Title I Design Report

Fermilab Main Injector

Project No. 92-G-302

Volume 3

Technical Cost Estimate

March 1998

Revision 5

Fermi National Accelerator Laboratory
Batavia, Illinois

FMT CONTROL COPY

Operated by Universities Research Association, Inc.
Under Contract with the United States Department of Energy

Fermilab

March 27, 2003

This is the final version of the cost estimate/WBS for the Fermilab Main Injector (FMI). Although the FMI staff kept the cost estimate/WBS up-to-date for most of the duration of the project, they discontinued the updating near the end of the project. The last update was in March 1998. At that stage, they still had $ 4.0 M remaining unassigned contingency out of a total project cost of $ 229.6 M. This will give some indication of the final maturity of the numbers contained in this file. In my evaluation, there would be little likelihood of any future updating, considering 5 years have passed and all the participants have move on to other projects.

Similarly, it seems difficult to resurrect the actual data files for this WBS compilation. What is presented here is a scanned copy of the printed March 1998 report to the DOE, which has been placed into an MS Word file and put into a readable format (by hand, by yours truly). I apologize for the errors that were likely to sneak in by this labor intensive procedure. Please let me know if an EXCEL or MacProject version is really needed and we can try to resurrect the original files.

This WBS has about 400-500 elements, going often to Level 6 (once to Level 7). In addition to this compilation, there are an equivalent number of pages with more details and notes for each of the lowest level (work package) WBS element. I was not up to scanning and formatting another comparable data set. Please let me know if you need that level of detail, and I'll copy and send it to you.

Finally, this compilation is available on my website in both MS Word (.doc) and .pdf formats.

http://home.fnal.gov/~peterg/USLC/FMI_WBS.doc

http://home.fnal.gov/~peterg/USLC/FMI_WBS.pdf

Peter

Peter H. Garbincius

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11: 19: 58 LEVEL 1 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS	DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
S-00l	l	FERMILAB MAIN INJECTOR	183,235.2	46,364.7	229,600.0	1	183,235.2	46,364.7	229,600.0
	TOTAL FERMILAB MAIN INJECTOR PROJECT					1	183,235.2	46,364.7	229,600.0

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11: 19: 58 LEVEL 2 SUMMARY - DIRECT COST

S-002	1.1	FERMILAB MAIN INJECTOR TECHNICAL COMPONEN							
			59,875.6	35,695.6	95,511.2	1	59,875.6	35,695.6	95,571.2
S-003	1.2	MAIN INJECTOR CONVENTIONAL CONSTRUCTION							
			84,717.2	3,836.6	88,553.9	1	84,717.2	3,836.6	88,553.9
S-004	1.3	PROJECT MANAGEMENT							
			1,840.2	6,832.5	8,672.7	1	1,840.2	6,832.5	8,672.7
384	1.4	MAIN INJECTOR CONTINGENCY							
			3,968.3	0.0	3.968.3	1	3,968.3	0.0	3,968.3
385	1.5	MAIN INJECTOR ESCALATION							
			32,833.9	0.0	32,833.9	1	32,833.9	0.0	32,833.9
S-00l	l	FERMILAB MAIN INJECTOR				===	=======	======	=======
						1	183,235.2	46,364.7	229,600.0

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11: 19: 58 LEVEL 3 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS	DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
S-005	1.1.1	MAIN INJECTOR MAGNETS							
			30,444.2	13,698.1	44,142.3	1	30,444.2	13,698.1	44,142.3
S-006	1.1.2	MAIN INJECTOR VACUUM							
			3,563.2	1,364.1	4,927.3	1	3,563.2	1,364.1	4,927.3
S-007	1.1.3	POWER SUPPLIES							
			7,363.7	5,301.1	12,664.8	1	7,363.7	5,301.1	12,664.8
S-008	1.1.4	RF SYSTEMS							
			4,262.1	1,839.2	6,101.3	1	4,262.1	1,839.2	6,101.3
S-009	1.1.6	KICKERS/SLOW EXTRACTION							
			1,835.7	2,468.6	4,304.3	1	1,835.7	2,468.6	4,304.3
S-010	1.1.7	RECYCLER-STOCHASTIC COOLING-SYSTEM							
			1,009.3	192.6	1,201.8	1	1,009.3	192.6	1,201.8
S-011	1.1.8	MIR INSTRUMENTATION							
			1,722.3	1,144.2	2,866.5	1	1,722.3	1,144.2	2.866.5
S-012	1.1.9	CONTROLS							
			1,602.3	1,729.1	3,331.4	1	1.602.3	1,729.1	3,331.4
S-013	1.1.10	SAFETY							
			399.4	398.8	798.2	1	399.4	398.8	798.2
S-014	1.1.12	MIR UTILITIES& ABORT							
			5,845.4	4,223.7	10,069.1	1	5,845.4	4,223.7	10,069.1
S-015	1.1.13	INSTALLATION							
			1,828.0	3,336.2	5,164.2	1	1,828.0	3,336.2	5,164.2
S-002	1.1	FERMILAB MAIN INJECTOR TECHNICAL COMPONENTS				===	======	======	======
						1	59,875.6	35,695.6	95,571.2

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11: 19: 58 LEVEL 3 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS	DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
S-016	1.2.1	CIVIL CONSTRUCTION/PHASE 1							
			12,668.4	0.0	12,668.4	1	12,668.4	0.0	12,668.4
S-017	1.2.2	CIVIL CONSTRUCTION/PHASE 2							
			50,440.1	0.0	50,440.1	1	50,440.1	0.0	50,440.1
S-018	1.2.3	CIVIL CONSTRUCTION/PHASE 3							
			10,288.9	0.0	10,288.9	1	10,288.9	0.0	10,288.9
S-019	1.2.4	CIVIL CONSTRUCTION/PHASE 4							
			1,496.1	0.0	1,496.1	1	1,496.1	0.0	1,496.1
S-020	1.2.14	CIVIL CONSTRUCTION ED&I							
			9,823.8	3,836.6	13,660.4	1	9,823.8	3,836.6	13,660.4
S-003	1.2	MAIN INJECTOR CONVENTIONAL CONSTRUCTION				===	======	=====	=======
						1	84,717.2	3,836.6	88,553.9
381	1.3.1	MAIN INJECTOR PROJECT MANAGEMENT							
			500.0	4,751.9	5,251.9	1	500.0	4,751.9	5,251.9
382	1.3.2	MAIN INJECTOR ACCELERATOR PHYSICS							
			0.0	2,080.6	2,080.6	1	0.0	2,080.6	2,080.6
383	1.3.3	MAIN INJECTOR G&A							
			1,340.2	0.0	1,340.2	1	1,340.2	0.0	1,340.2
S-004	1.3	PROJECT MANAGEMENT				===	======	======	======
						1	1,840.2	6,832.5	8,672.7

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11: 19: 58 LEVEL 4 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS	DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
S-021	1.1.1.1	MAIN INJECTOR RING MAGNETS							
			23,832.2	2,569.4	26,401.7	1	23,832.2	2,569.4	26,401.7
S-022	1.1.1.2	8 GEV LINE MAGNETS							
			827.4	249.9	1,077.3	1	827.4	249.9	1,077.3
S-023	1.1.1.3	150 GEV PROTON (MI52-F0) MAGNETS							
			476.7	569.4	1,046.1	1	476.7	569.4	1,046.1
S-024	1.1.1.4	150 GEV PBAR (MI62-F0) MAGNETS							
			476.7	569.4	1,046.1	1	476.7	569.4	1,046.1
S-025	1.1.1.5	120 GEV (F0-l'17) MAGNETS							
			29.9	65.4	95.3	1	29.9	65.4	95.3
S-026	1.1.1.6	SLOW SPILL (F1S-SY) MAGNETS							
			8.7	14.0	22.7	1	8.7	14.0	22.7
S-027	1.1.1.8	ABORT LINE MAGNETS							
			176.1	142.0	318.1	1	176.1	142.0	318.1
S-028	1.1.1.10	MAGNET TOOLING							
			1,584.	4 493.5	2,077.9	1	1,584.4	493.5	2,077.9
101	1.1.1.14	MAGNET ED&I							
			298.3	6,909.8	7.208.0	1	298.3	6,909.8	7.208.0
102	1.1.1;15	TSS-CODE-MAX							
			0.0	1,487.0	1,487.0	1	0.0	1,487.0	1.487.0
103	1.1.1.16	TSS-FACILITY PREPATATION							
			0.0	177.7	177.7	1	0.0	177.7	177.7
S-029	1.1.1.18	CHESTER							
			2,733.6	450.7	3,184.4	1	2,733.	6 450.7	3,184.4
S-005	1.1.1	MAIN INJECTOR MAGNETS				===	======	======	======
						1	30,444.2	13,698.1	44,142.3

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11: 19: 58 LEVEL 4 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS	DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
S-030	1.1.2.1	MIR VACUUM SYSTBM	2,246.1	91.7	2,337.8	1	2.246.1	91.7	2,337.8
S-031	1.1.2.10	BML VACUUM SYSTBM	496.2	44.0	540.1	1	496.2	44.0	540.1
S-032	1.1.2.12	MI-MIR ABORT VACUUM	44.9	6.5	51.4	1	44.9	6.5	51.4
S-033	1.1.2.13	MI-VACUUM INSTALLATION	64.0	234.5	298.5	1	64.0	234.5	298.5
137	1.1.2.14	VACUUM ED&I	8.5	801.2	809.6	1	8.5	801.2	809.6
S-034	1.1.2.18	VACUUM RECYCLER	703.4	186.4	889.8	1	703.4	186.4	889.8
S-006	1.1.2	MAIN INJECTOR VACUUM				===	=====	=====	=====
						1	3,563.2	1,364.1	4,927.3
S-035	1.1.3.1	MIR POWER SUPPLIES	4,734.5	1,400.0	6,134.5	1	4,734.5	1,400.0	6,134.5
S-036	1.1.3.2	8GEV LINE/POWER SUPPLY	185.1	84.7	269.8	1	185.1	84.7	269.8
S-037	1.1.3.3	150 GEV PROT LINE/POWER SUPPLIES	779.5	159.4	938.9	1	779.5	159.4	938.9
S-038	1.1.3.4	150GEV PBAR LINE/POWER SUPPLIES	28.0	16.0	44.1	1	28.0	16.0	44.1
S-039	1.1.3.5	PBAR PROD LINE(F11 TO F17/POWER SUPPLIES	245.0	46.5	291.5	1	245.0	46.5	291.5
S-040	1.1.3.6	SLOW SPILL LINE/POWER SUPPLIES	206.0	58.4	264.4	1	206.0	58.4	264.4
166	1.1.3.7	BML PS CONTROLLERS	5.8	23.7	29.5	1	5.8	23.7	29.5
S-041	1.1.3.12	MI-CABLES INSTALLATION	751.5	1,163.1	1,914.6	1	751.5	1,163.1	1,914.6
S-042	1.1,3.13	MI-P.S. INSTALLATION	404.4	173.1	577.5	1	404.4	173.1	577.5
171	1.1.3.14	POWER SUPPLIES ED&I	0.0	2,132.2	2,132.2	1	0.0	2,132.2	2,132.2
S-043	1.1.3.18	RECYCLER POWER SUPPLIES	23.9	44.0	67.9	1	23.9	44.0	67.9
S-007	1.1.3	POWER SUPPLIES				===	=====	=====	======
						1	7,363.7	5,301.1	12,664.8
S-044	1.1.4.1	RF SYSTEMS/RING	3,769.0	309.3	4,078.3	1	3,769.0	309.3	4,078.3
182	1.1.4.10	RF SYSTEMS/RING REFURBISHING	100.8	207.2	308.0	1	100.8	207.2	308.0
S-045	1.1.4.13	FO INSTALLATION	201.7	305.0	506.7	1	201.7	305.0	506.7
185	1.1.4.14	RF SYSTEMS ED&I	4.2	943.7	948.0	1	4.2	943.7	948.0
S.046	1,l.4.18	RF SYSTEMS RECYCLER	186.4	74.0	260.4	1	186.4	74.0	260.4
S-008	1.1.4	RF SYSTEMS				===	=====	=====	=====
						1	4,262.1	1,839.2	6,101.3

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11: 19: 58 LEVEL 4 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS	DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
S-047	1.1.6.1	MIR EXTRACTION	940.1	477.5	1,417.6	1	940.1	477.5	1,417.6
S-048	1.1.6.2	SLOW EXTRACTION	371.7	129.6	501.3	1	371.7	129.6	501.3
S-049	1.1.6.3	TEV 150 GEV PBAR INJECTION	62.0	69.1	131.1	1	62.0	69.1	131.1
~05	1.1.6.14	KICKERS & SLOW EXTRACTION ED&I	4.2	1,515.0	1,519.2	1	4.2	1,515.0	1,519.2
S-050	1.1.6.18	KICKERS/RECYCLER	457.7	277.4	735.1	1	457.7	277.4	735.1
S-009	1.1.6	KICKERS , SLOW EXTRACTION				===	=====	=====	=====
						1	1,835.7	2,468.6	4,304.3
209	1.1.7.14	RECYCLER-STOCHASTIC COOLING-EDIA	4.2	185.2	189.5	1	4.2	185.2	189.5
S-051	1.1.7.18	RECYCLER-STOCHASTIC COOLING	1,005.0	7.4	1,012.4	1	1,005.0	7.4	1,012.4
S-010	1.1.7	RECYCLER-STOCHASTIC COOLING-SYSTBM				===	=====	====	=====
						1	1,009.3	192.6	1,201.8
S-052	1.1.8.1	MIR INSTRUMENTATION	374.5	87.7	462.2	1	374.5	87.7	462.2
S-057	1.1.8.10	MIR INSTRUMENTATION	619.4	51.6	671.0	1	619.4	51.6	671.0
S-058	1.1.8.13	MI-INSTRUMENTATION INSTALLATION	0.0	186.4	186.4	1	0.0	186.4	186.4
232	1.1.8.14	INSTRUMENTATION ED&I	4.2	721.8	726.0	1	4.2	721.8	726.0
S-059	1.l.8.18	INSTRUMENTATION RECYCLER	724.2	96.7	820.8	1	724.2	96.7	820.8
S-Ol1	1.1.8	MIR INSTRUMENTATION				===	=====	=====	=====
						1	1,722.3	1,144.2	2,866.5
S-060	1.1.9.1	MIR CONTROLS	1,072.9	641.4	1,714.2	1	1,072.9	641.4	1,714.2
S-061	1.1.9.10	BEAMLINE AGGREGATE	424.8	65.2	490.0	1	424.8	65.2	490.0
256	1.1.9.14	CONTROLS ED&I	0.0	993.7	993.7	1	0.0	993.7	993.7
S-062	1.1.9.18	CONTROLS-RECYCLER	104.7	28.9	133.6	1	104.7	28.9	133.6
S-012	1.1.9	CONTROLS				===	=====	=====	=====
						1	1,602.3	1,729.1	3,331.4
259	1.1.10.1	MIR SAFETY SYSTEM	197.0	58.6	255.5	1	197.0	58.6	255.5
260	1.1.10.2	BML SAFETY SYSTEM	152.2	28.5	180.7	1	152.2	28.5	180.7
!S-063	1.1.10.13	MI-SAFETY SYSTBM INSTALLATION	25.3	103.9	129.2	1	25.3	103.9	129.2
263	1.1.10.14	SAFETY SYSTEMS ED&I	0.0	203.9	203.9	1	0.0	203.9	203.9
S-064	1.1.10.18	SAFETY SYSTBMS RECYCLER	24.9	4.0	28.9	1	24.9	4.0	28.9
S-013	1.1.10	SAFETY				===	====	====	====
						1	399.4	398.8	798.2

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11: 19: 58 LEVEL 4 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS	DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
S-065	1.1.12.1	MIR MECHANICAL UTILITIBS	3,656.8	1,661.9	5,318.8	1	3,656.8	1,661.9	5,318.8
S-066	1.1,12.10	BEAMLINE AGGRBGATE	571.0	293.4	864.4	1	571.0	293.4	864.4
S-067	1.1.12.13	MI-BUS INSTALLATION	1,598.0	850.6	2,448.7	1	1,598.0	850.6	2,448.7
290	1.1.12.14	UTILITIES. ABORT ED&I	0.0	1,376.7	1,376.7	1	0.0	1,376.7	1,376.7
S-068	1.1.12.18	UTILITIES-RECYCLER RING	19.5	41.1	60.6	1	19.5	41.1	60.6
S-014	1.1.12	MIR UTILITIES . ABORT				===	=====	=====	======
						1	5,845.4	4,223.7	10,069.1
S-069	1.1.13.1	MIR INSTALLATION	1,290.9	974.5	2,265.3	1	1,290.9	974.5	2,265.3
S-070	1.1.13.2	8 GEV LINE	115.0	192.5	307.5	1	115.0	192.5	307.5
S-071	1.1.13.3	150 GEV PROT LINE	167.2	73.5	240.7	1	167.2	73.5	240.7
S-074	1.1.13.6	SLOW SPILL INSTALLATION	28.0	14.4	42.4	1	28.0	14.4	42.4
S-075	1.1.13.7	MIR/NEW TEV VACUUM	0.0	13.9	13.9	1	0.0	13.9	13.9
S-076	1.1.13.8	MIR/NEW F0 REMQVAL AND REINSTALLATION	20.0	128.2	148.2	1	20.0	128.2	148.2
349	1.1.13.14	INSTALLATION ED&I	0.0	1,810.9	1,810.9	1	0.0	1,810.9	1,810.9
350	1.1.13.18	INSTALLATION-RECYCLER	207.0	128.4	335.4	1	207.0	128.4	335.4
S-015	1.1.13	INSTALLATION				===	=====	=====	=====
						1	1,828.0	3,336.2	5,164.2
351	1.2.1.1	WETLAND MITIGATION, PHASE 1	590.6	0.0	590.6	1	590.6	0.0	590.6
356	1.2.2.1	INJECTOR ENCLOSURE AT MI60, PHASE 2	3,750.0	0.0	3,750.0	1	3,750.0	0.0	3,750.0
357	1.2.2.3	INJECTORR ENCLOSURE AT MI62-MI52, PHASE 2	17,743.0	0.0	17,743.0	1	17,743.0	0.0	17,743.0
358	1.2.2.3	SERVICE BLDGS 10,20,30,40,50, PHASE 2	2,290.5	0.0	2,290.5	1	2,290.5	0.0	2,290.5
359	1.2.2.4	MI52 & 62 SERVICE BUILDING, PHASE 2	1,571.5	0.0	1,571.5	1	1,571.5	0.0	1,571.5
360	1.2.2.5	MI60 SERVICE BUILDING, PHASE 2	3,065.0	0.0	3,065.0	1	3,065.0	0.0	3,065.0
361	1.2.2.6	SERVICE BLDG. FO N. ADDITION, PHASE 2	1,197.5	0.0	1,197.5	1	1,197.5	0.0	1,197.5
362	1.2.2.7	8 GEV BEAM ENCLOSURE, PHASE 2	3,648.1	0.0	3,648.1	1	3,648.1	0.0	3,648.1
363	1.2.2.8	MI8/NORTH HATCH BUILDING, PHASE 2	1.196.4	0.0	1,196.4	1	1,196.4	0.0	1,196.4
364	1.2.2.9	345 KV TRANSMISSION LINE, PHASE 2	3,565.6	0.0	2,565.6	1	2,565.6	0.0	2,565.6
365	1.2.2.10	KAUTZ ROAD SUBSTATION, PHASE 2	6,187.5	0.0	6,187.5	1	6,187.5	0.0	6,187.5
365	1.2.2.11	COOLING WATER SYSTEM, PHASE 2	1,759.0	0.0	1,759.0	1	1,759.0	0.0	1,759.0
357	1.2.2.13	PRECAST CONCRETE ELEMENTS, PHASE 2	2,977.0	0.0	2,977.0	1	2,977.0	0.0	2,977.0
368	1.2.2.13	SHIELDING STEEL, PHASE 2	2,489.0	0.0	2,489.0	1	2,489.0	0.0	2,489.0
S-017	1.2.2	CIVIL CONSTRUCTION/PHASE 2				1	50,440.1	0.0	50,440.1

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11: 19: 58 LEVEL 4 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS	DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
369	1.2.3.1	F0 ENCL. & BLDG F0 MODS, F-17 BLDG, PHASE 3							
			7,253.2	0.0	7,253.2	1	7,253.2	0.0	7,253.2
370	1.2.3.2	8 GEV BOOSTER ENCL. CONNECTION, PHASE 3							
			2,497.3	0.0	2,497.3	1	2,497.3	0.0	2,497.3
371	1.2.3.3	8 GEV ENCLOSURE AT ANTIPROTON, PHASE 3							
			263.5	0.0	263.5	1	263.5	0.0	263.5
372	1.2.3.18	STOCHASTIC COOL LIGHT LINK PENETRATIONS							
			274.8	0.0	274.8	1	274.8	0.0	274.8
S-018	1.2.3	CIVIL CONSTRUCTION/PHASE 3				===	======	===	======
						1	10,288.9	0.0	10,288.9
373	1.2.4.1	LANDSCAPING & PAVING, PHASE 4							
			746.1	0.0	746.1	1	746.1	0.0	746.1
374	1.2.4.2	F-SECTOR SHIELDING							
			400.0	0.0	400.0	1	400.0	0.0	400.0
375	1.2.4.3	CIVIL PHASE 4 REMEDIATION							
			350.0	0.0	350.0	1	350.0	0.0	350.0
S-019	1.2.4	CIVIL CONSTRUCTION/PHASE 4				===	=====	==	=====
						1	1,496.1	0.0	1,496.1
376	1.2.14.1	CIVIL CONSTRUCTION/Phase 1 ED&I							
			1,195.2	462.6	1,657.8	1	1,195.2	462.6	1,657.8
377	1.2.14.2	CIVIL CONSTRUCTION/Phase 2 ED&I							
			7,005.7	2,569.0	9,574.7	1	7,005.7	2,569.0	9,574.7
378	1.2.14.3	CIVIL CONSTRUCTION/Phase 3 ED&I							
			1,565.1	575.0	2,140.0	1	1,565.1	575.0	2,140.0
379	1.2.14.4	CIVIL CONSTRUCTION/Phase 4 ED&I							
			57.8	80.1	137.9	1	57.8	80.1	137.9
380	1.2.14.5	CIVIL MANAGES SERVICES FOR AS-BUILT DRAWINGS							
			0.0	150.0	150.0	1	0.0	150.0	150.0
S-020	1.2.14	CIVIL CONSTRUCTION ED&I				===	=====	=====	======
						1	9,823.8	3,836.6	13,660.4

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11: 19: 58 LEVEL 5 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS	DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
S-080	1.1.1.1.1	MIR MAGNETS/DIPOLES	21,405.6	940.7	22,346.3	1	21,405.6	940.7	22,346.3
S-081	1.1.1.1.2	MIR MAGNETS/QUADS	1,509.1	1,025.8	2,535.5	1	1,509.7	1,025.8	2,535.5
S-082	1.1.1.1.3	MIR MAGNETS/CORRECTORS	381.0	557.1	938.2	1	381.0	557.1	938.2
S-083	1.1.1.l.4	MIR MAGNETS/TRIM DIPOLES	535.9	45.8	581.7	1	535.9	45.8	581.1
S-02l	l.1.1.1	MAIN INJECTOR RING MAGNETS				===	======	=====	======
						1	23,832.2	2,569.4	26,401.7
S-084	1.1.1.2.1	8GEV MAGNETS/DIPOLES	255.8	19.7	335.5	1	255.8	79.7	335.5
S-085	1.1.1.2.2	8GEV MAGNETS/QUADS	561.6	159.2	720.9	1	561.6	159.2	720.9
S-086	1.1.1.2.4	8GEV MAGNETS/TRIM DIPOLES	10.0	11.0	21.0	1	10.0	11.0	21.0
S-088	1.1.1.3.1	150GEV P MAGNETS/DIPOLES	8.2	7.9	16.	1	8.2	7.9	16.1
S-089	1.1.1.3.2	150GEV P MAGNETS/QUADS	125.3	289.0	414.2	1	125.3	289.0	414.2
S-090	1.1.1.3.4	150GEV P MAGNETS/DIPOLE TRIMS	4.2	4.6	8.8	1	4.2	4.6	8.8
S-091	1.1.1.3.5	150GEV PROTON/LAMBERTSONS	339.1	267.9	606.9	1	339.1	261.9	606.9
S-023	1.1.1.3	150 GEV PROTON (MI52-F0) MAGNETS			===	====	====	=====	
						1	476.7	569.4	1,046.1

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11: 19: 58 LEVEL 5 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS	DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
S-092	1.1.1.4.1	150GEV PBAR MAGNETS/DIPOLES	8.2	7.9	16.1	1	8.2	7.9	16.1
S'-093	1.1.1.4.2	150GEV PBAR MAGNETS/QUADS	125.3	289.0	414.2	1	125.3	289.0	414.2
S-094	1.1.1.4.4	150GEV PBAR MAGNETS/TRIM DIPOLES	4.2	4.6	8.8	1	4.2	4.6	8.8
S-095	1.1.1.4.5	150GEV PBAR/LAMBERTSONS	339.1	261.9	606.9	1	339.1	267.9	606.9
S-024	1.1.1.4	150 GEV PBAR (MI62-F0) MAGNETS				===	====	====	=====
						1	416.1	569.4	1,046.1
S-096	1.1.1.5.1	120GEV MAGNETS/DIPOLES	4.4	4.2	8.6	1	4.4	4.2	8.6
S-097	1.1.1.5.2	120GEV MAGS/84" MR QUAD BQB	23.9	59.4	83.3	1	23.9	59.4	83.3
S-098	1.1.1.5.4	120GEV MAGNETS/TRIM DIPOLES	1.6	1.8	3.4	1	1.6	1.8	3.4
S-025	1.1.1.5	120 GEV (F0-F17) MAGNETS				===	===	===	===
						1	29.9	65.4	95.3
S-099	1.1.1.6.1	SLOW SPILL MAGNETS/DIPOLES	2.8	6.5	9.3	1	2.8	6.5	9.3
S-100	1.1.1.6.2	SLOW SPILL MAGS/BQB	0.4	1.3	1.7	1	0.4	1.3	1.7
S-101	1.1.1.6.4	SLOW SPILL MAGNETS/BUMPS	5.6	6.2	11.8	1	5.6	6.2	11.8
S-026	1.1.1.6	SLOW SPILL (F1S-SY) MAGNETS				===	===	===	===
						1	8.7	14.0	22.7
S-102	1.1.1.8.1	ABORT LINE MAGNETS/DIPOLES	1.1	1.1	2.1	1	1.1	1.1	2.1
S-103	1.1.1.8.2	ABORT LINE MAGNETS/QUADS	1.3	4.7	6.0	1	1.3	4.7	6.0
S-104	1.1.1.8.4	ABORT LINE MAGNETS/TRIM DIPOLES	0.8	0.9	1.7	1	0.8	0.9	1.7
S-105	1.1.1.8.5	ABORT/LAMBERTSONS	173.0	135.3	308.3	1	173.0	135.3	308.3
S-027	1.1.1.8	ABORT LINE MAGNETS				===	====	====	====
						1	176.1	142.0	318.1
S-106	1.1.1.10.1	DIPOLE TOOLING	863.3	129.4	992.7	1	863.3	129.4	992.7
S-107	1.1.1.10.2	QUADRUPOLB TOOLING	302.3	180.8	483.1	1	302.3	180.8	483.1
S-108	1.1.1.10.3	SPECIAL MAGNET TOOLING	22.8	88.9	111.7	1	22.8	88.9	111.7
S-109	1.1.1.10.4	SPECIAL MAGNET TOOLING	51.9	6.7	58.5	1	51.9	6.7	58.5
S-110	1.1.1.10.5	LAMBERTSON MAGNET TOOLING	344.1	87.8	432.0	1	344.1	87.8	432.0
S-028	1.1.1.10	MAGNET TOOLING				===	=====	====	=====
						1	1,584.4	493.5	2,077.9

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11: 19: 58 LEVEL 5 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS	DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
S-111	1.1.1.18.1	RECYCLER-PM VERTICAL BEND DIPOLE							
			53.5	7.2	60.7	1	53.5	7.2	60.7
S-112	1.1.1.18.2	RECYCLER-PM STANDARD AND BYPASS QUADRUPOL							
			134.7	37.0	171.6	1	134.7	37.0	171.6
S-113	1.1.1.18.3	RECYCLER-CORRECTION ELEMENTS							
			13.8	15.4	29.2	1	13.8	15.4	29.2
S-114	1.1.1.18.4	RECYCLER-REUSED HOR. & VER. TRIM DIPS							
			4.1	5.3	9.4	1	4.1	5.3	9.4
S-115	1.1.1.18.5	RECYCLER-PERMANENT MAGNET LAMBERTSON							
			42.3	9.2	51.5	1	42.3	9.2	51.5
S-116	1.1.1.18.6	RECYCLER-FOC,DEFOC , MIRR GRAD. DIPS							
			2,402.2	347.2	2,749.3	1	2,402.2	347.2	2,749.3
117	1.1.1.18.10	CHESTER							
			83.1	29.4	112.5	1	83.1	29.4	112.5
S-029	1.1.1.18	CHESTER				===	=====	====	=====
						1	2,733.6	450.7	3,184.4
118	1.1.2.1.1	MIR VACUUM SYS/VACUUM CHAMBER,BELLOWS							
			1.022.3	63.9	1.086.2	1	l,022.3	63.9	l,086.2
119	1.1.2.1.2	MIR VACUUM SYS/ROUGH PUMPS,TURBO CARTS							
			782.4	2.4	784.8	1	782.4	2.4	784.8
120	1.1.2.1.3	MIR VACUUM SYS/GAUGES, CABLES							
			441.4	25.4	466.8	1	441.4	25.4	466.8
S-030	1.1.2.1	MIR VACUUM SYSTEM				===	=====	===	=====
						1	2,246.1	91.7	2,337.8
S-117	1.1.2.10.1	BML VACUUM/CHAMBERS , BELLOWS							
			223.3	40.3	263.5	1	223.3	40.3	263.5
S-118	1.1.2.10.2	BML VACUUM/ROUGH PUMPS/TURBO CARTS							
			207.9	2.0	209.9	1	207.9	2.0	209.9
S-119	1.1.2.10.3	BML VACUUM/GAUGES , CABLES							
			65.0	1.7	66.7	1	65.0	1.7	66.7
S-031	1.1.2.10	BML VACUUM SYSTEM				===	====	===	====
						1	496.1	44.0	540.1
S.l20	1.1.2.12.1	MI-MIR ABORT VACUUM							
			44.9	6.5	51.4	1	44.9	6.5	51.4
S.032	1.1.2.12	MI-MIR ABORT VACUUM				===	===	===	===
						1	44.9	6.5	51.4
131	1.1.2.13.1	MI-MIR VACUUM INSTALLATION							
			0.0	145.4	145.4	1	0.0	145.4	145.4
132	1.1,2.13.3	MI-8 GEV VACUUM INSTALLATION							
			0.0	42.7	42.7	1	0.0	42.7	42.7
133	1.1.2.13.4	MI-150 GEV VACUUM INSTALLATION							
			0.0	16.3	16.3	1	0.0	16.3	16.3
134	1.1.2.13.5	MI-SLOW SPILL VACUUM INSTALLATION							
			0.0	16.6	16.6	1	0.0	16.6	16.6
135	1.1.2.13.6	MI-NEW TEV F0 VACUUM							
			35.3	9.9	45.2	1	35.3	9.9	45.2
136	1.1.2.13.7	MI-MIR/NEW TEV E0 VACUUM							
			28.7	3.7	32.4	1	28.7	3.7	32.4
S-033	1.1.2.13	MI-VACUUM INSTALLATION				===	===	====	====
						1	64.0	234.5	298.5

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11: 19: 58 LEVEL 5 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS	DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
138	1.1.2.18.1	VACUUM - RING. TRANSFER LINES (SHEET A)							
			703.4	59.3	762.7	1	703.4	59.3	762.7
139	1.1.2.18.13	VACUUM-INSTALLATION (ULTRA HIGH VAC) (SHE							
			0.0	127.1	127.1	1	0.0	127.1	127.1
S-034	1.1.2.18	VACUUM RECYCLER				===	====	====	====
						1	703.4	186.4	889.8
S-l21	1.1.3.1.1	MIR PWR SUP/DIPOLE SUPPLY							
			3,355.9	820.9	4,176.7	1	3,355.9	820.9	4,176.7
142	1.1.3.1.2	MIR PWR SUP/QUADRUPOLE SUPPLIES							
			108.2	34.8	143.0	6	649.4	208.6	858.0
143	1.1.3.1.3	MIR PWR SUP/SEXTUPOLE SUPPLIES							
			272.1	28.4	300.5	1	272.1	28.4	300.5
144	1.1.3.1.4	MIR PWR SUP/CORRECTION ELEMENT SUPPLIES							
			296.6	254.4	551.1	1	296.6	254.4	551.1
145	1.1.3.1.6	MIR INJECTOR REGULATION SYSTEM							
			99.1	33.6	132.8	1	99.1	33.6	132.8
146	1.1.3.1.7	MIR REGULATION SUPPLIES							
			22.4	35.5	57.8	1	22.4	35.5	57.8
147	1.1.3.1.8	MIR ABORT SUPPLY							
			39.0	18.6	57.6	1	39.0	18.6	57.6
S-035	1.1.3.1	MIR POWER SUPPLIES				===	=====	=====	=====
						1	4,734.5	1,400.0	6,134.5
148	1.1.3.2.1	8GEV LINE/DIPOLE POWER SUPPLIES							
			18.3 2	6.0	44.3	1	18.3	26.0	44.3
149	1.1.3.2.2	8GEV LINE/ QUADRUPOLE POWER SUPPLIES							
			62.3	17.8	80.1	1	62.3	17.8	80.1
150	1.1.3.2.3	8GEV LINE/CORR ELEMBNT POWER SUPPLIES							
			104.5	40.9	145.4	1	104.5	40.9	145.4
152	1.1.3.3.1	150GEV PROT LINE/DIPOLE SUPPLIES							
			237.5	92.4	329.9	1	237.5	92.4	329.9
153	1.1.3.3.2	150GEV PROT LINE/QUADRUPOLE SUPPLIES							
			514.0	50.9	564.9	1	514.0	50.9	564.9
154	1.1.3.3.3	150GEV PROT LINE/CORR ELE SUPPLIES							
			28.0	16.0	44.0	1	28.0	16.0	44.0
158	1.1.3.4.3	150GEV PBAR LINE/CORR BLEMENT SUPPLIES							
			28.0	16.0	44.1	1	28.0	16.0	44.1
160	1.1.3.5.1	PBAR PROD LINE(Fll TO F17)/DIPOLE SUPPLIES							
			133.0	29.4	162.4	1	133.0	29.4	162.4
161	1.1.3.5.2	PBAR PROD LINE(Fll TO F17)/QUADRUPOLE SUP							
			112.0	17.1	129.1	1	112.0	17.1	129.1
163	1.1.3.6.1	SLOW SPILL LINE/DIPOLE SUPPLIES							
			162.0	47.2	209.2	1	162.0	47.2	209.2
164	1.1.3.6.2	SLOW SPILL LINE/QUADRUPOLE SUPPLIES							
			44.0	11.1	55.1	1	44.0	11.1	55.1
167	1.1.3.12.1	MI-MIR CABLE INSTALLATION							
			310.2	694.5	1,004.7	1	310.2	694.5	1,004.7
168	1.1;3.12.2	MI-BML INSTALL CABLES							
			441.3	468.6	910.0	1	441.3	468.6	910.0
S-041	1.1.3.12	MI-CABLES INSTALLATION				===	====	=====	=====
						1	751.5	1,163.1	1,914.6
169	1.1.3.13.1	MI-MIR HARMONIC FILTER							
			354.9	6.1	361.0	1	354.9	6.1	361.0
170	1.1.3.13.2	MI-BML PROT P.S. INSTALLATION							
			49.5	167.0	216.4	1	49.5	167.0	216.4
S-042	1.1.3.13	MI-P.S. INSTALLATION				===	====	====	====
						1	404.4	173.1	577.5

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11: 19: 58 LEVEL 5 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS	DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
172	1.1.3.18.13	POWER SUPPLIES RECYCLER PS INSTALL							
			3.0	5.5	8.5	8	23.9	44.0	67.9
S-043	1.1.3.18	RECYCLER POWER SUPPLIES							
						1	23.9	44.0	67.9
S-122	1.1.4.1.1	MIR RF 53 MHZ							
			3,748.8	299.4	4,048.2	1	3,748.8	299.4	4,048.2
S-123	1.1.4.1.2	COALESCING SYSTEM							
			20.2	9.9	30.1	1	20.2	9.9	30.1
S-044	1.1.4.1	RF SYSTEMS/RING				===	=====	====	=====
						1	3.769.0	309.3	4,078.3
184	1.1.4.13.6	MI-F0 TEV REINSTALLATION							
			201.7	305.0	506.1	1	201.7	305.0	506.1
S-045	1.1.4.13	F0 INSTALLATION				===	====	====	====
						1	201.7	305.0	506.7
186	1.1.4.18.1	RF SYSTEMS RECYCLER RING							
			186.4	59.5	245.9	1	186.4	59.5	245.9
181	1.1.4.18.13	RF SYSTEMS RECYLER INSTALLATION							
			0.0	14.5	14.5	1	0.0	14.5	14.5
S-046	1.1.4.18	RF 8YSTEMS RECYCLER				===	====	===	====
						1	186.4	74.0	260.4
S-124	1.1.5.1.1	8 GEV PROT INJ KICKER							
			365.2	192.1	557.8	1	365.2	192.7	557.8
S-125	1.1.5.1.2	8 GEV PBAR INJECTION KICKER							
			338.0	165.9	503.9	1	338.0	165.9	503.9
B-127	1.1.5.1.4	MIR 150 GEV PBAR EXT KICKER							
			28.0	55.8	83.8	1	28.0	55.8	83.8
B-128	1.1.5.1.5	MIR EXT PROTON ABORT KICKER							
			208.9	63.1	212.0	1	208.9	63.1	212.0
S-047	1.1.5.1	MIR EXTRACTION				===	====	====	=====
						1	940.1	477.5	1,417.6
198	1.1.5.2.1	MIR SLOW EXT/ELECTROSTATIC SEPTUM							
			167.5	113.7	281.2	1	167.5	113.7	281.2
199	1.1.5.2.2	MIR SLOW EXT/SPBCIAL MAGNETIC ELEMENTS							
			142.0	0.0	142.0	1	142.0	0.0	142.0
200	1.1.5.2.3	MIR SLOW EXT/QXR SY8TEM							
			52.3	15.9	78.1	1	52.3	15.9	78.1
S-048	1.1.5.2	SLOW EXTRACTION				===	====	====	====
						1	371.7	129.5	501.3
S-129	1.1.5.3.1	TEV 150 GEV PROT INJ KICKER							
			49.0	42.2	91.2	1	49.0	42.2	91.2
S-130	1.1.5.3.2	TEV 150 GEV PBAR INJ KICKER							
			13.0	26.9	39.9	1	13.0	26.9	39.9
S-049	1.1.5.3	TEV 150 GEV PBAR INJECTION				===	===	===	====
						1	62.0	69.1	131.1

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11: 19: 58 LEVEL 5 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
206	1.1.6.18.1 KICKERS/RECYCLER MAGNETS	65.3	29.4	94.7	3	195.9	88.1	284.0
207	1.1.6.18.2 KICKERS/RECYCLER POWER SUPPLIES	74.7	46.0	120.7	3	224.1	138.1	362.1
208	1.1.6.18.13 KICKERS/RECYCLER INSTALLATION	12.6	17.1	29.7	3	37.7	51.3	89.0
S-050	1.1.6.18 KICKERS/RECYCLER				===	====	====	====
					1	457.7	277.4	735.1
210	1.1.7.18.1 RECYCLER-STOCHASTIC COOLING-RING	1,005.0	0.0	1,005.0	1	1,005.0	0.0	1,005.0
211	1.1.7.18.13 RECYCLER-STOCHASTIC COOLING-INSTALLATION	0.0	7.4	7.4	1	0.0	7.4	7.4
S-051	1.1.7.18 RECYCLER-STOCHASTIC COOLING				===	=====	===	=====
					1	1,005.0	7.4	1,012.4
212	1.1.8.1.1 MIR INST/BPM SYSTEM	197.0	49.7	246.7	1	197.0	49.7	246.7
213	1.1.8.1.2 MIR INST/BLM SYSTEM	15.5	2.9	18.4	1	15.5	2.9	18.4
214	1.1.8.1.3 MIR INST/LONGI~INAL PICKUP	25.3	11.0	36.3	1	25.3	11.0	36.3
215	1.1.8.1.4 MIR INST/TRANSVBRSB PICKUP	12.9	0.0	12.9	2	25.9	0.0	25.9
216	1.1.8.1.5 MIR INST/DAMPERS	7.5	1.5	9.0	2	15.0	3.1	18.1
217	1.1.8.1.6 MIR INST/FLYING WIRES	9.8	15.8	25.7	1	9.8	15.8	25.7
218	1.1.8.1.7 MIR INST/D.C.C.T.	0.0	1.5	1.5	1	0.0	1.5	1.5
220	1.1.8.1.9 MIR ION PROFILE MONITORS (IPM)	78.0	0.0	78.0	1	78.0	0.0	78.0
221	1.1.8.1.10 MIR TEMPERATURE AND HUMIDITY SENSORS	8.0	3.7	11.7	1	8.0	3.7	11.7
S-052	1.1.8.1 MIR INSTRUMENTATION				===	====	===	====
					1	374.5	87.7	462.2
226	1.1.8.10.1 MIR INST/BEAMLINE AGGREGATE BPM SYSTEM	299.9	10.8	310.8	1	299.9	10.8	310.8
227	1.1.8.10.2 MIR INST/BEAMLINE	43.9	2.5	46.4	1	43.9	2.5	46.4
228	1.1.8.10.7 MIR INST/AGGREGATE TORROIDS	3.9	1.1	5.0	10	39.3	10.8	50.1
229	1.1.8.10.9 MIR INST/BEAMLINE SEMS	236.2	27.5	263.7	1	236.2	27.5	263.7
S-057	1.1.8.10 MIR INSTRUMBNTATION				===	====	===	====
					1	619.4	51.6	671.0
230	1.1.8.13.1 MI-MIR INSTR INSTALLATION	0.0	102.9	102.9	1	0.0	102.9	102.9
231	1.1.8.13.2 MI-8 GEV INSTR INSTALLATION	0.0	83.5	83.5	1	0.0	83.5	83.5
S-058	1.1.8.13 MI-INSTRUMENTATION INSTALLATION				===	===	====	====
					1	0.0	186.4	186.4

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11: 19: 58 LEVEL 5 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
233	1.1.8.18.1 INSTRUMENTATION RECYCLER (RING)	724.2	74.2	798.4	1	724.2	74.2	798.4
234	1.1.8.18.13 INSTRUMENTATION RECYCLER INSTALLATION	0.0	22.5	22.5	1	0.0	22.5	22.5
S-059	1.1.8.18 INSTRUMENTATION RECYCLER				===	====	===	====
					1	724.2	96.7	820.8
235	1.1.9.1.1 MIR CONTROLS/COMPUTERS,LINKS	76.4	41.2	117.6	1	76.4	41.2	117.6
236	1.1.9.1.2 MIR CONTROLS/CRATES,CARDS,RELAY RACKS,CAB	375.1	0.0	375.1	1	375.1	0.0	375.1
237	1.1.9.1.3 MIR CONTROLS/CATV SYSTEM	150.7	31.7	182.4	1	150.7	31.7	182.4
238	1.1.9.1.4 MIR CONTROLS/FIRUS SYSTEM	11.4	15.3	26.7	1	11.4	15.3	26.7
239	1.1.9.1.5 MIR CONTROLS/ETHERNET	64.5	0.0	64.5	1	64.5	0.0	64.5
240	1.1.9.1.6 MIR CONTROL8/NETWORKING INFRASTRUCTURE	96.5	0.0	96.5	1	96.5	0.0	96.5
241	1.1.9.1.7 MIR CONTROLS/NETWORKING INSTALLATION	18.0	337.1	355.1	1	18.0	337.1	355.1
242	1.1.9.1.8 MIR CONTROLS/VACUUM	31.6	3.3	35.0	1	31.6	3.3	35.0
243	1.1.9.1.9 MIR CONTROLS/INSTALLATION	6.7	111.8	118.6	1	6.7	111.8	118.6
244	1.1.9.1.10 MIR CONTROLS VME	81.2	3.2	84.4	1	81.2	3.2	84.4
245	1.1.9.1.12 MI LCW CONTROL SYSTEM	160.7	97.7	258.4	1	160.7	97.7	258.4
S-060	1.1.9.1 MIR CONTROLS				===	=====	====	=====
					1	1,072.9	641.4	1,714.2
246	1.1.9.10.1 BML CONTROLS/COMPUTERS,LINKS	47.4	0.0	47.4	1	47.4	0.0	47.4
247	1.1.9.10.2 BML CONTROLS/CRATES,RELAY RACKS,CABLING	273.2	25.4	298.6	1	273.2	25.4	298.6
250	1.1.9.10.5 BML CONTROLS/NETWORKING EQUIPMENT	54.4	0.0	54.4	1	54.4	0.0	54.4
251	1.1.9.10.6 BML CONTROLS/NETWORKING INFRASTRUCTURE	16.3	0.0	16.3	1	16.3	0.0	16.3
252	1.1.9.10.7 BML CONTROLS/NETWORKING INSTALLATION	0.0	3.8	3.8	1	0.0	3.8	3.8
253	1.1.9.10.8 BEAMLINE CONTROLS/VACUUM	7.0	1.0	7.9	1	7.0	1.0	7.9
254	1.1.9.10.9 BML CONTROLS/INSTALLATION	12.3	33.6	45.9	1	12.3	33.6	45.9
255	1.1.9.10.10 BML CONTROLS VME	14.2	1.4	15.6	1	14.2	1.4	15.6
S-061	1.1.9.10 BEAMLINE AGGREGATE				1	424.8	65.2	490.0
257	1.1.9.18.1 CONTROLS-RECYCLER (RING)	104.7	0.0	104.7	1	104.7	0.0	104.7
258	1.1.9.18.13 CONTROLS-RECYCLER (INSTALLATION)	0.0	28.9	28.9	1	0.0	28.9	28.9
S-062	1.1.9.18 CONTROLS-RECYCLER MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST				1	104.7	28.9	133.6

PRINTED 27-MAR-98 11: 19: 58 LEVEL 5 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
261	1.1.10.13.1 MI-MIR SAFETY SYSTEM INSTALLATION 1							
		4.2	54.5	68.7	1	14.2	54.5	68.7
262	1.1.10.13.Z MI-BML SAFETY SYSTEM INSTALLATION							
		11.1	49.4	60.5	1	11.1	49.4	60.5
S-063	1.1.10.13 MI-SAFETY SYSTEM INSTALLATION				===	===	====	====
					1	25.3	103.9	129.2
264	1.1.10.18.1 SAFETY SYSTEMS RECYCLER-RING							
		23.8	1.5	25.3	1	23.8	1.5	25.3
265	1.1.10.18.13 SAFBTY SYSTEMS RECYCLER-INSTALLATION							
		1.1	2.4	3.6	1	1.1	2.4	3.6
S-064	1.1,10.18 SAFETY SYSTEMS RECYCLER				===	===	===	===
					1	24.9	4.0	28.9
S-131	1.1.12.1.1 MIR INSTALL WATER SYSTEM							
		3,549.8	1,628.4	5,178.2	1	3,549.8	1,628.4	5,178.2
S-133	1.1.12.1.3 MIR ABORT SYSTEMS							
		107.0	33.5	140.5	1	107.0	33.5	140.5
S-065	1.1.12.1 MIR MECHANICAL UTILITIES				===	=====	=====	=====
					1	3,656.8	1,661.9	5,318.8
S-134	1.1.12.10.1 BML WATER SYSTEMS							
		571.0	293.4	864.4	1	571.0	293.4	864.4
288	1.1.12.13.1 MI-MIR MAGNET BUS INSTALLATION							
		1,575.8	783.1	2,358.9	1	1,575.8	783.1	2.358.9
289	1.1.12.13.2 MI-BML PROT PWR DIST MAGNET BUS INSTALL							
		22.2	67.5	89.7	1	22.2	67.5	89.7
S-067	1.1.12.13 MI-BUS INSTALLATION				===	=====	====	=====
					1	1,598.0	850.6	2,448.7
291	1.1.12.18.1 UTILITIES-RECYCLER RING							
		19.5	0.0	19.5	1	19.5	0.0	19.5
292	1.1.12.18.13 UTILITIES-RECYCLER RING INSTALLATION							
		0.0	41.1	41.1	1	0.0	41.1	41.1
S-068	1.1.12.18 UTILITIBS-RECYCLER RING				===	===	===	===
					1	19.5	41.1	60.6
S-136	1.1.13.1.1 MIR MAGNET INSTALLATION							
		1,276.0	964.7	2,240.7	1	1,276.	0 964.7	2,240.7
S-138	1.1.13.1.6 MIR ABORT INSTALLATION							
		14.9	9.8	24.7	1	14.9	9.8	24.7
S-140	1.1.13.2.1 8 GEV LINE/SURVEY, ALIGN MAGNETS							
		115.0	192.5	307.5	1	115.0	192.5	307.5
S-141	1.1.13.3.1 150 GEV PROT LINE MAGNET INSTALLATION							
		167.2	73.5	240.7	1	167.2	73.5	240.7
S-144	1.1.13.6.1 SLOW SPILL/MAGNET INSTALLATION							
		28.0	14.4	42.4	1	28.0	14.4	42.4
S-145	1.1.13.7.2 MIR/NEW TEV F0 VACUUM							
		0.0	13.9	13.9	1	0.0	13.9	13.9
S-075	1.1.13.7 MIR/NEW TEV VACUUM				===	===	===	===
					1	0.0	13.9	13.9
343	1.1.13.8.1 F0 MAGNET REMOVAL AND REINSTALLATION							
		0.0	58.4	58.4	1	0.0	58.4	58.4
344	1.1.13.8.2 F0 CRYO REMOVAL AND REINSTALLATION							
		20.0	69.8	89.8	1	20.0	69.8	89.8
S-076	1.1.13.8 MIR/NEW F0 REMOVAL AND REINSTALLATION				===	===	====	====
					1	20.0	128.2	148.2

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11: 19: 58 LEVEL 5 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS	DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
352	1.2.1.2.1	CIVIL CONSTR PH l/SITE PREPARATION							
			1,395.4	0.0	1,395.4	1	1,395.4	0.0	1,395.4
353	1.2.1.2.2	CIVIL CONSTR PH 2/COOLING PONDS							
			2,772.1	0.0	2,772.1	1	2,772.1	0.0	2.772.1
354	1.2.1.3.1	CIVIL CONSTR PH l/ROADS, UTILITIES							
			4,695.0	0.0	4,695.0	1	4,695.0	0.0	4,695.0
355	1.1.1.3.1	CIVIL CONSTR PH 1/13.8 KV POWER				===	======	===	======
			3,215.1	0.0	3,215.2	1	3,215.2	0.0	3,215.2

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11:19:58 LEVEL 6 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
1	1.1,1.1.1.1 MIR MAGNETS/240' DIPOLES IDA							
		70.8	3.5	74.3	105	7,437.1	366.6	7,803.6
2	1.1.1.1.1.2 MIR MAGNETS/240' DIPOLES IDB							
		69.3	3.0	72.3	105	7,281.7	313.3	7,594.9
3	1.1.1.1.1.3 MIR MAGNETS/160" DIPOLES IDC							
		55.1	2.3	57.4	61	3,360.2	143.2	3,503.4
4	1.1.1.1.1.4 MIR MAGNETS/160" DIPOLES IDD							
		54.5	1.9	56.5	61	3,326.7	117.7	3.444.4
S-080	1.1.1.1.1 MIR MAGNETS/DIPOLES				===	======	====	======
					1	21,405.6	940.7	22,346.3
5	1.1.1.1.2.3 MIR MAGNETS/100" QUADS IQC (NEW)							
		15.3	12.9	28.2	31	474.4	399.7	874.1
6	1.1.1.1.2.4 MIR MAGNETS/116" QUAD IQD (NEW)							
		17.3	9.2	26.5	47	813.6	431.2	1,244.7
7	1.1.1.1.2.5 MIR MAGNETS/84" QUADS BQB (REWORK)							
		1.7	1.5	3.3	127	220.1	193.4	413.5
8	1.1.1.1.2.9 MIR MAGNETS/84" QUADS BQB ROLLED (REWORK)							
		1.7	1.5	3.3	1	1.7	1.5	3.3
S-081	1.1.1.1.2 MIR MAGNETS/QUADS				===	=====	=====	=====
					1	1,509.7	1,025.8	2,535.5
9	1.1.1.1.3.1 MIR MAGNETS/SEXTUPOLES 18" ISA (NEW)							
		3.1	4.7	7.9	108	339.0	509.6	848.6
10	1.1.1.1.3.2 MIR MAGNETS/TRIM QUAD (REWORK)							
		0.4	0.4	0.8	16	6.4	7.0	13.4
11	1.1.1.1.3.3 MIR MAGNETS/SKEW QUAD (REWORK)							
		0.4	0.4	0.8	18	7.2	7.9	15.1
14	1.1.1.1.3.6 MIR MAGNETS/OCTUPOLES (REWORK)							
		0.4	0.5	0.9	62	26.4	29.0	55.4
15	1.1.1.1.3.7 MIR MAGNETS/CR SKEW QUADS							
		0.5	0.9	1.4	4	2.0	3.5	5.5
S-082	1.1.1.1.3 MIR MAGNETS/CORRECTORS				===	====	====	====
					1	381.0	557.1	938.2
16	1.1.1.1.4.2 MIR MAGNETS/HORIZ TRIM - IDH (NEW)							
		2.3	0.2	2.6	104	244.3	22.9	267.2
17	1.1.1.1.4.4 MIR MAGNETS/VERT TRIM DIP IDV (NEW)							
		2.8	0.2	3.0	104	291.6	22.9	314.5
21	1.1.1.2.1.8 8GEV MAGNETS/PERM.MAG. ARC DIPOLE(B2 RBP							
		5.1	1.4	6.5	49	249.2	69.5	318.7
22	1.1.1.2.1.12 8GEV MAGNETS/EPB DIPOLE 5-1.5-120 (REWORK							
		1.6	2.6	4.2	4	6.5	10.2	16.7
25	1.1.1.2.2.7 8GEV MAGNETS/SQA(17" QUADS) (REWORK)							
		0.4	1.1	1.5	16	6.2	18.0	24.1
26	1.1.1.2.2.8 8GEV MAGNETS/PERM. MAG. ARC GRAD.MAG							
		8.3	2.1	10.3	65	537.8	133.8	671.5
27	1.1.1.2.2.9 8GEV MAGNETS/PERM. MAG.l/2 METER QUADS							
		2.0	0.8	2.8	9	17.7	7.5	25.2
S-085	1.1.1.2.2 8GEV MAGNETS/QUADS							
					1	561.6	159.2	720.9
28	1.1.1.2.4.1 8GEV MAGNETS/H TRIM DIPOLE HDC (REWORK)							
		0.2	0.2	0.4	25	5.0	5.5	10.5
29	1.1.1.2.4.3 8GEV MAGNETS/V TRIM DIPOLE (REWORK)							
		0.2	0.2	0.4	25	5.0	5.5	10.5
S-086	1.1.1.2.4 8GEV MAGNETS/TRIM DIPOLES							
					1	10.0	11.0	21.0

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11:19:58 LEVEL 6 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS	DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
32	1.1.1.3.1.7	150GEV P MAGNETS/B2(240") DIP BDM (REWORK							
			0.5	0.5	1.1	15	8.2	7.9	16.1
S-088	1.1.1.3.1	150GEV P MAGNETS/DIPOLES				===	===	===	===
						1	8.2	7.9	16.1
33	1.1.1.3.2.5	150GEV P MAGNETS/3Q84 QUADS BQB (REWORK)							
			0.4	1.5	1.9	7	2.8	10.7	13.5
35	1.1.1.3.2.12	150GEV MAGNETS/3Q120 QUAD (MORE)							
			14.9	31.9	46.8	7	104.4	223.3	327.7
36	1.1.1.3.2.13	150GEV MAGNETS/3Q60 QUAD (MORE)							
			9.0	27.5	36.5	2	18.1	55.0	73.1
S-089	1.1.1.3.2	150GEV P MAGNETS/QUADS				===	===	===	===
						1	25.3	89.0	14.2
37	1.1.1.3.4.1	150GEV P MAGNETS/H TRIM DIPOLE (REWORK)							
			0.2	0.2	0.4	7	1.4	1.5	2.9
38	1.1.1.3.4.3	150GEV P MAGNETS/V TRIM DIPOLE (REWORK)							
			0.2	0.2	0.4	14	2.8	3.1	5.9
S-090	1.1.1.3.4	150GEV P MAGNETS/DIPOLE TRIMS				===	===	===	===
						1	4.2	4.6	8.8
39	1.1.1.3.5.2	150GEV P/MI LAMBERTSON 110" (2.8M) (NEW)							
			52.6	40.9	93.5	5	262.9	204.4	467.3
41	1.1.1.3.5.5	150GEV P/MI C-MAGNET 132" (NEW)							
			15.2	12.7	27.9	5	76.2	63.5	139.7
S-09	1.1.1.3.5	150GEV PROTON/LAMBERTSONS				===	====	====	====
						1	339.1	267.9	606.9
42	1.1.1.4.1.7	150GEV PBAR/B2 240" DIPOLES BDM (REWORK)							
			0.5	0.5	1.1	15	8.2	7.9	16.1
S-092	1.1.1.4.1	150GEV PBAR MAGNETS/DIPOLES				===	==	==	===
						1	8.2	7.9	16.1
43	1.1.1.4.2.5	150GEV PBAR MAGNETS/84" QUADS BQB (REWORK							
			0.4	1.5	1.9	7	2.8	10.7	13.5
45	1.1.1.4.2.12	150GEV PBAR MAGNETS/3Q120 QUADS (MORE)							
			14.9	31.9	46.8	7	104.4	223.3	327.7
46	1.1.1.4.2.13	150GEV PBAR MAGNETS/3Q60 QUADS (MORE)							
			9.0	27.5	36.5	2	18.1	55.0	73.1
S-093	1.1.1.4.2	150GEV PBAR MAGNETS/QUADS				===	====	====	====
						1	125.3	289.0	414.2
47	1.1.1.4.4.1	150GEV PBAR MAGNETS/H TRIM DIPOLE (REWORK							
			0.2	0.2	0.4	7	1.4	1.5	2.9
48	1.1.1.4.4.3	150GEV PBAR MAGNETS/V TRIM DIPOLE (REWORK							
			0.2	0.2	0.4	14	2.8	3.1	5.9
S-094	1.1.1.4.4	150GEV PBAR MAGNETS/TRIM DIPOLES				===	===	===	===
						1	4.2	4.6	8.8
49	1.1.1.4.5.2	150GEV PBAR/MI LAMBERTSON 110" (2.8M) (NEW							
			52.6	40.9	93.5	5	262.9	204.4	467.3
51	1.1.1.4.5.5	150GEV PBAR/MI C-MAGNET 132" (NEW)							
			15.2	12.7	27.9	5	76.2	63.5	139.7
S-095	1.1.1.4.5	150GEV PBAR/LAMBERTSONS				===	====	====	====
						1	339.1	267.9	606.9

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11:19:58 LEVEL 6 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
52	1.1.1.5.1.13 120GEV MAGNETS/B3 DIPOLS ODM (REWORK)							
		0.5	0.5	1.1	8	4.4	4.2	8.6
55	1.1.1.5.2.12 120GEV MAGS/3Q120 QUAD (MORE)							
		14.9	31.9	46.8	1	14.9	31.9	46.8
56	1.1.1.5.2.13 120GEV MAGS/3Q60 QUAD (MORE)							
		9.0	27.5	36.5	1	9.0	27.5	36.5
S-097	1.1.1.5.2 120GEV MAGS/84" MR QUAD BQB				===	===	===	===
					1	23.9	59.4	83.3
57	1.1.1.5.4.1 120GEV MAGNETS/HDC TRIM DIPOLE (REWORK)							
		0.2	0.2	0.4	4	0.8	0.9	1.7
58	1.1.1.5.4.3 120GEV MAGNETS/VDC MR TRIM DIPOLE (REWORK							
		0.2	0.2	0.4	4	0.8	0.9	1.7
S-098	1.1.1.5.4 120GEV MAGNETS/TRIM DIPOLES				===	===	===	===
					1	1.6	1.8	3.4
60	1.1.1.6.1.12 SLOW SPILL MAGNETS/EPB 1-1.5-120 (REWORK)							
		0.6	4.4	5.0	1	0.6	4.4	5.0
61	1.1.1.6.1.13 SLOW SPILL MAGS/B3 DIPOLE ODM (REWORK)							
		0.5	0.5	1.1	4	2.2	2.1	4.3
63	1.1.1.6.2.5 SLOW SPILL MAGS/84" QUADS BQB (REWORK)							
		0.4	1.3	1.7	1	0.4	1.3	1.7
65	1.1.1.6;4.1 SLOW SPILL MAGS/H TRIM DIPOLE (REWORK)							
		0.2	0.2	0.4	14	2.8	3.1	5.9
66	1.1.1.6.4.3 SLOW SPILL MAGS/V TRIM DIPOLE (REWORK)							
		0.2	0.2	0.4	14	2.8	3.1	5.9
S-101	1.1.1.6.4 SLOW SPILL MAGNETS/BUMPS				===	===	===	===
					1	5.6	6.2	11.8
67	1.1.1.8.1.7 ABORT LINE MAGNETS/B2 BDM DIPOLE (REWORK)							
		0.5	0.5	1.1	2	1.1	1.1	2.1
S-102	1.1.1.8.1 ABORT LINE MAGNETS/DIPOLES				===	===	===	===
					1	1.1	1.1	2.1
68	1.1.1.8.2.5 ABORT LINE MAGNETS/3Q52 QUADS BQB (REWORK							
		0.4	1.5	1.9	2	0.8	3.0	3.8
69	1.1.1.8.2.6 ABORT LINE MAGNETS/3Q52 QUADS BQA (REWORK							
		0.5	1.7	2.1	1	0.5	1.7	2.1
S-103	1.1.1.8.2 ABORT LINE MAGNETS/QUADS				===	===	===	===
					1	1.3	4.7	6.0
70	1.1.1.8.4.1 ABORT LINK MAGNETS/H TRIM DIPOLE (REWORK)							
		0.2	0.2	0.4	2	0.4	0.4	0.8
71	1.1.1.8.4.3 ABORT LINE MAGNETS/V TRIM DIPOLE (REWORK)							
		0.2	0.2	0.4	2	0.4	0.4	0.8
S-l04	1.1.1.8.4 ABORT LINE MAGNETS/TRIM DIPOLES				===	===	===	===
					1	0.8	0.9	1.7
72	1.1.1.8.5.2 ABORT LINE MAGNETS/MI LAMBERTSON 110" (2.							
		52.6	40.9	93.5	3	157.7	1226	280.4
74	1.1.1.8.5.5 ABORT LINE MAGNETS/MI C-MAGNET 13~" (NEW)							
		15.2	12.7	27.9	1	15.2	12.7	27.9
S-105	1.1.1.8.5 ABORT/LAMBERTSONS				===	====	====	====
					1	173.0	135.3	308.3

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11:19:58 LEVEL 6 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
75	1.1.1.10.1.1 DIPOLE TOOLING/MIR DIPOLE	842.5	127.6	970.1	1	842.5	127.6	970.1
77	1.1.1.10.1.7 DIPOLE TOOLING/B2 240" DIPOLE (REWORK)	1.0	0.9	1.9	1	1.0	0.9	1.9
78	1.1.1.10.1.8 8 GEV LINE TOOLING	18.8	0.0	18.8	1	18.8	0.0	18.8
79	1.1.1.10.1.12 DIPOLE TOOLING/EPB DIPOLE 5-1.5-120 (MORE	0.0	0.0	0.0	1	0.0	0.0	0.0
80	1.1.1.10.1.13 DIPOLE TOOLING/B3 DIPOLE (REWORK)	1.0	0.9	1.9	1	1.0	0.9	1.9
S-106	1.1.1.10.1 DIPOLE TOOLING				===	====	====	====
					1	863.3	129.4	992.7
81	1.1.1.10.2.3 MI QUAD TOOLING (NEW)	267.7	151.0	418.8	1	267.7	151.0	418.8
82	1.1.1.10.2.5 QUAD TOOLING/OLD MR 84"	2.0	1.8	3.8	1	2.0	1.8	3.8
83	1.1.1.10.2.6 QUAD TOOLING/BOA 52" (REWORK)	1.0	0.9	1.9	1	1.0	0.9	1.9
84	1.1.1.10.2.7 QUAD TOOLING/SQA 17" (REWORK)	3.0	7.0	10.0	1	3.0	7.0	10.0
86	1.1.1.10.2.12 QUAD TOOLING/3Ql20A	0.5	10.0	10.6	1	0.5	10.0	10.6
87	1.1.1.10.2.13 QUAD TOOLING/3Q60A	28.0	10.0	38.0	1	28.0	10.0	38.0
S-107	1.1.1.10.2 QUADRUPOLE TOOLING				===	====	====	====
					1	302.3	180.8	483.1
88	1.1.1.10.3.1 MR TOOLING/SEXTUPOLE (NEW)	19.8	86.2	106.0	1	19.8	86.2	106.0
89	1.1.1.10,3.2 MR TOOLING/TRIM QUAD (REWORK)	1.0	0.9	1.9	1	1.0	0.9	1.9
90	1.1.1.10.3.3 MR TOOLING/SKBW QUAD (REWORK)	1.0	0.9	1.9	1	1.0	0.9	1.9
93	1.1.1.10.3.6 MR TOOLING/OCTUPOLE (REWORK)	1.0	0.9	1.9	1	1.0	0.9	1.9
S-108	1.1.1.10.3 SPBCIAL MAGNET TOOLING				===	===	===	====
					1	22.8	88.9	111.7
94	1.1.1.10.4.1 MR TOOLING/HORZ TRIM DIPOLE (REWORK)	1.0	0.9	1.9	1	1.0	0.9	1.9
95	1.1.1.10.4.2 MR TOOLING/HORZ TRIM DIPOLE (NEW)	25.0	4.0	29.0	1	25.0	4.0	29.0
96	1.1.1.10.4.3 MR TOOLING/VERT TRIM DIPOLE (REWORK)	1.0	0.9	1.9	1	1.0	0.9	1.9
97	1.1.1.10.4.4 MR TOOLING/VERT TRIM DIPOLE (NEW)	24.9	0.9	25.7	1	24.9	0.9	25.7
S-109	1.1.1.10.4 SPBCIAL MAGNET TOOLING				===	===	===	===
					1	51.9	6.7	58.5
99	1.1.1.10.5.2 LAMBERTSON TOOLING/MI 110" (NEW)	317.3	42.4	359.8	1	317.3	42.4	359.8
100	1.1.1.10.5.5 TOOLING/F-17 C 132" MAGNET(MORE)	26.8	45.4	72.2	1	26.8	45.4	72.2
S-110	1.1.1.10.5 LAMBERTSON MAGNET TOOLING				===	====	====	====
					1	344.1	87.8	432.0

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11:19:58 LEVEL 6 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
104	1.1.1.18.1.15 RECYCLER-PM VERTICAL BEND DIPOLE							
		7.6	1.0	8.7	7	53.5	7.2	60.7
S-111	1.1.1.18.1 RECYCLER-PM VBRTICAL BEND DIPOLE				===	===	===	===
					1	53.5	7.2	60.7
105	1.1.1.18.2.14 RECYCLER-PM STANDARD QUADRUPOLES-.05 M LO							
		1.7	0.5	2.1	64	107.7	29.6	137.3
106	1.1.1.18.2.15 RECYCLER-PM BYPASS QUADRUPOLES-.05 M LONG							
		1.7	0.5	2.1	16	26.9	7.4	34.3
S-112	1.1.1.18.2 RECYCLER-PM STANDARD AND BYPASS QUADRUPOLES				===	====	===	====
					1	134.7	37.0	171.6
107	1.1.1.18.3.2 RECYCLER-CORRECTION ELEMENTS TROMBONE QUA							
		0.4	0.4	0.8	9	3.6	4.0	7.5
108	1.1.1.18.3.3 RECYCLER-CORRECTION ELEMENTS SQEW QUADS							
		0.4	0.4	0.8	2	0.8	0.9	1.7
109	1.1.1.18.3.5 RECYCLER-CORRECTION ELEMENTS SEXTUPOLES							
		0.4	0.4	0.8	24	9.5	10.6	20.0
S-113	1.1.1.18.3 RECYCLER-CORRECTION ELEMENTS				===	===	===	===
					1	13.8	15.4	29.2
110	1.1.1.18.4.1 RECYCLER-REURBISHED MR HOR. TRIM DIPS							
		0.1	0.1	0.2	24	2.0	2.6	4.7
111	1.1.1.18.4.3 RECYCLER-REFURBISHED MR VER. TRIM DIPS							
		0.1	0.1	0.2	24	2.0	2.6	4.7
S-114	1.1.1.18.4 RECYCLER-REUSED HOR. & VER. TRIM DIPS				===	===	===	===
					1	4.1	5.3	9.4
112	1.1.1.18.5.7 RECYCLER-PERMANBNT MAGNET LAMBERTSON							
		8.5	1.8	10.3	5	42.3	9.2	51.5
S-115	1.1.1.18.5 RECYCLER-PERMANENT MAGNET LAMBERTSON				===	===	===	===
					1	42.3	9.2	51.5
113	1.1.1.18.6.2 RECYCLER-PERM. MAGNET FOC. GRAD. DIPS							
		7.6	1.0	8.7	108	825.1	111.7	936.8
114	1.1.1.18.6.3 RECYCLER-PERM. MAGNET DEFOC. GRAD. DIPS							
		7.6	1.0	8.7	108	825.1	111.7	936.8
115	1.1.1.18.6.4 RECYCLER-PERM MAG GRAD DIPS DISPER SUPPR							
		5.3	0.9	6.2	136	721.3	119.7	841.0
116	1.1.1.18.6.5 RECYCLER-PERM. MAGNET MIRR GRAD. DIPS							
		7.6	1.0	8.7	4	30.6	4.1	34.7
S-116	1.1.1.18.6 RECYCLER.FOC.DEFOC & MIRR GRAD. DIPS				===	=====	=====	=====
					1	2,402.2	347.2	2,749.3
121	1.1.2.10.1.1 BML VACUUM SYS/8GEV CHAMBER.BELLOWS							
		136.7	21.7	158.4	1	136.7	21.7	158.4
122	1.1.2.10.1.2 BML VACUUM SYS/150GEV BELLOWS. CHAMBERS							
		83.9	11.9	95.7	1	83.9	11.9	95.7
123	1.1.2.10.1.3 BML VACUUM SYS/SPILL BELLOWS. CHAMBERS							
		2.7	6.7	9.4	1	2.7	6.7	9.4
S-117	1.1.2.10.1 BML VACUUM/CHAMBERS & BELLOWS				===	====	===	====
					1	323.3	40.3	263.5

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11:19:58 LEVEL 6 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
124	1.1.2.10.2.1 BML VACUUM SYS/8GEV PUMPS							
		174.4	1.7	176.1	1	174.4	1.7	176.1
125	1.1.2.10.2.2 BML VACUUM SYS/150GEV PUMPS							
		33.5	0.3	33.9	1	33.5	0.3	33.9
127	1.1.2.10.3.1 BML VACUUM SYS/8GEV GAUGES							
		42.8	1.0	43.8	1	42.8	1.0	43.8
128	1.1.2.10.3.2 BML VACUUM SYS/150GEV GAUGES							
		22.2	0.7	22.9	1	22.2	0.7	22.9
130	1.1.2.12.1.2 MI-MIR ABORT VACUUM							
		44.9	6.5	51.4	1	44.9	6.5	51.4
S-120	1.1.2.12.1 MI-MIR ABORT VACUUM				===	===	===	===
					1	44.9	6.5	51.4
140	1.1.3.1.1.1 MIR PWR SUP/DIPOLE SUPPLY							
		21.8	49.3	71.2	11	240.2	542.6	782.8
141	1.1.3.1.1.2 MIR PWR SUP/DIPOLE SUPPLY							
		283.2	25.3	308.5	11	3,115.6	278.3	3,393.9
S-121	1.1.3.1.1 MIR PWR SUP/DIPOLE SUPPLY				===	=====	====	=====
					1	3,355.9	820.9	4,176.7
S-147	1.1.4.1.1.1 MIR RF 53MHZ/POWER AMPLIFIERS							
		1,700.9	166.2	1,867.0	1	1,700.9	166.2	1,867.0
S-148	1.1.4.1.1.2 MIR RF 5)MHZ/ANODE SUPPLIES/MODULATORS							
		1,809.1	70.5	1,879.5	1	1,809.1	70.5	1,879.5
177	1.1.4.1.1.3 MIR RF 53MHZ/LOW LEVEL							
		11.3	14.5	25.8	1	11.3	14.5	25.8
178	1.1.4.1.1.4 MIR RF 53MHZ/TRANSMISSION LINE							
		200.5	35.9	236.5	1	200.5	35.9	236.5
179	1.1.4,1.1.6 MIR RF 53MHZ/H=588 CAVITIES							
		27.0	12.3	39.3	1	27.0	12.3	39.3
S-122	1.1.4.1.1 MIR RF 53 MHZ				===	=====	====	=====
					1	3,748.8	299.4	4,048.2
180	1.1.4.1.2.1 COAL/RF CAVITIES							
		0.0	7.1	7.1	1	0.0	7.1	7.1
181	1.1.4.1.2.4 COAL/TRANSMISSION LINE RF							
		20.2	2.8	23.0	1	20.2	2.8	23.0
S-123	1.1.4.1.2 COALESCING SYSTEM				===	===	==	===
					1	20.2	9.9	30.1
188	1.1.6.1.1.1 MIR 8 GEV PROT INJ/KICKER MAGNET							
		92.0	128.9	220.9	1	92.0	128.9	220.9
189	1.1.6.1.1.2 MIR 8 GEV PROT INJ/POWER SUPPLY							
		273.2	63.8	337.0	1	273.2	63.8	337.0
S-124	1.1.6.1.1 8 GEV PROT INJ KICKER				===	====	====	====
					1	365.2	192.7	557.8
190	1.1.6.1.2.1 8 GEV PBAR INJ/KICKER MAGNET							
		140.0	61.2	201.2	1	140.0	61.2	201.2
191	1.1.6.1.2.2 8 GEV PBAR INJ/KICKER POWER SUPPLY							
		198.0	104.7	302.7	1	198.0	104.7	302.7
S-125	1.1.6.1.2 8 GEV PBAR INJECTION KICKER				===	====	====	====
					1	338.0	165.9	503.9

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11:19:58 LEVEL 6 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
194	1.1.6.1.4.1 150 GEV PBAR EXT/KICKER MAGNET							
		0.0	18.3	18.3	1	0.0	18.3	18.3
195	1.1.6.1.4.2 150 GEV PBAR EXT/KICKER POWER SUPPLY							
		28.0	37.4	65.4	1	28.0	37.4	65.4
S-127	1.1.6.1.4 MIR 150 GEV PBAR EXT KICKER				==	===	===	===
					1	28.0	55.8	83.8
196	1.1.6.1.5.1 PROT ABORT KICKER MAGNET							
		10.0	21.9	31.9	1	10.0	21.9	31.9
197	1.1.6.1.5.2 PROT ABORT KICKER POWER SUPPLY							
		198.9	41.3	240.2	1	198.9	41.3	240.2
S-128	1.1.6.1.5 MIR EXT PROTON ABORT KICKER				===	====	===	====
					1	208.9	63.1	272.0
201	1.1.6.3.1.1 TEV 150 GEV PROT INJ KICKER							
		36.0	15.3	51.3	1	36.0	15.3	51.3
202	1.1.6.3.1.2 TEV 150 GEV PROT INJ KICKER POWER SUPPLY							
		13.0	26.9	39.9	1	13.0	26.9	39.9
S-129	1.1.6.3.1 TEV 150 GEV PROT INJ KICKER				===	===	===	===
					1	49.0	42.2	91.2
204	1.1.6.3.2.2 TEV 150 GEV PBAR INJ KICKER POWER SUPPLY							
		13.0	26.9	39.9	1	13.0	26.9	39.9
S-130	1.1.6.3.2 TEV 150 GEV PBAR INJ KICKER				===	===	===	===
					1	13.0	26.9	39.9
266	1.1.12.1.1.1 MIR WATER SYS/POND PUMP SYSTEM							
		154.5	71.5	226.0	1	154.5	71.5	226.0
267	1.1.12.1.1.2 MIR WATER SYS/HEAT EXCHANGE							
		525.0	17.1	542.1	1	525.0	17.1	542.1
261	1.1.12.1.1.3 MIR WATER SYS/LCW PROCESSING							
		256.3	130.2	386.5	1	256.3	130.2	386.5
269	1.1.12.1.1.4 MIR WATER SYS/LCW PUMP SYSTEM							
		316.0	57.1	373.1	1	316.0	57.1	373.1
270	1.1.12.1.1.5 MIR WATER SYS/LCW PIPING							
		1,445.1	928.8	2,373.9	1	1,445.1	928.8	2,373.9
271	1.1.12.1.1.6 RF-95 DEG LCW/HEAT EX & PUMP SYS							
		265.0	31.9	297.0	1	265.0	31.9	297.0
272	1.1.12.1.1.7 RF-95 DEG LCW/PROCESSING							
		92.8	35.0	127.8	1	92.8	35.0	127.8
273	1.1.12.1.1.8 RF-95 DEG LCW/PIPING							
		248.8	193.4	442.2	1	248.8	193.4	442.2
274	1.1.12.1.1.9 RP-55 DEG LCW/PROCESSING							
		73.0	31.7	104.7	1	73.0	31.7	104.7
275	1.1.12.1.1.10 RP-55 DEG LCW/HEAT EX & PUMP SYS							
		44.4	29.7	74.1	1	44.4	29.7	74.1
276	1.1.12.1.1.11 RP-55 DEG LCW/CHILLEP LCW PIPING							
		128.9	101.9	230.8	1	128.9	101.9	230.8
S-131	1.1.12.1.1 MIR INSTALL WATER SYSTEM				===	======	=====	=====
					1	3,549.8	1,628.4	5,178.2
279	1.1.12.1.3.1 MIR ABORT/BEAM PUMP SYSTEM							
		107.0	33.5	140.5	1	107.0	33.5	140.5

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11:19:58 LEVEL 6 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
281	1.1.12.10.1.1 BML WATER SYS/PONP PUMP SYSTEM							
		40.4	17.4	57.8	1	40.4	17.4	57.8
282	1.1.12.10.1.2 BML WATER SYS/HEAT EXCHANGER							
		91.5	7.8	99.3	1	91.5	7.8	99.3
283	1.1.12.10.1.3 BML WATER SYS/LCW PROCESSING							
		87.0	39.9	127.0	1	87.0	39.9	127.0
284	1.1.12.10.1.4 BML WATER SYS/LCW PUMP SYSTEMS							
		74.8	26.9	101.7	1	74.8	26.9	101.7
285	1.1.12.10.1.5 BML WATER SYS/LCW PIPING							
		277.2	201.3	478.6	1	277.2	201.3	478.6
S-134	1.1.12.10.1 BML WATER SYSTEMS				===	====	====	====
					1	571.0	293.4	864.4
293	1.1.13.1.1.1 MIR/INSTALL MAGNET STANDS							
		l,062.3	34.7	1,097.0	1	l,062.3	34.7	1,097.0
294	1.1.13.1.1.2 MIR/INSTALL MAGNETS							
		195.0	396.0	591.0	1	195.0	396.0	591.0
295	1.1.13.1.1.3 MIR/SURVEY , ALIGN MAGNETS							
		16.5	331.2	347.7	1	16.5	331.2	347.7
296	1.1.13.1.1.4 OLD MR MAGNET REMOVAL							
		2.2	202.8	205.0	1	2.2	202.8	205.0
S-136	1.1.13.1.1 MIR MAGNET INSTALLATION				===	=====	====	=====
					1	1,276.0	964.7	2,240.7
304	1.1.13.1.6.1 MIR ABORT STAND INSTALLATION							
		14.9	1.0	15.9	1	14.9	1.0	15.9
305	1.1.13.1.6.2 MIR ABORT MAGNETS INSTALLATION							
		0.0	8.7	8.7	1	0.0	8.7	8.7
S-138	1.1.13.1.6 MIR ABORT INSTALLATION				===	===	===	===
					1	14.9	9.8	24.7
309	1.1.13.2.1.1 8 GEV LINE/INSTALL MAGNET STANDS							
		87.3	8.8	96.1	1	87.3	8.8	96.1
310	1.1.13.2.1.2 8 GEV LINE/INSTALL MAGNETS							
		19.9	47.8	67.7	1	19.9	47.8	67.7
311	1.1.13.2.1.3 8 GEV LINE/8URVEY & ALIGN MAGNETS							
		7.8	135.9	143.7	1	7.8	135.9	143.7
S-140	1.1.13.2.1 8 GEV LINE/SURVEY & ALIGN MAGNETS				===	====	====	====
					1	115.0	192.5	307.5
315	1.1.13.3.1.1 150 GEV PROT LINE/INSTALL MAGNET STANDS							
		167.2	5.7	172.9	1	167.2	5.7	172.9
316	1.1.13.3.1.2 150 GEV PROT LINE/INSTALL MAGNET8							
		0.0	67.8	67.8	1	0.0	67.8	67.8
333	1.1.13.6.1.1 SLOW SPILL/INSTALL MAGNET STANDS							
		28.0	2.3	30.3	1	28.0	2.3	30.3
334	1.1.13.6.1.2 SLOW SPILL/INSTALL MAGNETS							
		0.0	12.1	12.1	1	0.0	12.1	12.1
340	1.1.13.7.2.1 MIR/F0 COMPONENT REMOVAL							
		0.0	13.9	13.9	1	0.0	13.9	13.9
173	1.1.4.1.1.1.1 MIR RF 53MHZ/200KW POWER AMPLIFIERS							
		41.9	6.5	55.4	15	733.4	97.4	830.1
174	1.1.4.1.1.1.2 MIR RF 53MHZ/4KWATT SOLID STATE AMP							
		64.5	4.6	69.1	15	967.5	61.1	1,036.3
S-147	1.1.4.1.1.1 MIR RF 53MHZ/POWER AMPLIFIERS				===	=====	====	=====
					1	1,700.9	166.2	1,867.0

MAIN INJECTOR FABRICATION, CONSTRUCTION, INSTALLATION COST ESTIMATE SUMMARY - B
PRINTED 27-MAR-98 11:19:58 LEVEL 7 SUMMARY - DIRECT COST

DETAIL PAGE#	WBS DESCRIPTION	MATERIAL K$	LABOR K$	TOTAL K$	QUANT REQ'D	MAT'L K$	LABOR K$	GRAND TOT K$
175	1.1.4.1.1.2.1 MIR RF 53MHZ/ANODE SUPPLIES							
		111.5	27.5	916.0	1	111.5	27.5	916.0
176	1.1.4.1.1.2.2 MIR RF 53MHZ/MODULATORS							
		920.6	43.0	963.5	1	920.6	43.0	963.5
S-148	1.1.4.1.1.2 MIR RF 53MHZ/ANODE SUPPLIES/MODULATORS				===	=====	===	=====
					1	1,109.1	70.5	1,879.5