

WBS Dictionary as of 10/23/02
Run IIb Online/DAQ

WBS	Name	Start	Finish	M&S EQ	M&S Labor	FNAL Labor	Total Cost					
1.3	Online Systems	1/2/02	3/28/06	\$605,000.00	\$0.00	\$205,822.40	\$810,822.40					
<i>Notes</i>												
WBS Definition- This summary WBS element includes upgrades associated with data-taking and detector monitoring and controls systems. We have set a goal for data-logging of 100 Hz in the higher luminosity environment of Run 2b. This element describes the resources needed to develop an online system that will meet the physics needs of the experiment.												
1.3.1	Level 3 Systems	1/2/02	3/21/06	\$210,000.00	\$0.00	\$1,278.40	\$211,278.40					
<i>Notes</i>												
WBS Definition- Summary task for operations involving acquisition of Linux systems. Includes DAQ Readout SBC and Level 3 nodes.												
Risk Mitigation- The cost impact results from a possible need to purchase more Level 3 filter farm nodes in order to meet the processing requirements of the L3 software trigger. The 70% contingency on the node procurement task wbs 1.3.1.2.3 is set large enough to enable almost a doubling of the purchase. If in a situation where this might be needed, a software effort to reduce the per-event processing time could additionally be mounted.												
1.3.1.1	Linux System Evaluations	4/1/03	6/22/05	\$0.00	\$0.00	\$0.00	\$0.00					
<i>Notes</i>												
WBS Definition- Periodic market and system analysis following Computing Division purchase schedules.												
1.3.1.1.1	Linux system evaluations 1	4/1/03	6/20/03	\$0.00	\$0.00	\$0.00	\$0.00					
	<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
	17	OpPhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	46.4 h	0 h	0 h	0 h	46.4 h
	19	OpPhysicistU	10%	\$0.00	\$0.00	\$0.00	\$0.00	46.4 h	0 h	0 h	0 h	46.4 h
<i>Notes</i>												
WBS Definition- There are two evaluation components to this task - an updated evaluation of the needs for Level 3 processing and an updated market and system analysis to supply those needs. Note that this specific task is a RunIIa upgrade, and considered a precursor to RunIIb efforts.												
Labor BOE- The Level 3 processing needs will be determined by the collective efforts of many groups within the collaboration, including the Offline reconstruction software groups, the Level 3 filter software group, and the trigger definition working groups. The market and system analysis is performed at least annually by the Computing Division as part of their standard reconstruction and analysis farms purchases. The Level 3 system purchases will be piggy-backed on the much larger Computing Division purchases. The "on project" effort associated with this task is for the management interface to these external efforts. This will take place via periodic formal and informal meetings and e-mail exchanges with the external groups. The Labor estimate is a net of 1/2 day per week for a 10 week period. The estimate is based upon RunII experience to date. Note that this task is a RunIIa upgrade, and considered a precursor to RunIIb efforts. The are no "on-project" labor costs.												
Labor Contingency- N/A												
1.3.1.1.2	Linux system evaluations 2	4/1/04	6/22/04	\$0.00	\$0.00	\$0.00	\$0.00					
	<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
	17	OpPhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	46.4 h	0 h	0 h	0 h	46.4 h
	19	OpPhysicistU	10%	\$0.00	\$0.00	\$0.00	\$0.00	46.4 h	0 h	0 h	0 h	46.4 h
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Labor Contingency- The only "on-project" labor associated with this task is for Physicist time spent in the evaluation process. A 50% contingency is applied to account for the possibility of additional discussion of needs and available options. The size of the contingency is based on RunI and RunII experience with variability of similar tasks.												

WBS Dictionary as of 10/23/02
Run IIb Online/DAQ

WBS	Name	Start	Finish	M&S EQ	M&S Labor	FNAL Labor	Total Cost
1.3.1.1.3	Linux system evaluations 3	4/1/05	6/22/05	\$0.00	\$0.00	\$0.00	\$0.00

ID	Resource Name	Units	Cost	Baseline Cost	Act. Cost	Rem. Cost	Work	Ovt. Work	Baseline Work	Act. Work	Rem. Work
1	PhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	46.4 h	0 h	0 h	0 h	46.4 h
2	PhysicistU	10%	\$0.00	\$0.00	\$0.00	\$0.00	46.4 h	0 h	0 h	0 h	46.4 h

Notes

WBS Definition-

There are two evaluation components to this task - an updated evaluation of the needs for Level 3 processing and an updated market and system analysis to supply those needs.

Labor BOE-

The Level 3 processing needs will be determined by the collective efforts of many groups within the collaboration, including the Offline reconstruction software groups, the Level 3 filter software group, and the trigger definition working groups. The market and system analysis is performed at least annually by the Computing Division as part of their standard reconstruction and analysis farms purchases. The Level 3 system purchases will be piggy-backed on the much larger Computing Division purchases. The "on project" effort associated with this task is for the management interface to these external efforts. This will take place via periodic formal and informal meetings and e-mail exchanges with the external groups. The Labor estimate is a net of 1/2 day per week for a 10 week period. The estimate is based upon RunII experience to date.

Labor Contingency-

The only "on-project" labor associated with this task is for Physicist time spent in the evaluation process. A 50% contingency is applied to account for the possibility of additional discussion of needs and available options. The size of the contingency is based on RunI and RunII experience with variability of similar tasks.

1.3.1.2	L3 filter Node PO	6/23/03	11/17/05	\$210,000.00	\$0.00	\$0.00	\$210,000.00
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Notes

WBS Definition-

Periodic purchase of L3 filter nodes, requisition and PO creation.

1.3.1.2.1	L3 filter node PO 1	6/23/03	8/8/03	\$0.00	\$0.00	\$0.00	\$0.00
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ID	Resource Name	Units	Cost	Baseline Cost	Act. Cost	Rem. Cost	Work	Ovt. Work	Baseline Work	Act. Work	Rem. Work
17	OpPhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	27.2 h	0 h	0 h	0 h	27.2 h

Notes

WBS Definition-

Purchase of Run IIa filter nodes (32 nodes). Requisition and PO creation. This is part of the RunIIa base program and has no Run IIb associated costs. These nodes will contribute to the early version of the eventual Run IIb farm.

Labor BOE-

3 days of physicist time for writing the specifications and reviewing the PO. The estimate of 6 calendar weeks for the task includes the time required to obtain authorization and purchasing operations.

M&S BOE-

Each node + cabling & racks is expected to cost \$2.2k. This is funded from the RunIIa base program.

Risk Mitigation:

N/A

1.3.1.2.2	L3 filter node PO 2	6/23/04	8/10/04	\$0.00	\$0.00	\$0.00	\$0.00
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ID	Resource Name	Units	Cost	Baseline Cost	Act. Cost	Rem. Cost	Work	Ovt. Work	Baseline Work	Act. Work	Rem. Work
17	OpPhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	27.2 h	0 h	0 h	0 h	27.2 h

Notes

WBS Definition-

Purchase of Run IIa filter nodes (32 nodes). Requisition and PO creation. This is part of the Run IIa base program and has no Run IIb associated costs. These nodes will contribute to the eventual Run IIb farm.

Labor BOE

3 days of Fermilab physicist + 3 days of university physicist for evaluating and reviewing the PO. The estimate of 6 calendar weeks for the task includes the time required to obtain authorization and purchasing operations.

M&S BOE

Each node + cabling & racks is expected to cost \$2.2k.

Risk Mitigation-

The cost impact results from a possible need to purchase more Level 3 filter farm nodes in order to meet the processing requirements of the L3 software trigger. The 70% contingency for this task is set large enough to enable almost a doubling of the purchase. If in a situation where this might be needed, a software effort to reduce the per-event processing time could additionally be mounted.

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WBS	Name	Start	Finish	M&S EQ	M&S Labor	FNAL Labor	Total Cost																																																
1.3.1.2.3	L3 filter node PO 3	10/3/05	11/17/05	\$210,000.00	\$0.00	\$0.00	\$210,000.00																																																
	<table border="1"> <thead> <tr> <th>ID</th> <th>Resource Name</th> <th>Units</th> <th>Cost</th> <th>Baseline Cost</th> <th>Act. Cost</th> <th>Rem. Cost</th> <th>Work</th> <th>Ovt. Work</th> <th>Baseline Work</th> <th>Act. Work</th> <th>Rem. Work</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>PhysicistF</td> <td>10%</td> <td>\$0.00</td> <td>\$0.00</td> <td>\$0.00</td> <td>\$0.00</td> <td>27.2 h</td> <td>0 h</td> <td>0 h</td> <td>0 h</td> <td>27.2 h</td> </tr> <tr> <td>2</td> <td>PhysicistU</td> <td>10%</td> <td>\$0.00</td> <td>\$0.00</td> <td>\$0.00</td> <td>\$0.00</td> <td>27.2 h</td> <td>0 h</td> <td>0 h</td> <td>0 h</td> <td>27.2 h</td> </tr> <tr> <td>20</td> <td>MandS</td> <td>210,000</td> <td>\$210,000.00</td> <td>\$0.00</td> <td>\$0.00</td> <td>\$210,000.00</td> <td>210,000</td> <td></td> <td>0</td> <td>0</td> <td>210,000</td> </tr> </tbody> </table>	ID	Resource Name	Units	Cost	Baseline Cost	Act. Cost	Rem. Cost	Work	Ovt. Work	Baseline Work	Act. Work	Rem. Work	1	PhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	27.2 h	0 h	0 h	0 h	27.2 h	2	PhysicistU	10%	\$0.00	\$0.00	\$0.00	\$0.00	27.2 h	0 h	0 h	0 h	27.2 h	20	MandS	210,000	\$210,000.00	\$0.00	\$0.00	\$210,000.00	210,000		0	0	210,000						
ID	Resource Name	Units	Cost	Baseline Cost	Act. Cost	Rem. Cost	Work	Ovt. Work	Baseline Work	Act. Work	Rem. Work																																												
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20	MandS	210,000	\$210,000.00	\$0.00	\$0.00	\$210,000.00	210,000		0	0	210,000																																												
	<u>Notes</u>																																																						
	WBS Definition- Purchase of the Run IIb Level 3 filter nodes (96 nodes). Requisition and PO creation.																																																						
	Labor BOE 3 days of Fermilab physicist + 3 days of university physicist for evaluating and reviewing the PO. The estimate of 6 calendar weeks for the task includes the time required to obtain authorization and purchasing operations.																																																						
	M&S BOE Gotten from CD experience buying farms and applying Moore's law. Each node + cabling & racks is expected to cost \$2.2k. The 70% contingency for this task is set large enough to enable almost a doubling of the purchase, if necessary, in order to meet the processing requirements of the L3 software trigger.																																																						
1.3.1.3	L3 Filter Node Delivery	8/11/03	1/18/06	\$0.00	\$0.00	\$0.00	\$0.00																																																
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	WBS Definition- Periodic purchase of L3 filter nodes; delivery time																																																						
1.3.1.3.1	L3 Filter node delivery 1	8/11/03	10/14/03	\$0.00	\$0.00	\$0.00	\$0.00																																																
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1.3.1.3.2	L3 Filter node delivery 2	8/11/04	10/14/04	\$0.00	\$0.00	\$0.00	\$0.00																																																
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1.3.1.3.3	L3 Filter node delivery 3	11/18/05	1/18/06	\$0.00	\$0.00	\$0.00	\$0.00																																																
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	WBS Definition- Delivery time for L3 filter nodes.																																																						
1.3.1.4	L3 Filter Node Commissioning	10/15/03	2/10/06	\$0.00	\$0.00	\$1,278.40	\$1,278.40																																																
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	WBS Definition- Periodic purchase of L3 filter nodes; installation, setup, and commissioning																																																						
1.3.1.4.1	L3 Filter node commissioning 1	10/15/03	11/14/03	\$0.00	\$0.00	\$0.00	\$0.00																																																
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	WBS Definition- 1/3 L3 Filter nodes (22 nodes), Installation, setup, and commissioning																																																						
	Labor BOE- This represents 1 rack of processors, which takes one week of technical and system admin time to install and commission.																																																						
1.3.1.4.2	L3 Filter node commissioning 2	10/15/04	11/16/04	\$0.00	\$0.00	\$0.00	\$0.00																																																
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WBS Dictionary as of 10/23/02
Run IIb Online/DAQ

WBS	Name	Start	Finish	M&S EQ	M&S Labor	FNAL Labor	Total Cost				
"L3 Filter node commissioning 2" continued											
<i>Notes</i>											
WBS Definition- 1/3 L3 Filter nodes (22 nodes), Installation, setup, and commissioning											
Labor BOE- This represents 1 rack of processors, which takes one week of technical and system admin time to install and commission.											
1.3.1.4.3	L3 Filter node commissioning 3	1/19/06	2/10/06	\$0.00	\$0.00	\$1,278.40	\$1,278.40				
<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
1	PhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	13.6 h	0 h	0 h	0 h	13.6 h
2	PhysicistU	20%	\$0.00	\$0.00	\$0.00	\$0.00	27.2 h	0 h	0 h	0 h	27.2 h
3	CompProfF	20%	\$1,278.40	\$0.00	\$0.00	\$1,278.40	27.2 h	0 h	0 h	0 h	27.2 h
<i>Notes</i>											
WBS Definition- 1/3 L3 Filter nodes (22 nodes), Installation, setup, and commissioning											
Labor BOE- This represents 1 rack of processors, which takes one week of technical and system admin time to install and commission.											
1.3.1.5	Test Stand Support	10/1/02	9/19/05	\$0.00	\$0.00	\$0.00	\$0.00				
<i>Notes</i>											
WBS Definition- Summary task-Expert support for SiDet test stand operations											
1.3.1.5.1	Test Stand DAQ System installation	10/1/02	12/5/02	\$0.00	\$0.00	\$0.00	\$0.00				
<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
2	PhysicistU	20%	\$0.00	\$0.00	\$0.00	\$0.00	73.6 h	0 h	0 h	0 h	73.6 h
<i>Notes</i>											
WBS Definition- Installation of DAQ hardware and software components in prototype test stand at SiDet; configuration of test stand											
Labor BOE- Run2a experience											
1.3.1.5.2	Test Stand DAQ System support	12/6/02	9/19/05	\$0.00	\$0.00	\$0.00	\$0.00				
<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
2	PhysicistU	5%	\$0.00	\$0.00	\$0.00	\$0.00	276 h	0 h	0 h	0 h	276 h
<i>Notes</i>											
WBS Definition- Normal system operations; support for special test requests											
Labor BOE- Run2a experience											
1.3.1.6	OS and Software	1/2/02	3/21/06	\$0.00	\$0.00	\$0.00	\$0.00				
<i>Notes</i>											
WBS Definition- Summary Task-Base program Operation system and application software operations for DAQ front ends and Level 3 systems											
1.3.1.6.1	Level 3 System management	1/2/02	3/21/06	\$0.00	\$0.00	\$0.00	\$0.00				
<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
18	OpCompProfF	10%	\$0.00	\$0.00	\$0.00	\$0.00	838.4 h	0 h	0 h	147.2 h	691.2 h
19	OpPhysicistU	10%	\$0.00	\$0.00	\$0.00	\$0.00	838.4 h	0 h	0 h	147.2 h	691.2 h
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WBS Definition-											

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Run IIb Online/DAQ

WBS	Name	Start	Finish	M&S EQ	M&S Labor	FNAL Labor	Total Cost				
"Level 3 System management" continued											
<p><i>Notes</i> Operating system and hardware maintenance; includes Linux OS management for SBC and Level 3 nodes.</p> <p>Labor BOE- The estimate of continuous effort required for system management of the Level 3 software filter farms is based on RunIIa experience.</p>											
1.3.1.6.2	DAQ readout system maintenance	1/2/02	3/21/06	\$0.00	\$0.00	\$0.00	\$0.00				
<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
18	OpCompProfF	10%	\$0.00	\$0.00	\$0.00	\$0.00	838.4 h	0 h	0 h	147.2 h	691.2 h
19	OpPhysicistU	10%	\$0.00	\$0.00	\$0.00	\$0.00	838.4 h	0 h	0 h	147.2 h	691.2 h
<p><i>Notes</i> WBS Definition- DAQ readout system software maintenance; includes SBC software and Level 3 framework</p> <p>Labor BOE- The level of application software management for the DAQ readout components is based on RunIIa experience.</p>											
1.3.2	Network and Host Systems	1/2/02	3/28/06	\$247,000.00	\$0.00	\$155,927.20	\$402,927.20				
<p><i>Notes</i> WBS Definition- Summary task for operations involving acquisition of Network and Host systems. Includes DAQ, Database, File Server, Control Room, and Monitor nodes.</p>											
1.3.2.1	Online/DAQ Network	4/1/04	8/18/04	\$0.00	\$0.00	\$0.00	\$0.00				
<p><i>Notes</i> WBS Definition- Summary task for Network upgrades- Base program. Network needs explicitly associated with Run2b systems are included within those specific system requirements.</p>											
1.3.2.1.1	Switch component evaluation	4/1/04	6/4/04	\$0.00	\$0.00	\$0.00	\$0.00				
<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
17	OpPhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	36.8 h	0 h	0 h	0 h	36.8 h
<p><i>Notes</i> WBS Definition- Determine items to be purchased</p> <p>Labor BOE- Run2a experience</p>											
1.3.2.1.2	Switch component PO	6/7/04	7/8/04	\$0.00	\$0.00	\$0.00	\$0.00				
<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
17	OpPhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	18.4 h	0 h	0 h	0 h	18.4 h
<p><i>Notes</i> WBS Definition- Requisition and PO creation</p>											
1.3.2.1.3	Switch component delivery	7/9/04	8/10/04	\$0.00	\$0.00	\$0.00	\$0.00				
<p><i>Notes</i> WBS Definition- Delivery time</p>											
1.3.2.1.4	Switch component commissioning	8/11/04	8/18/04	\$0.00	\$0.00	\$0.00	\$0.00				
<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
17	OpPhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	4.8 h	0 h	0 h	0 h	4.8 h
<p><i>Notes</i> WBS Definition- Install, cable, commission</p>											

WBS Dictionary as of 10/23/02
Run IIb Online/DAQ

WBS	Name	Start	Finish	M&S EQ	M&S Labor	FNAL Labor	Total Cost					
"Switch component commissioning" continued												
	<u>Notes</u>											
	Labor BOE- Run2a experience											
1.3.2.2	Control Room Nodes	6/23/03	11/1/05	\$0.00	\$0.00	\$0.00	\$0.00					
	<u>Notes</u>											
	WBS Definition- This is the summary task for the purchase of Control Room nodes. These will be purchased and supported as part of the base program.											
1.3.2.2.1	Control Room Node PO	6/23/03	7/26/05	\$0.00	\$0.00	\$0.00	\$0.00					
	<u>Notes</u>											
	WBS Definition- Summary Task-Base program Periodic purchase of Control Room nodes; Requisition and PO creation											
1.3.2.2.1.1	Control Room node PO 2	6/23/03	7/24/03	\$0.00	\$0.00	\$0.00	\$0.00					
	<u>ID</u>	<u>Resource Name</u>	<u>Units</u>	<u>Cost</u>	<u>Baseline Cost</u>	<u>Act. Cost</u>	<u>Rem. Cost</u>	<u>Work</u>	<u>Ovt. Work</u>	<u>Baseline Work</u>	<u>Act. Work</u>	<u>Rem. Work</u>
	17	OpPhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	18.4 h	0 h	0 h	0 h	18.4 h
	<u>Notes</u>											
	WBS Definition- Periodic purchase of Control Room nodes to replace old nodes. Nodes are assumed to be replaced every 5 years. This is a maintenance/operatiing cost and is not part of the Run 2b upgrade project.											
	Labor BOE: The annual cost is \$10k in operating costs. This is estimated by assuming we replace 20% of the control room nodes each year (3 systems/year * \$2k/system + monitors).											
1.3.2.2.1.2	Control Room node PO 3	6/23/04	7/26/04	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	<u>ID</u>	<u>Resource Name</u>	<u>Units</u>	<u>Cost</u>	<u>Baseline Cost</u>	<u>Act. Cost</u>	<u>Rem. Cost</u>	<u>Work</u>	<u>Ovt. Work</u>	<u>Baseline Work</u>	<u>Act. Work</u>	<u>Rem. Work</u>
	17	OpPhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	18.4 h	0 h	0 h	0 h	18.4 h
	<u>Notes</u>											
	WBS Definition- Periodic purchase of Control Room nodes to replace old nodes. Nodes are assumed to be replaced every 5 years. This is a maintenance/operatiing cost and is not part of the Run 2b upgrade project.											
	Labor BOE: The annual cost is \$10k in operating costs. This is estimated by assuming we replace 20% of the control room nodes each year (3 systems/year * \$2k/system + monitors).											
1.3.2.2.1.3	Control Room node PO 4	6/23/05	7/26/05	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	<u>ID</u>	<u>Resource Name</u>	<u>Units</u>	<u>Cost</u>	<u>Baseline Cost</u>	<u>Act. Cost</u>	<u>Rem. Cost</u>	<u>Work</u>	<u>Ovt. Work</u>	<u>Baseline Work</u>	<u>Act. Work</u>	<u>Rem. Work</u>
	17	OpPhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	18.4 h	0 h	0 h	0 h	18.4 h
	<u>Notes</u>											
	WBS Definition- Periodic purchase of Control Room nodes to replace old nodes. Nodes are assumed to be replaced every 5 years. This is a maintenance/operatiing cost and is not part of the Run 2b upgrade project.											
	Labor BOE: The annual cost is \$10k in operating costs. This is estimated by assuming we replace 20% of the control room nodes each year (3 systems/year * \$2k/system + monitors).											
1.3.2.2.2	Control Room Node Delivery	7/25/03	9/29/05	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	<u>Notes</u>											
	WBS Definition- Summary Task-Base program Periodic purchase of Control Room nodes; Delivery time											
1.3.2.2.2.1	Control Room node delivery 2	7/25/03	9/29/03	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	<u>Notes</u>											
	WBS Definition- Periodic purchase of Control Room nodes; Delivery time											

WBS Dictionary as of 10/23/02
Run IIb Online/DAQ

WBS	Name	Start	Finish	M&S EQ	M&S Labor	FNAL Labor	Total Cost					
1.3.2.2.2	Control Room node delivery 3	7/27/04	9/29/04	\$0.00	\$0.00	\$0.00	\$0.00					
	<i>Notes</i> WBS Definition- Periodic purchase of Control Room nodes; Delivery time											
1.3.2.2.3	Control Room node delivery 4	7/27/05	9/29/05	\$0.00	\$0.00	\$0.00	\$0.00					
	<i>Notes</i> WBS Definition- Periodic purchase of Control Room nodes; Delivery time											
1.3.2.2.3	Control Room Node Commissioning	9/30/03	11/1/05	\$0.00	\$0.00	\$0.00	\$0.00					
	<i>Notes</i> WBS Definition- Summary task-Base program Periodic purchase of Control Room nodes; Installation, setup, and commissioning											
1.3.2.2.3.1	Control Room node commissioning 2	9/30/03	10/30/03	\$0.00	\$0.00	\$0.00	\$0.00					
	<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
	17	OpPhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	18.4 h	0 h	0 h	0 h	18.4 h
	18	OpCompProfF	20%	\$0.00	\$0.00	\$0.00	\$0.00	36.8 h	0 h	0 h	0 h	36.8 h
	<i>Notes</i> WBS Definition- Periodic purchase of Control Room nodes; Installation, setup, and commissioning Labor BOE- Run2a experience											
1.3.2.2.3.2	Control Room node commissioning 3	9/30/04	11/1/04	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
	17	OpPhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	18.4 h	0 h	0 h	0 h	18.4 h
	18	OpCompProfF	20%	\$0.00	\$0.00	\$0.00	\$0.00	36.8 h	0 h	0 h	0 h	36.8 h
	<i>Notes</i> WBS Definition- Periodic purchase of Control Room nodes; Installation, setup, and commissioning Labor BOE- Run2a experience											
1.3.2.2.3.3	Control Room node commissioning 4	9/30/05	11/1/05	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
	17	OpPhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	18.4 h	0 h	0 h	0 h	18.4 h
	18	OpCompProfF	20%	\$0.00	\$0.00	\$0.00	\$0.00	36.8 h	0 h	0 h	0 h	36.8 h
	<i>Notes</i> WBS Definition- Periodic purchase of Control Room nodes; Installation, setup, and commissioning Labor BOE- Run2a experience											
1.3.2.3	Monitoring Nodes	6/23/03	11/1/05	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	<i>Notes</i> WBS Definition- Summary task for the purchase of Monitoring nodes. These will be purchased and supported as part of the base program.											
1.3.2.3.1	Monitoring Node PO	6/23/03	7/26/05	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	<i>Notes</i> WBS Definition- Summary Task-Base program											

WBS Dictionary as of 10/23/02
Run IIb Online/DAQ

WBS	Name	Start	Finish	M&S EQ	M&S Labor	FNAL Labor	Total Cost				
"Monitoring Node PO" continued											
<i>Notes</i> Periodic purchase of Monitor nodes; Requisition and PO creation											
1.3.2.3.1.1	Monitoring node PO 2	6/23/03	7/24/03	\$0.00	\$0.00	\$0.00	\$0.00				
<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
17	OpPhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	18.4 h	0 h	0 h	0 h	18.4 h
<i>Notes</i> WBS Definition- Periodic purchase of Monitor nodes; Requisition and PO creation Labor BOE- Run2a experience											
1.3.2.3.1.2	Monitoring node PO 3	6/23/04	7/26/04	\$0.00	\$0.00	\$0.00	\$0.00				
<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
17	OpPhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	18.4 h	0 h	0 h	0 h	18.4 h
<i>Notes</i> WBS Definition- Periodic purchase of Monitor nodes; Requisition and PO creation Labor BOE- Run2a experience											
1.3.2.3.1.3	Monitoring node PO 4	6/23/05	7/26/05	\$0.00	\$0.00	\$0.00	\$0.00				
<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
17	OpPhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	18.4 h	0 h	0 h	0 h	18.4 h
<i>Notes</i> WBS Definition- Periodic purchase of Monitor nodes; Requisition and PO creation Labor BOE- Run2a experience											
1.3.2.3.2	Monitoring Node Delivery	7/25/03	9/29/05	\$0.00	\$0.00	\$0.00	\$0.00				
<i>Notes</i> WBS Definition- Summary Task-Base program Periodic purchase of Monitor nodes; Delivery time											
1.3.2.3.2.1	Monitoring node delivery 2	7/25/03	9/29/03	\$0.00	\$0.00	\$0.00	\$0.00				
<i>Notes</i> WBS Definition- Periodic purchase of Monitor nodes; Delivery time											
1.3.2.3.2.2	Monitoring node delivery 3	7/27/04	9/29/04	\$0.00	\$0.00	\$0.00	\$0.00				
<i>Notes</i> WBS Definition- Periodic purchase of Monitor nodes; Delivery time											
1.3.2.3.2.3	Monitoring node delivery 4	7/27/05	9/29/05	\$0.00	\$0.00	\$0.00	\$0.00				
<i>Notes</i> WBS Definition- Periodic purchase of Monitor nodes; Delivery time											

WBS Dictionary as of 10/23/02
Run IIb Online/DAQ

WBS	Name	Start	Finish	M&S EQ	M&S Labor	FNAL Labor	Total Cost					
1.3.2.3.3	Monitoring Node Commissioning	9/30/03	11/1/05	\$0.00	\$0.00	\$0.00	\$0.00					
	<i>Notes</i>											
	WBS Definition- Summary Task-Base program Periodic purchase of Monitor nodes; Installation, setup, and commissioning											
1.3.2.3.3.1	Monitoring node commissioning 2	9/30/03	10/30/03	\$0.00	\$0.00	\$0.00	\$0.00					
	<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
	17	OpPhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	18.4 h	0 h	0 h	0 h	18.4 h
	18	OpCompProfF	20%	\$0.00	\$0.00	\$0.00	\$0.00	36.8 h	0 h	0 h	0 h	36.8 h
	<i>Notes</i>											
	WBS Definition- Periodic purchase of Monitor nodes; Installation, setup, and commissioning											
	Labor BOE- Run2a experience											
1.3.2.3.3.2	Monitoring node commissioning 3	9/30/04	11/1/04	\$0.00	\$0.00	\$0.00	\$0.00					
	<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
	17	OpPhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	18.4 h	0 h	0 h	0 h	18.4 h
	18	OpCompProfF	20%	\$0.00	\$0.00	\$0.00	\$0.00	36.8 h	0 h	0 h	0 h	36.8 h
	<i>Notes</i>											
	WBS Definition- Periodic purchase of Monitor nodes; Installation, setup, and commissioning											
	Labor BOE- Run2a experience											
1.3.2.3.3.3	Monitoring node commissioning 4	9/30/05	11/1/05	\$0.00	\$0.00	\$0.00	\$0.00					
	<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
	17	OpPhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	18.4 h	0 h	0 h	0 h	18.4 h
	18	OpCompProfF	20%	\$0.00	\$0.00	\$0.00	\$0.00	36.8 h	0 h	0 h	0 h	36.8 h
	<i>Notes</i>											
	WBS Definition- Periodic purchase of Monitor nodes; Installation, setup, and commissioning											
	Labor BOE- Run2a experience											
1.3.2.4	Storage Systems	5/1/02	3/20/06	\$103,000.00	\$0.00	\$1,729.60	\$104,729.60					
	<i>Notes</i>											
	WBS Definition- Disk storage systems											
1.3.2.4.1	Fibre Channel SAN R&D	5/1/02	9/29/03	\$0.00	\$0.00	\$0.00	\$0.00					
	<i>Notes</i>											
	WBS Definition- Construct Linux-hosted Fibre Channel SAN											
1.3.2.4.1.1	FC SAN R&D evaluation	5/1/02	7/11/02	\$0.00	\$0.00	\$0.00	\$0.00					
	<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
	17	OpPhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	40 h	0 h	0 h	40 h	0 h
	<i>Notes</i>											
	WBS Definition- Evaluate SAN components											
	Labor BOE- Run2a experience											

WBS Dictionary as of 10/23/02
Run IIb Online/DAQ

WBS	Name	Start	Finish	M&S EQ	M&S Labor	FNAL Labor	Total Cost				
1.3.2.4.1.2	FC SAN R&D PO	7/12/02	8/8/02	\$0.00	\$0.00	\$0.00	\$0.00				
<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
17	OpPhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	16 h	0 h	0 h	16 h	0 h
<u>Notes</u>											
WBS Definition- Requisition and PO creation											
Labor BOE- Run2a experience											
1.3.2.4.1.3	FC SAN R&D delivery	8/9/02	9/20/02	\$0.00	\$0.00	\$0.00	\$0.00				
<u>Notes</u>											
WBS Definition- Delivery time											
1.3.2.4.1.4	FC SAN R&D commissioning	9/23/02	10/23/02	\$0.00	\$0.00	\$0.00	\$0.00				
<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
17	OpPhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	18.4 h	0 h	0 h	0 h	18.4 h
<u>Notes</u>											
WBS Definition- Installation, setup, and commissioning											
Labor BOE- Run2a experience											
1.3.2.4.1.5	FC SAN R&D analysis	10/24/02	9/29/03	\$0.00	\$0.00	\$0.00	\$0.00				
<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
17	OpPhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	184 h	0 h	0 h	0 h	184 h
<u>Notes</u>											
WBS Definition- Performance and reliability testing											
Labor BOE- Run2a experience											
1.3.2.4.2	Fibre Channel SAN	9/30/03	3/20/06	\$60,000.00	\$0.00	\$864.80	\$60,864.80				
<u>Notes</u>											
WBS Definition- Storage Area Network infrastructure											
1.3.2.4.2.1	Evaluation	9/30/03	5/25/04	\$0.00	\$0.00	\$0.00	\$0.00				
<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
1	PhysicistF	5%	\$0.00	\$0.00	\$0.00	\$0.00	64.4 h	0 h	0 h	0 h	64.4 h
<u>Notes</u>											
WBS Definition- Evaluate SAN components. This includes FC hubs/switches and FC disk arrays											
Labor BOE- In Run2a we did a web search of appropriate components, plus researched similar systems at the lab. In the end we chose disk crates identical to those used for a major Offline system. We expect a similar amount of effort will be required to determine the most appropriate system at the time of this evaluation.											
1.3.2.4.2.2	PO	5/26/04	7/14/04	\$60,000.00	\$0.00	\$0.00	\$60,000.00				
<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
1	PhysicistF	20%	\$0.00	\$0.00	\$0.00	\$0.00	54.4 h	0 h	0 h	0 h	54.4 h
20	MandS	60,000	\$60,000.00	\$0.00	\$0.00	\$60,000.00	60,000	0	0	0	60,000
<u>Notes</u>											
WBS Definition-											

WBS Dictionary as of 10/23/02
Run IIb Online/DAQ

WBS	Name	Start	Finish	M&S EQ	M&S Labor	FNAL Labor	Total Cost																								
"PO" continued																															
	<u>Notes</u> Requisition and PO Creation; FC hubs and disk arrays M&S BOE: Fibre Channel JBOD buffer disk = \$40k; SAN hub/cables = \$20k. Labor BOE- In Run2a we did a web search of appropriate components, plus researched similar systems at the lab. In the end we chose disk crates identical to those used for a major Offline system. We expect a similar amount of effort will be required. Risk Mitigation (Cost)- The cost impact results from a possible need to purchase more, or more expensive, event buffer disk in order to meet the high availability requirements of the Data Logging system. The 50% contingency for this task is set large enough to enable a 50% expansion of capacity or to allow a 50% more expensive solution. The costs of these systems are well known, so the principal risk comes from an external source - the reliability of the Offline tape writing facility.																														
1.3.2.4.2.3	Delivery	7/15/04	9/17/04	\$0.00	\$0.00	\$0.00	\$0.00																								
	<u>Notes</u> WBS Definition- Delivery time																														
1.3.2.4.2.4	Commissioning	9/20/04	10/20/04	\$0.00	\$0.00	\$864.80	\$864.80																								
	<table border="1"> <thead> <tr> <th>ID</th> <th>Resource Name</th> <th>Units</th> <th>Cost</th> <th>Baseline Cost</th> <th>Act. Cost</th> <th>Rem. Cost</th> <th>Work</th> <th>Ovt. Work</th> <th>Baseline Work</th> <th>Act. Work</th> <th>Rem. Work</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>CompProfF</td> <td>10%</td> <td>\$864.80</td> <td>\$0.00</td> <td>\$0.00</td> <td>\$864.80</td> <td>18.4 h</td> <td>0 h</td> <td>0 h</td> <td>0 h</td> <td>18.4 h</td> </tr> </tbody> </table>							ID	Resource Name	Units	Cost	Baseline Cost	Act. Cost	Rem. Cost	Work	Ovt. Work	Baseline Work	Act. Work	Rem. Work	3	CompProfF	10%	\$864.80	\$0.00	\$0.00	\$864.80	18.4 h	0 h	0 h	0 h	18.4 h
ID	Resource Name	Units	Cost	Baseline Cost	Act. Cost	Rem. Cost	Work	Ovt. Work	Baseline Work	Act. Work	Rem. Work																				
3	CompProfF	10%	\$864.80	\$0.00	\$0.00	\$864.80	18.4 h	0 h	0 h	0 h	18.4 h																				
	<u>Notes</u> WBS Definition- Installation, setup, and commissioning Labor BOE- Run2a experience																														
1.3.2.4.2.5	Operation	10/21/04	3/20/06	\$0.00	\$0.00	\$0.00	\$0.00																								
	<table border="1"> <thead> <tr> <th>ID</th> <th>Resource Name</th> <th>Units</th> <th>Cost</th> <th>Baseline Cost</th> <th>Act. Cost</th> <th>Rem. Cost</th> <th>Work</th> <th>Ovt. Work</th> <th>Baseline Work</th> <th>Act. Work</th> <th>Rem. Work</th> </tr> </thead> <tbody> <tr> <td>18</td> <td>OpCompProfF</td> <td>5%</td> <td>\$0.00</td> <td>\$0.00</td> <td>\$0.00</td> <td>\$0.00</td> <td>138 h</td> <td>0 h</td> <td>0 h</td> <td>0 h</td> <td>138 h</td> </tr> </tbody> </table>							ID	Resource Name	Units	Cost	Baseline Cost	Act. Cost	Rem. Cost	Work	Ovt. Work	Baseline Work	Act. Work	Rem. Work	18	OpCompProfF	5%	\$0.00	\$0.00	\$0.00	\$0.00	138 h	0 h	0 h	0 h	138 h
ID	Resource Name	Units	Cost	Baseline Cost	Act. Cost	Rem. Cost	Work	Ovt. Work	Baseline Work	Act. Work	Rem. Work																				
18	OpCompProfF	5%	\$0.00	\$0.00	\$0.00	\$0.00	138 h	0 h	0 h	0 h	138 h																				
	<u>Notes</u> WBS Definition- Normal system operation tasks Labor BOE- Run2a experience																														
1.3.2.4.3	RAID System	9/30/03	3/20/06	\$43,000.00	\$0.00	\$864.80	\$43,864.80																								
	<u>Notes</u> WBS Definition- RAID disk array																														
1.3.2.4.3.1	Evaluation	9/30/03	5/25/04	\$0.00	\$0.00	\$0.00	\$0.00																								
	<table border="1"> <thead> <tr> <th>ID</th> <th>Resource Name</th> <th>Units</th> <th>Cost</th> <th>Baseline Cost</th> <th>Act. Cost</th> <th>Rem. Cost</th> <th>Work</th> <th>Ovt. Work</th> <th>Baseline Work</th> <th>Act. Work</th> <th>Rem. Work</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>PhysicistF</td> <td>5%</td> <td>\$0.00</td> <td>\$0.00</td> <td>\$0.00</td> <td>\$0.00</td> <td>64.4 h</td> <td>0 h</td> <td>0 h</td> <td>0 h</td> <td>64.4 h</td> </tr> </tbody> </table>							ID	Resource Name	Units	Cost	Baseline Cost	Act. Cost	Rem. Cost	Work	Ovt. Work	Baseline Work	Act. Work	Rem. Work	1	PhysicistF	5%	\$0.00	\$0.00	\$0.00	\$0.00	64.4 h	0 h	0 h	0 h	64.4 h
ID	Resource Name	Units	Cost	Baseline Cost	Act. Cost	Rem. Cost	Work	Ovt. Work	Baseline Work	Act. Work	Rem. Work																				
1	PhysicistF	5%	\$0.00	\$0.00	\$0.00	\$0.00	64.4 h	0 h	0 h	0 h	64.4 h																				
	<u>Notes</u> WBS Definition- Evaluate RAID components Labor BOE- Run2a experience																														

WBS Dictionary as of 10/23/02
Run IIb Online/DAQ

WBS	Name	Start	Finish	M&S EQ	M&S Labor	FNAL Labor	Total Cost
1.3.2.4.3.2	PO	5/26/04	7/14/04	\$43,000.00	\$0.00	\$0.00	\$43,000.00
	<i>ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost Work Ovt. Work Baseline Work Act. Work Rem. Work</i>						
	1 PhysicistF 20% \$0.00 \$0.00 \$0.00 \$0.00 54.4 h 0 h 0 h 0 h 54.4 h						
	20 MandS 43,000 \$43,000.00 \$0.00 \$0.00 \$43,000.00 43,000 0 0 0 43,000						
	<u>Notes</u>						
	WBS Definition- Requisition and PO Creation; RAID disk arrays for file server, supporting databases and general use.						
	M&S BOE- FC RAID controllers = \$10k. Disk crates, rack = \$15k. Hot-swappable disks = \$18k.						
	Labor BOE- Run2a experience						
	Risk Mitigation (Cost)- The cost impact results from a possible need to purchase more, or more expensive, disk in order to meet the high availability and storage requirements of the Online system. The 50% contingency for this task is set large enough to enable a 50% expansion of capacity or to allow a 50% more expensive solution. The costs of these systems are well known.						
1.3.2.4.3.3	Delivery	7/15/04	9/17/04	\$0.00	\$0.00	\$0.00	\$0.00
	<u>Notes</u>						
	WBS Definition- Delivery time						
1.3.2.4.3.4	Commissioning	9/20/04	10/20/04	\$0.00	\$0.00	\$864.80	\$864.80
	<i>ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost Work Ovt. Work Baseline Work Act. Work Rem. Work</i>						
	3 CompProfF 10% \$864.80 \$0.00 \$0.00 \$864.80 18.4 h 0 h 0 h 0 h 18.4 h						
	<u>Notes</u>						
	WBS Definition- Installation, setup, and commissioning						
	Labor BOE- Run2a experience						
1.3.2.4.3.5	RAID Array Active	10/20/04	10/20/04	\$0.00	\$0.00	\$0.00	\$0.00
	<u>Notes</u>						
	WBS Definition- milestone:						
1.3.2.4.3.6	Operation	10/21/04	3/20/06	\$0.00	\$0.00	\$0.00	\$0.00
	<i>ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost Work Ovt. Work Baseline Work Act. Work Rem. Work</i>						
	18 OpCompProfF 5% \$0.00 \$0.00 \$0.00 \$0.00 138 h 0 h 0 h 0 h 138 h						
	<u>Notes</u>						
	WBS Definition- Normal system operation tasks						
	Labor BOE- Run2a experience						
1.3.2.4.4	Backup System	6/3/02	3/15/06	\$0.00	\$0.00	\$0.00	\$0.00
	<u>Notes</u>						
	WBS Definition- Tape backup system						
1.3.2.4.4.1	Evaluation	6/3/02	7/29/02	\$0.00	\$0.00	\$0.00	\$0.00
	<i>ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost Work Ovt. Work Baseline Work Act. Work Rem. Work</i>						
	17 OpPhysicistF 5% \$0.00 \$0.00 \$0.00 \$0.00 16 h 0 h 0 h 16 h 0 h						

WBS Dictionary as of 10/23/02
Run IIb Online/DAQ

WBS	Name	Start	Finish	M&S EQ	M&S Labor	FNAL Labor	Total Cost				
"Evaluation" continued											
<u>Notes</u> WBS Definition- Evaluate BACKUP options Labor BOE- Run2a experience											
1.3.2.4.4.2	PO	7/30/02	9/10/02	\$0.00	\$0.00	\$0.00	\$0.00				
<u>ID</u>	<u>Resource Name</u>	<u>Units</u>	<u>Cost</u>	<u>Baseline Cost</u>	<u>Act. Cost</u>	<u>Rem. Cost</u>	<u>Work</u>	<u>Ovt. Work</u>	<u>Baseline Work</u>	<u>Act. Work</u>	<u>Rem. Work</u>
17	OpPhysicistF	5%	\$0.00	\$0.00	\$0.00	\$0.00	12 h	0 h	0 h	12 h	0 h
<u>Notes</u> WBS Definition- Requisition and PO Creation; Backup system. This is assumed to be a base program activity.											
1.3.2.4.4.3	Delivery	9/11/02	11/12/02	\$0.00	\$0.00	\$0.00	\$0.00				
<u>Notes</u> WBS Definition- Delivery time											
1.3.2.4.4.4	Commissioning	11/13/02	12/17/02	\$0.00	\$0.00	\$0.00	\$0.00				
<u>ID</u>	<u>Resource Name</u>	<u>Units</u>	<u>Cost</u>	<u>Baseline Cost</u>	<u>Act. Cost</u>	<u>Rem. Cost</u>	<u>Work</u>	<u>Ovt. Work</u>	<u>Baseline Work</u>	<u>Act. Work</u>	<u>Rem. Work</u>
18	OpCompProfF	10%	\$0.00	\$0.00	\$0.00	\$0.00	18.4 h	0 h	0 h	0 h	18.4 h
<u>Notes</u> WBS Definition- Installation, setup, and commissioning Labor BOE- Run2a experience											
1.3.2.4.4.5	Operation	12/18/02	3/15/06	\$0.00	\$0.00	\$0.00	\$0.00				
<u>ID</u>	<u>Resource Name</u>	<u>Units</u>	<u>Cost</u>	<u>Baseline Cost</u>	<u>Act. Cost</u>	<u>Rem. Cost</u>	<u>Work</u>	<u>Ovt. Work</u>	<u>Baseline Work</u>	<u>Act. Work</u>	<u>Rem. Work</u>
18	OpCompProfF	5%	\$0.00	\$0.00	\$0.00	\$0.00	319.6 h	0 h	0 h	0 h	319.6 h
<u>Notes</u> WBS Definition- Normal system operation tasks Labor BOE- Run2a experience											
1.3.2.5	HOST Systems R&D	4/22/02	11/20/03	\$0.00	\$0.00	\$0.00	\$0.00				
<u>Notes</u> WBS Definition- Evaluate Linux server system with FC SAN as DAQ Host system											
1.3.2.5.1	Host R&D evaluation	4/22/02	6/17/02	\$0.00	\$0.00	\$0.00	\$0.00				
<u>ID</u>	<u>Resource Name</u>	<u>Units</u>	<u>Cost</u>	<u>Baseline Cost</u>	<u>Act. Cost</u>	<u>Rem. Cost</u>	<u>Work</u>	<u>Ovt. Work</u>	<u>Baseline Work</u>	<u>Act. Work</u>	<u>Rem. Work</u>
17	OpPhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	32 h	0 h	0 h	32 h	0 h
<u>Notes</u> WBS Definition- Market and system analysis Labor BOE- Run2a experience											

WBS Dictionary as of 10/23/02
Run IIb Online/DAQ

WBS	Name	Start	Finish	M&S EQ	M&S Labor	FNAL Labor	Total Cost
1.3.2.5.2	Host R&D node PO	6/18/02	7/30/02	\$0.00	\$0.00	\$0.00	\$0.00
	<i>ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost Work Ovt. Work Baseline Work Act. Work Rem. Work</i>						
	17 OpPhysicistF 10% \$0.00 \$0.00 \$0.00 \$0.00 24 h 0 h 0 h 24 h 0 h						
	<u>Notes</u> WBS Definition- Requisition and PO creation Labor BOE- Run2a experience						
1.3.2.5.3	Host R&D node delivery	7/31/02	9/26/02	\$0.00	\$0.00	\$0.00	\$0.00
	<u>Notes</u> WBS Definition- Delivery time						
1.3.2.5.4	Host R&D node commissioning	9/27/02	10/29/02	\$0.00	\$0.00	\$0.00	\$0.00
	<i>ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost Work Ovt. Work Baseline Work Act. Work Rem. Work</i>						
	17 OpPhysicistF 10% \$0.00 \$0.00 \$0.00 \$0.00 18.4 h 0 h 0 h 0 h 18.4 h						
	<u>Notes</u> WBS Definition- Installation, setup, and commissioning Labor BOE- Run2a experience						
1.3.2.5.5	Host R&D node analysis	10/30/02	11/20/03	\$0.00	\$0.00	\$0.00	\$0.00
	<i>ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost Work Ovt. Work Baseline Work Act. Work Rem. Work</i>						
	17 OpPhysicistF 10% \$0.00 \$0.00 \$0.00 \$0.00 211.2 h 0 h 0 h 0 h 211.2 h						
	<u>Notes</u> WBS Definition- Configuration, performance, and reliability testing Labor BOE- Run2a experience						
1.3.2.6	DAQ HOST Systems	6/26/03	1/6/06	\$52,000.00	\$0.00	\$3,459.20	\$55,459.20
	<u>Notes</u> WBS Definition- Summary Task-Requisition and PO creation						
1.3.2.6.1	DAQ HOST secondary node PO	6/26/03	8/13/03	\$20,000.00	\$0.00	\$0.00	\$20,000.00
	<i>ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost Work Ovt. Work Baseline Work Act. Work Rem. Work</i>						
	1 PhysicistF 10% \$0.00 \$0.00 \$0.00 \$0.00 \$0.00 27.2 h 0 h 0 h 0 h 27.2 h						
	20 MandS 20,000 \$20,000.00 \$0.00 \$0.00 \$20,000.00 20,000 0 0 0 20,000						
	<u>Notes</u> WBS Definition- Requisition and PO creation for secondary mid-range server. M&S BOE- Catalog prices for 4-way Linux server Labor BOE- Run2a experience						
1.3.2.6.2	DAQ HOST secondary node delivery	8/14/03	10/17/03	\$0.00	\$0.00	\$0.00	\$0.00
	<u>Notes</u> WBS Definition- Delivery time						

WBS Dictionary as of 10/23/02
Run IIb Online/DAQ

WBS	Name	Start	Finish	M&S EQ	M&S Labor	FNAL Labor	Total Cost
1.3.2.6.3	DAQ HOST secondary node commissioning	10/20/03	11/19/03	\$0.00	\$0.00	\$1,729.60	\$1,729.60
	<i>ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost Work Ovt. Work Baseline Work Act. Work Rem. Work</i>						
	1 PhysicistF 10% \$0.00 \$0.00 \$0.00 \$0.00 18.4 h 0 h 0 h 0 h 18.4 h						
	3 CompProfF 20% \$1,729.60 \$0.00 \$0.00 \$1,729.60 36.8 h 0 h 0 h 0 h 36.8 h						
	<i>Notes</i>						
	WBS Definition- Installation, setup, and commissioning						
	Labor BOE- Run2a experience						
1.3.2.6.4	DAQ HOST Secondary System Active	11/19/03	11/19/03	\$0.00	\$0.00	\$0.00	\$0.00
	<i>Notes</i>						
	WBS Definition- Milestone-System available to early users						
1.3.2.6.5	DAQ HOST secondary system operation	11/20/03	12/14/04	\$0.00	\$0.00	\$0.00	\$0.00
	<i>ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost Work Ovt. Work Baseline Work Act. Work Rem. Work</i>						
	18 OpCompProfF 5% \$0.00 \$0.00 \$0.00 \$0.00 105.6 h 0 h 0 h 0 h 105.6 h						
	<i>Notes</i>						
	WBS Definition- Normal system operations						
	Labor BOE- Run2a experience						
1.3.2.6.6	DAQ HOST primary node PO	7/19/04	9/2/04	\$32,000.00	\$0.00	\$0.00	\$32,000.00
	<i>ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost Work Ovt. Work Baseline Work Act. Work Rem. Work</i>						
	1 PhysicistF 10% \$0.00 \$0.00 \$0.00 \$0.00 27.2 h 0 h 0 h 0 h 27.2 h						
	20 MandS 32,000 \$32,000.00 \$0.00 \$0.00 \$32,000.00 32,000 0 0 0 32,000						
	<i>Notes</i>						
	WBS Definition- Requisition and PO creation for Primary high-end server.						
	M&S BOE- Catalog prices for 4-way Linux server						
	Labor BOE- Run2a experience						
1.3.2.6.7	DAQ HOST primary node delivery	9/3/04	11/8/04	\$0.00	\$0.00	\$0.00	\$0.00
	<i>Notes</i>						
	WBS Definition- Delivery time						
1.3.2.6.8	DAQ HOST primary node commissioning	11/9/04	12/13/04	\$0.00	\$0.00	\$1,729.60	\$1,729.60
	<i>ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost Work Ovt. Work Baseline Work Act. Work Rem. Work</i>						
	1 PhysicistF 10% \$0.00 \$0.00 \$0.00 \$0.00 18.4 h 0 h 0 h 0 h 18.4 h						
	3 CompProfF 20% \$1,729.60 \$0.00 \$0.00 \$1,729.60 36.8 h 0 h 0 h 0 h 36.8 h						
	<i>Notes</i>						
	WBS Definition- Installation, setup, and commissioning						
	Labor BOE- Run2a experience						

WBS Dictionary as of 10/23/02
Run IIb Online/DAQ

WBS	Name	Start	Finish	M&S EQ	M&S Labor	FNAL Labor	Total Cost					
1.3.2.6.9	DAQ HOST Primary System Active	12/13/04	12/13/04	\$0.00	\$0.00	\$0.00	\$0.00					
	<i>Notes</i> WBS Definition- Milestone-System available to users											
1.3.2.6.10	DAQ HOST primary system operation	12/14/04	1/6/06	\$0.00	\$0.00	\$0.00	\$0.00					
	<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
	18	OpCompProfF	5%	\$0.00	\$0.00	\$0.00	\$0.00	103.6 h	0 h	0 h	0 h	103.6 h
	<i>Notes</i> WBS Definition- Normal system operations Labor BOE- Run2a experience											
1.3.2.7	ORACLE Systems	6/12/03	3/28/06	\$52,000.00	\$0.00	\$130,622.40	\$182,622.40					
	<i>Notes</i> WBS Definition- Summary task-Acquire and commission ORACLE database systems											
1.3.2.7.1	Development ORACLE system evaluation	6/12/03	1/6/04	\$0.00	\$0.00	\$0.00	\$0.00					
	<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
	1	PhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	110.4 h	0 h	0 h	0 h	110.4 h
	<i>Notes</i> WBS Definition- Evaluate ORACLE server options Labor BOE- Run2a experience											
1.3.2.7.2	Development ORACLE System Purchase	1/7/04	2/24/04	\$20,000.00	\$0.00	\$0.00	\$20,000.00					
	<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
	1	PhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	27.2 h	0 h	0 h	0 h	27.2 h
	20	MandS	20,000	\$20,000.00	\$0.00	\$0.00	\$20,000.00	20,000	0 h	0	0	20,000
	<i>Notes</i> WBS Definition- Requisition and PO Creation: mid-range server for the development ORACLE system. M&S BOE- Catalog prices for 4-way Linux server Labor BOE- Run2a experience											
1.3.2.7.3	Development ORACLE system delivery	2/25/04	4/28/04	\$0.00	\$0.00	\$0.00	\$0.00					
	<i>Notes</i> WBS Definition- Delivery time											
1.3.2.7.4	Development ORACLE system commissioning	4/29/04	6/1/04	\$0.00	\$0.00	\$4,324.00	\$4,324.00					
	<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
	1	PhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	18.4 h	0 h	0 h	0 h	18.4 h
	3	CompProfF	50%	\$4,324.00	\$0.00	\$0.00	\$4,324.00	92 h	0 h	0 h	0 h	92 h
	<i>Notes</i> WBS Definition- Installation, setup, and commissioning Labor BOE-											

WBS Dictionary as of 10/23/02
Run IIb Online/DAQ

WBS	Name	Start	Finish	M&S EQ	M&S Labor	FNAL Labor	Total Cost				
"Development ORACLE system commissioning" continued											
<i>Notes</i> Run2a experience											
1.3.2.7.5	Development ORACLE System Active	6/1/04	6/1/04	\$0.00	\$0.00	\$0.00	\$0.00				
<i>Notes</i> WBS Definition- Milestone-System available to early users											
1.3.2.7.6	Development ORACLE system analysis	6/2/04	7/12/05	\$0.00	\$0.00	\$103,776.00	\$103,776.00				
<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
3	CompProfF	100%	\$103,776.00	\$0.00	\$0.00	\$103,776.00	2,208 h	0 h	0 h	0 h	2,208 h
<i>Notes</i> WBS Definition- Function, performance, and reliability measurements Labor BOE- Run2a experience											
1.3.2.7.7	Production ORACLE System PO	5/2/05	6/17/05	\$32,000.00	\$0.00	\$0.00	\$32,000.00				
<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
1	PhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	27.2 h	0 h	0 h	0 h	27.2 h
20	MandS	32,000	\$32,000.00	\$0.00	\$0.00	\$32,000.00	32,000	0	0	0	32,000
<i>Notes</i> WBS Definition- Requisition and PO Creation for high-end server production ORACLE system M&S BOE- Catalog prices for 4-way Linux server Labor BOE- Run2a experience											
1.3.2.7.8	Production ORACLE system delivery	6/20/05	8/23/05	\$0.00	\$0.00	\$0.00	\$0.00				
<i>Notes</i> WBS Definition- Delivery time											
1.3.2.7.9	Production ORACLE system commissioning	8/24/05	9/26/05	\$0.00	\$0.00	\$4,324.00	\$4,324.00				
<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
1	PhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	18.4 h	0 h	0 h	0 h	18.4 h
3	CompProfF	50%	\$4,324.00	\$0.00	\$0.00	\$4,324.00	92 h	0 h	0 h	0 h	92 h
<i>Notes</i> WBS Definition- Installation, setup, and commissioning Labor BOE- Run2a experience											
1.3.2.7.10	Production ORACLE System Active	9/26/05	9/26/05	\$0.00	\$0.00	\$0.00	\$0.00				
<i>Notes</i> WBS Definition- Milestone-System available to users											
1.3.2.7.11	ORACLE systems operation	9/27/05	3/28/06	\$0.00	\$0.00	\$18,198.40	\$18,198.40				
<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
3	CompProfF	40%	\$18,198.40	\$0.00	\$0.00	\$18,198.40	387.2 h	0 h	0 h	0 h	387.2 h

WBS Dictionary as of 10/23/02
Run IIb Online/DAQ

WBS	Name	Start	Finish	M&S EQ	M&S Labor	FNAL Labor	Total Cost				
"ORACLE systems operation" continued											
<i>Notes</i> WBS Definition- Normal system operations Labor BOE- Run2a experience											
1.3.2.8	File Servers	6/12/03	1/6/06	\$40,000.00	\$0.00	\$20,116.00	\$60,116.00				
<i>Notes</i> WBS Definition- Acquire and commission File Server systems											
1.3.2.8.1	Secondary File Server evaluation	6/12/03	8/15/03	\$0.00	\$0.00	\$0.00	\$0.00				
<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
1	PhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	36.8 h	0 h	0 h	0 h	36.8 h
<i>Notes</i> WBS Definition- Evaluate File server options Labor BOE- Run2a experience											
1.3.2.8.2	Secondary File Server Purchase	8/18/03	10/3/03	\$20,000.00	\$0.00	\$0.00	\$20,000.00	20,000	0	0	20,000
<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
20	MandS	20,000	\$20,000.00	\$0.00	\$0.00	\$20,000.00	20,000				20,000
<i>Notes</i> WBS Definition- Requisition and PO Creation File server system M&S BOE- Catalog prices of dual or quad processor Linux servers Labor BOE- Run2a experience											
1.3.2.8.3	Secondary File Server delivery	10/6/03	12/10/03	\$0.00	\$0.00	\$0.00	\$0.00				
<i>Notes</i> WBS Definition- Delivery time											
1.3.2.8.4	Secondary File Server commissioning	12/11/03	1/22/04	\$0.00	\$0.00	\$864.80	\$864.80	18.4 h	0 h	0 h	18.4 h
<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
1	PhysicistF	10%	\$0.00	\$0.00	\$0.00	\$0.00	18.4 h	0 h	0 h	0 h	18.4 h
3	CompProfF	10%	\$864.80	\$0.00	\$0.00	\$864.80	18.4 h	0 h	0 h	0 h	18.4 h
<i>Notes</i> WBS Definition- Installation, setup, and commissioning Labor BOE- Run2a experience											
1.3.2.8.5	Secondary File Server Active	1/22/04	1/22/04	\$0.00	\$0.00	\$0.00	\$0.00				
<i>Notes</i> WBS Definition- Milestone-System available to early users											

WBS Dictionary as of 10/23/02
Run IIb Online/DAQ

WBS	Name	Start	Finish	M&S EQ	M&S Labor	FNAL Labor	Total Cost
1.3.2.8.6	Secondary File Server analysis	1/23/04	3/2/05	\$0.00	\$0.00	\$10,377.60	\$10,377.60
	<i>ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost Work Ovt. Work Baseline Work Act. Work Rem. Work</i>						
	3 CompProfF 10% \$10,377.60 \$0.00 \$0.00 \$10,377.60 220.8 h 0 h 0 h 0 h 220.8 h						
	<u>Notes</u>						
	WBS Definition- Function, performance, and reliability measurements						
	Labor BOE- Run2a experience						
1.3.2.8.7	Primary File Server Purchase	9/22/04	11/8/04	\$20,000.00	\$0.00	\$0.00	\$20,000.00
	<i>ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost Work Ovt. Work Baseline Work Act. Work Rem. Work</i>						
	20 MandS 20,000 \$20,000.00 \$0.00 \$0.00 \$20,000.00 20,000 0 0 0 20,000						
	<u>Notes</u>						
	WBS Definition- File server system; Requisition and PO Creation						
	M&S BOE- Catalog prices of quad processor Linux servers						
	Labor BOE- Run2a experience						
1.3.2.8.8	Primary File Server delivery	11/9/04	1/25/05	\$0.00	\$0.00	\$0.00	\$0.00
	<u>Notes</u>						
	WBS Definition- Delivery time						
1.3.2.8.9	Primary File Server commissioning	1/26/05	2/25/05	\$0.00	\$0.00	\$864.80	\$864.80
	<i>ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost Work Ovt. Work Baseline Work Act. Work Rem. Work</i>						
	1 PhysicistF 10% \$0.00 \$0.00 \$0.00 \$0.00 18.4 h 0 h 0 h 0 h 18.4 h						
	3 CompProfF 10% \$864.80 \$0.00 \$0.00 \$864.80 18.4 h 0 h 0 h 0 h 18.4 h						
	<u>Notes</u>						
	WBS Definition- Installation, setup, and commissioning						
	Labor BOE- Run2a experience						
1.3.2.8.10	Primary File Server Active	2/25/05	2/25/05	\$0.00	\$0.00	\$0.00	\$0.00
	<u>Notes</u>						
	WBS Definition- Milestone-System available to users						
1.3.2.8.12	Online System Production and Testing Complete	10/7/05	10/7/05	\$0.00	\$0.00	\$0.00	\$0.00
	<u>Notes</u>						
	WBS Definition- Milestone- All elements of the online system produced and tested.						
1.3.2.8.11	File Servers operation	2/28/05	1/6/06	\$0.00	\$0.00	\$8,008.80	\$8,008.80
	<i>ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost Work Ovt. Work Baseline Work Act. Work Rem. Work</i>						
	3 CompProfF 10% \$8,008.80 \$0.00 \$0.00 \$8,008.80 170.4 h 0 h 0 h 0 h 170.4 h						
	<u>Notes</u>						
	WBS Definition- Normal system operations						
	Labor BOE- Run2a experience						

WBS Dictionary as of 10/23/02
Run IIb Online/DAQ

WBS	Name	Start	Finish	M&S EQ	M&S Labor	FNAL Labor	Total Cost					
1.3.2.9	OS & Software	1/2/02	3/21/06	\$0.00	\$0.00	\$0.00	\$0.00					
	<i>Notes</i> WBS Definition- Summary task- Operation system and application software operations for Network and DAQ/Host systems.											
1.3.2.9.1	System management	1/2/02	3/21/06	\$0.00	\$0.00	\$0.00	\$0.00					
	<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
	18	OpCompProfF	50%	\$0.00	\$0.00	\$0.00	\$0.00	4,192 h	0 h	0 h	736 h	3,456 h
	<i>Notes</i> WBS Definition- Operating system and hardware maintenance Labor BOE- Run2a experience											
1.3.2.9.2	ORACLE DBAs	1/2/02	3/21/06	\$0.00	\$0.00	\$0.00	\$0.00					
	<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
	18	OpCompProfF	150%	\$0.00	\$0.00	\$0.00	\$0.00	12,576 h	0 h	0 h	2,208 h	10,368 h
	<i>Notes</i> WBS Definition- ORACLE database maintenance and development Labor BOE- Run2a experience											
1.3.2.9.3	DAQ software maintenance	1/2/02	3/21/06	\$0.00	\$0.00	\$0.00	\$0.00					
	<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
	18	OpCompProfF	100%	\$0.00	\$0.00	\$0.00	\$0.00	8,384 h	0 h	0 h	1,472 h	6,912 h
	<i>Notes</i> WBS Definition- DAQ application maintenance and development Labor BOE- Run2a experience											
1.3.2.9.4	Detector monitoring software maintenance	1/2/02	3/21/06	\$0.00	\$0.00	\$0.00	\$0.00					
	<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
	19	OpPhysicistU	100%	\$0.00	\$0.00	\$0.00	\$0.00	8,384 h	0 h	0 h	1,472 h	6,912 h
	<i>Notes</i> WBS Definition- Hardware and event data monitoring maintenance and development Labor BOE- Run2a experience											
1.3.3	Control Systems	1/2/02	3/21/06	\$148,000.00	\$0.00	\$32,505.20	\$180,505.20					
	<i>Notes</i> WBS Definition- Summary task-Operation and maintenance of Control System components											
1.3.3.1	Controls Processor Upgrades	2/16/04	12/21/05	\$148,000.00	\$0.00	\$16,074.00	\$164,074.00					
	<i>Notes</i> WBS Definition- Summary task-Replacement of Control System processors											

WBS Dictionary as of 10/23/02
Run IIb Online/DAQ

WBS	Name	Start	Finish	M&S EQ	M&S Labor	FNAL Labor	Total Cost
1.3.3.1.1	Controls Processor Evaluations	2/16/04	4/19/04	\$0.00	\$0.00	\$864.80	\$864.80
	<i>ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost Work Ovt. Work Baseline Work Act. Work Rem. Work</i>						
	3 CompProfF 5% \$864.80 \$0.00 \$0.00 \$864.80 18.4 h 0 h 0 h 0 h 18.4 h						
	<u>Notes</u>						
	WBS Definition- Evaluate Control System processor options						
	Labor BOE- Run2a experience						
1.3.3.1.2	Development Controls Processor purchases	4/20/04	6/7/04	\$8,000.00	\$0.00	\$1,278.40	\$9,278.40
	<i>ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost Work Ovt. Work Baseline Work Act. Work Rem. Work</i>						
	1 PhysicistF 10% \$0.00 \$0.00 \$0.00 \$0.00 27.2 h 0 h 0 h 0 h 27.2 h						
	3 CompProfF 10% \$1,278.40 \$0.00 \$0.00 \$1,278.40 27.2 h 0 h 0 h 0 h 27.2 h						
	20 MandS 8,000 \$8,000.00 \$0.00 \$0.00 \$8,000.00 8,000 0 0 0 8,000						
	<u>Notes</u>						
	WBS Definition- Requisition and PO Creation Control system processor evaluation nodes						
	M&S BOE- Run2a SBC and PowerPC node purchases						
	Labor BOE- Run2a experience						
1.3.3.1.3	Development Controls Processor delivery	6/8/04	8/11/04	\$0.00	\$0.00	\$0.00	\$0.00
	<u>Notes</u>						
	WBS Definition- Delivery time						
1.3.3.1.4	Development Controls Processor testing	8/12/04	2/3/05	\$0.00	\$0.00	\$8,648.00	\$8,648.00
	<i>ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost Work Ovt. Work Baseline Work Act. Work Rem. Work</i>						
	3 CompProfF 20% \$8,648.00 \$0.00 \$0.00 \$8,648.00 184 h 0 h 0 h 0 h 184 h						
	<u>Notes</u>						
	WBS Definition- Installation, setup, and commissioning; Testing with EPICS and D0 software						
	Labor BOE- Run2a experience						
1.3.3.1.5	Controls Processor purchases	2/4/05	3/23/05	\$140,000.00	\$0.00	\$1,278.40	\$141,278.40
	<i>ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost Work Ovt. Work Baseline Work Act. Work Rem. Work</i>						
	1 PhysicistF 5% \$0.00 \$0.00 \$0.00 \$0.00 13.6 h 0 h 0 h 0 h 13.6 h						
	3 CompProfF 10% \$1,278.40 \$0.00 \$0.00 \$1,278.40 27.2 h 0 h 0 h 0 h 27.2 h						
	20 MandS 140,000 \$140,000.00 \$0.00 \$0.00 \$140,000.00 140,000 0 0 0 140,000						
	<u>Notes</u>						
	WBS Definition- Control system processor production nodes; Requisition and PO Creation						
	M&S BOE- Run2a SBC and PowerPC node purchases						
	Labor BOE- The estimate of 4 calendar weeks for the task includes the time required to obtain authorization and purchasing operations.						

WBS Dictionary as of 10/23/02
Run IIb Online/DAQ

WBS	Name	Start	Finish	M&S EQ	M&S Labor	FNAL Labor	Total Cost					
1.3.3.1.6	Controls Processor delivery	3/24/05	5/26/05	\$0.00	\$0.00	\$0.00	\$0.00					
	<i>Notes</i> WBS Definition- Delivery time											
1.3.3.1.7	Controls Processor commissioning	5/27/05	6/29/05	\$0.00	\$0.00	\$1,729.60	\$1,729.60					
	<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
	3	CompProfF	20%	\$1,729.60	\$0.00	\$0.00	\$1,729.60	36.8 h	0 h	0 h	0 h	36.8 h
	<i>Notes</i> WBS Definition- Installation, setup, and commissioning; Loading EPICS and D0 software Labor BOE- Run2a experience											
1.3.3.1.8	Controls Processors operation	6/30/05	12/21/05	\$0.00	\$0.00	\$2,274.80	\$2,274.80					
	<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
	3	CompProfF	5%	\$2,274.80	\$0.00	\$0.00	\$2,274.80	48.4 h	0 h	0 h	0 h	48.4 h
	<i>Notes</i> WBS Definition- Normal system operations Labor BOE- Run2a experience											
1.3.3.2	Test Stand Support	10/1/02	9/19/05	\$0.00	\$0.00	\$16,431.20	\$16,431.20					
	<i>Notes</i> WBS Definition- Summary task-Expert support for SiDet test stand operations											
1.3.3.2.1	Test Stand Controls System installation	10/1/02	12/5/02	\$0.00	\$0.00	\$3,459.20	\$3,459.20					
	<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
	3	CompProfF	20%	\$3,459.20	\$0.00	\$0.00	\$3,459.20	73.6 h	0 h	0 h	0 h	73.6 h
	<i>Notes</i> WBS Definition- Installation of control system hardware and software components in prototype SiDet test stand; Configuration of test stand Labor BOE- Run2a experience: requires Computer Professional skills at level of 1 day per week for approximately 2 months.											
1.3.3.2.2	Test Stand Controls System support	12/6/02	9/19/05	\$0.00	\$0.00	\$12,972.00	\$12,972.00					
	<i>ID</i>	<i>Resource Name</i>	<i>Units</i>	<i>Cost</i>	<i>Baseline Cost</i>	<i>Act. Cost</i>	<i>Rem. Cost</i>	<i>Work</i>	<i>Ovt. Work</i>	<i>Baseline Work</i>	<i>Act. Work</i>	<i>Rem. Work</i>
	3	CompProfF	5%	\$12,972.00	\$0.00	\$0.00	\$12,972.00	276 h	0 h	0 h	0 h	276 h
	<i>Notes</i> WBS Definition- Normal system operations; Support for special test requests Labor BOE- Run2a experience											
1.3.3.3	OS and Software	1/2/02	3/21/06	\$0.00	\$0.00	\$0.00	\$0.00					
	<i>Notes</i> WBS Definition- Summary task- Operation system and application software operations for Control systems.											

WBS Dictionary as of 10/23/02
Run IIb Online/DAQ

WBS	Name	Start	Finish	M&S EQ	M&S Labor	FNAL Labor	Total Cost
1.3.3.3.1	Controls System software maintenance	1/2/02	3/21/06	\$0.00	\$0.00	\$0.00	\$0.00
	<i>ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost Work Ovt. Work Baseline Work Act. Work Rem. Work</i>						
	18 OpCompProfF 150% \$0.00 \$0.00 \$0.00 \$0.00 12,576 h 0 h 0 h 2,208 h 10,368 h						
	<i>Notes</i>						
	WBS Definition- Control system maintenance and development						
	Labor BOE- Run2a experience						
1.3.3.3.2	Controls application maintenance	1/2/02	3/21/06	\$0.00	\$0.00	\$0.00	\$0.00
	<i>ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost Work Ovt. Work Baseline Work Act. Work Rem. Work</i>						
	18 OpCompProfF 50% \$0.00 \$0.00 \$0.00 \$0.00 4,192 h 0 h 0 h 736 h 3,456 h						
	<i>Notes</i>						
	WBS Definition- Specialized application maintenance and development						
	Labor BOE- Run2a experience						
1.3.3.3.3	Detector monitoring software maintenance	1/2/02	3/21/06	\$0.00	\$0.00	\$0.00	\$0.00
	<i>ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost Work Ovt. Work Baseline Work Act. Work Rem. Work</i>						
	19 OpPhysicistU 100% \$0.00 \$0.00 \$0.00 \$0.00 8,384 h 0 h 0 h 1,472 h 6,912 h						
	<i>Notes</i>						
	WBS Definition- Hardware and event data monitoring maintenance and development						
	Labor BOE- Run2a experience						
1.3.4	DAQ/Online Management	10/1/02	3/21/06	\$0.00	\$0.00	\$16,111.60	\$16,111.60
	<i>Notes</i>						
	WBS Definition- Summary task for subproject management tasks						
1.3.4.1	Online Group management	10/1/02	3/21/06	\$0.00	\$0.00	\$16,111.60	\$16,111.60
	<i>ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost Work Ovt. Work Baseline Work Act. Work Rem. Work</i>						
	1 PhysicistF 10% \$0.00 \$0.00 \$0.00 \$0.00 685.6 h 0 h 0 h 0 h 685.6 h						
	2 PhysicistU 20% \$0.00 \$0.00 \$0.00 \$0.00 1,371.2 h 0 h 0 h 0 h 1,371.2 h						
	3 CompProfF 5% \$16,111.60 \$0.00 \$0.00 \$16,111.60 342.8 h 0 h 0 h 0 h 342.8 h						
	<i>Notes</i>						
	WBS Definition- Meetings, reports, reviews, personnel						
	Labor BOE- Run2a experience						