
236	1.3.2.5	Crates	0%	7/18/06	9/29/06																
243	1.3.2.6	Power supplies (low and high voltage)	0%	7/18/06	10/6/06																
252	1.3.2.7	Trigger and Timing	0%	10/31/05	9/13/06																

GRETINA Schedule August 2005

ID	Work Breakdown Ref	Task Name	% Complete	Start	Finish	Gantt Chart															
						2005				2006				2007				2008			
						Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	
279	1.3.3	Electronics Production	0%	7/11/07	8/13/08	[Gantt bar from 7/11/07 to 8/13/08]															
340	1.4	Computing Systems	1%	3/1/04	4/7/09	[Gantt bar from 3/1/04 to 4/7/09]															
341	1.4.1	Requirement document	100%	3/1/04	3/26/04	[Gantt bar from 3/1/04 to 3/26/04]															
342		Lvl 3: Computing Req Doc Complete	100%	5/18/05	5/18/05	[Gantt bar from 5/18/05 to 5/18/05]															
343	1.4.2	CS Prototype	0%	10/3/05	2/6/07	[Gantt bar from 10/3/05 to 2/6/07]															
344	1.4.2.1	System Architecture	0%	10/3/05	4/14/06	[Gantt bar from 10/3/05 to 4/14/06]															
350	1.4.2.2	DAQ Specifications and design	0%	4/17/06	9/6/06	[Gantt bar from 4/17/06 to 9/6/06]															
354	1.4.2.3	Event Building	0%	9/7/06	1/30/07	[Gantt bar from 9/7/06 to 1/30/07]															
369	1.4.2.4	Event Processing	0%	4/17/06	2/6/07	[Gantt bar from 4/17/06 to 2/6/07]															
387	1.4.2.5	Hardware	0%	9/7/06	11/9/06	[Gantt bar from 9/7/06 to 11/9/06]															
405	1.4.2.6	Slow control/monitoring	0%	9/7/06	1/30/07	[Gantt bar from 9/7/06 to 1/30/07]															
417	1.4.3	CS Production	0%	8/14/07	4/7/09	[Gantt bar from 8/14/07 to 4/7/09]															
519	1.5	System Assembly	0%	4/4/07	9/16/10	[Gantt bar from 4/4/07 to 9/16/10]															
520		Lvl 2: Elec & Computing Subsys Ready for Prototype Assem.	0%	4/4/07	4/4/07	[Gantt bar from 4/4/07 to 4/4/07]															
521	1.5.1	Prototype	0%	4/5/07	6/11/07	[Gantt bar from 4/5/07 to 6/11/07]															
533		Lvl 1: CD-2B/CD-3B	0%	7/10/07	7/10/07	[Gantt bar from 7/10/07 to 7/10/07]															
534		Lvl 2: Prod Elec and Comp Subsys. Ready for Final Assembly	0%	6/12/09	6/12/09	[Gantt bar from 6/12/09 to 6/12/09]															
535	1.5.2	Production	0%	6/15/09	2/23/10	[Gantt bar from 6/15/09 to 2/23/10]															
572		Lvl 1: CD-4: Approve Start of Operations	0%	9/16/10	9/16/10	[Gantt bar from 9/16/10 to 9/16/10]															
573	1.6	Project Management	21%	3/1/04	9/16/10	[Gantt bar from 3/1/04 to 9/16/10]															
574	1.6.1	Management	18%	3/1/04	9/16/10	[Gantt bar from 3/1/04 to 9/16/10]															
575	1.6.1.1	Initial phase (FY04-FY05)	95%	3/1/04	9/30/05	[Gantt bar from 3/1/04 to 9/30/05]															
576		Contractor Project Manager - FY04	100%	3/1/04	9/30/04	[Gantt bar from 3/1/04 to 9/30/04]															
577		CPM - FY05	100%	10/1/04	2/28/05	[Gantt bar from 10/1/04 to 2/28/05]															
578		CPM - FY05 ETC	86%	3/1/05	9/30/05	[Gantt bar from 3/1/05 to 9/30/05]															
579		Project Engineer - FY04	100%	3/1/04	9/30/04	[Gantt bar from 3/1/04 to 9/30/04]															
580		Proj Engineer - FY05	100%	10/1/04	2/28/05	[Gantt bar from 10/1/04 to 2/28/05]															
581		Proj Engineer - FY05 ETC	86%	3/1/05	9/30/05	[Gantt bar from 3/1/05 to 9/30/05]															
582		Project Control Analyst - FY04	100%	3/1/04	9/30/04	[Gantt bar from 3/1/04 to 9/30/04]															
583		Project Controls Analyst - FY05	100%	10/1/04	2/28/05	[Gantt bar from 10/1/04 to 2/28/05]															
584		Project Controls Analyst - FY05 ETC	86%	3/1/05	9/30/05	[Gantt bar from 3/1/05 to 9/30/05]															
585	1.6.1.2	Long term	0%	10/3/05	9/30/09	[Gantt bar from 10/3/05 to 9/30/09]															
589	1.6.1.3	Final phase (-0.5 of FY10)	0%	10/1/09	9/16/10	[Gantt bar from 10/1/09 to 9/16/10]															
594	1.6.1.4	Quality Assurance Manager	0%	4/1/05	12/22/09	[Gantt bar from 4/1/05 to 12/22/09]															
595	1.6.1.5	Subsystem Managers	17%	3/1/04	11/3/09	[Gantt bar from 3/1/04 to 11/3/09]															
596		Design Phase	100%	6/1/04	2/28/05	[Gantt bar from 6/1/04 to 2/28/05]															
597		Design ETC	49%	3/1/05	3/27/06	[Gantt bar from 3/1/05 to 3/27/06]															
598		Mechanical (Production)	0%	8/14/07	9/4/08	[Gantt bar from 8/14/07 to 9/4/08]															
599		Detector	28%	3/1/04	9/3/09	[Gantt bar from 3/1/04 to 9/3/09]															
600		Electronics	0%	8/1/05	8/13/09	[Gantt bar from 8/1/05 to 8/13/09]															
601		Computing Systems	2%	8/1/05	8/13/09	[Gantt bar from 8/1/05 to 8/13/09]															
602		Systems assembly	0%	6/15/09	11/3/09	[Gantt bar from 6/15/09 to 11/3/09]															
603	1.6.2	General Project Expenses	25%	3/1/04	4/15/10	[Gantt bar from 3/1/04 to 4/15/10]															
604	1.6.2.1	Network security & remote access	23%	5/20/04	1/20/10	[Gantt bar from 5/20/04 to 1/20/10]															
605	1.6.2.2	System Support	23%	5/20/04	1/20/10	[Gantt bar from 5/20/04 to 1/20/10]															
606	1.6.2.3	Misc. Expenses	100%	5/20/04	2/28/05	[Gantt bar from 5/20/04 to 2/28/05]															
607		Misc Exp ETC	11%	3/1/05	1/20/10	[Gantt bar from 3/1/05 to 1/20/10]															
608		LDRD Tax	27%	3/1/04	4/15/10	[Gantt bar from 3/1/04 to 4/15/10]															
609	1.6.2.4	Travel	29%	3/1/04	9/30/09	[Gantt bar from 3/1/04 to 9/30/09]															
620	1.7	Environment and Safety	41%	3/1/04	2/1/10	[Gantt bar from 3/1/04 to 2/1/10]															