WBS 3.0 C-0 Outfitting

Tom Lackowski

WBS 3.0

Overview

- Introduction
- Components of C-0 Outfitting
- Organization Chart
- Technical Description
- Project Planning and Management Overview
- ES&H

Introduction

- WBS 3.0, provides the architectural, structural, mechanical and electrical finish-out work for the BTeV detector in the existing C-0 Building. This subproject also provides the modifications to the Main Ring C-0 Service Building and primary power for the Interaction Region (IR).

  - Three major contracts are planned to accomplish this work
    - C-0 Occupancy Phase 1 – Completes the building shell to a minimally habitable building. OSHA and Life Safety requirements provided.
    - C-Sector High Voltage – Installs new 13.8KV feeder from KRS to C-0. Installs power for IR.
    - C-0 Occupancy Phase 2 – Installs the finishes, mechanical and electrical requirements of the BTeV detector.

Major Components

- C-0 Building
  - Architectural and structural finish out including:
    - Two Mezzanine floors
    - Stairs, elevator, partitions, toilet rooms.
    - Floor and wall finishes including raised computer floors.
  - Mechanical Systems
    - HVAC systems for Collision Hall, Assembly Hall, and Mezz..
    - Chilled water system.
    - High density computer room cooling.
    - Fire protection throughout the facility.
  - Electrical
    - Primary Power – 3 - 1500 KVA substations.
    - Three distribution subsystems; power supplies, quiet electronics, & house power.
    - 250 KVA Generator.

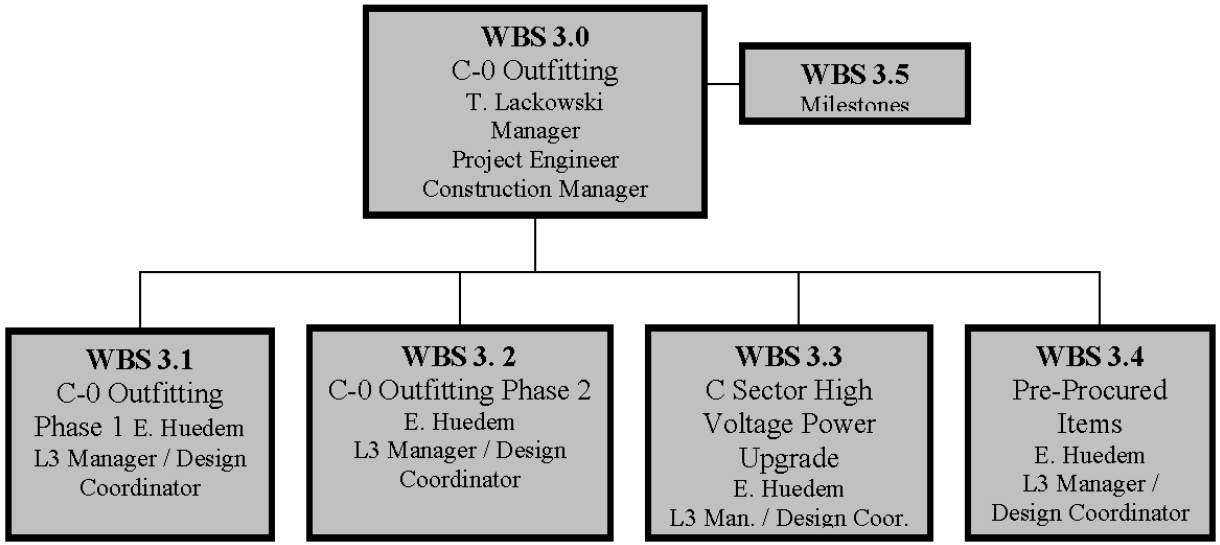
IR & Infrastructure

- IR Support
  - Primary Power; 1500 KVA transformer at C-0, 500 KVA transformers at B-4 and C-1.
  - 480 V secondary including panel boards.
  - Minor C-0 Service Building Architectural Modification.
  - Heated enclosure for outside bus between C-0 Service Building and penetrations leading to enclosure.

- Infrastructure
  - 13.8 KV feeder from Kautz Road Substation to C-0 Building.

Organization

Base cost $5.9M (M+S: $4.9M Labor: $1.M)

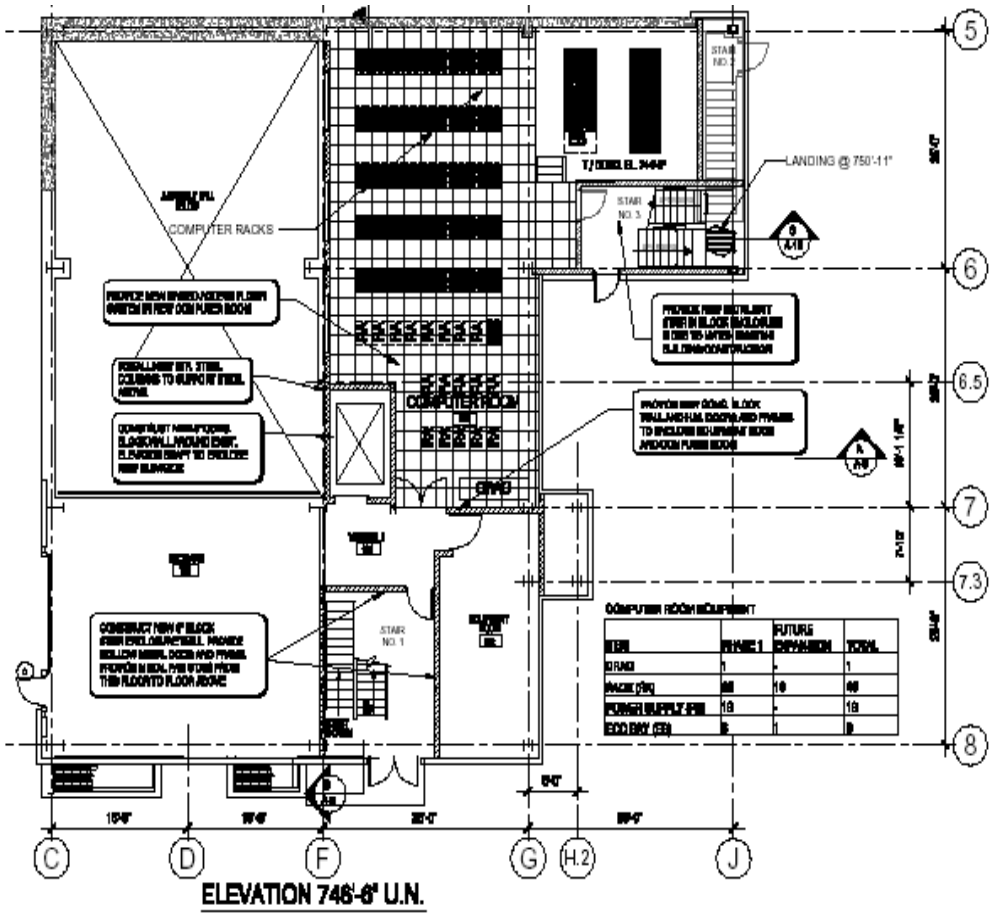


FESS Engineering		
CIVIL C. Federowicz	DDC CONTROLS L. Hammond	CONSTRUCTION MANAGEMENT OFFICE Manager – T. Lackowski Construction Coor. - TBD Procurement – R. Cypret Legal - TBD Environment – R. Walton Health & Safety - M. Heflin
ARCHITECTURAL G. Van Zandbergen	PROCESS PIPING SYSTEMS L. Hammond	
STRUCTURAL T. Lackowski	FIRE PROTECTION FIRE DETECTION J. Neihoff	
MECHAICAL SYSTEMS E. Huedum	ELECTRICAL Consultant Engineer	

Current Conditions

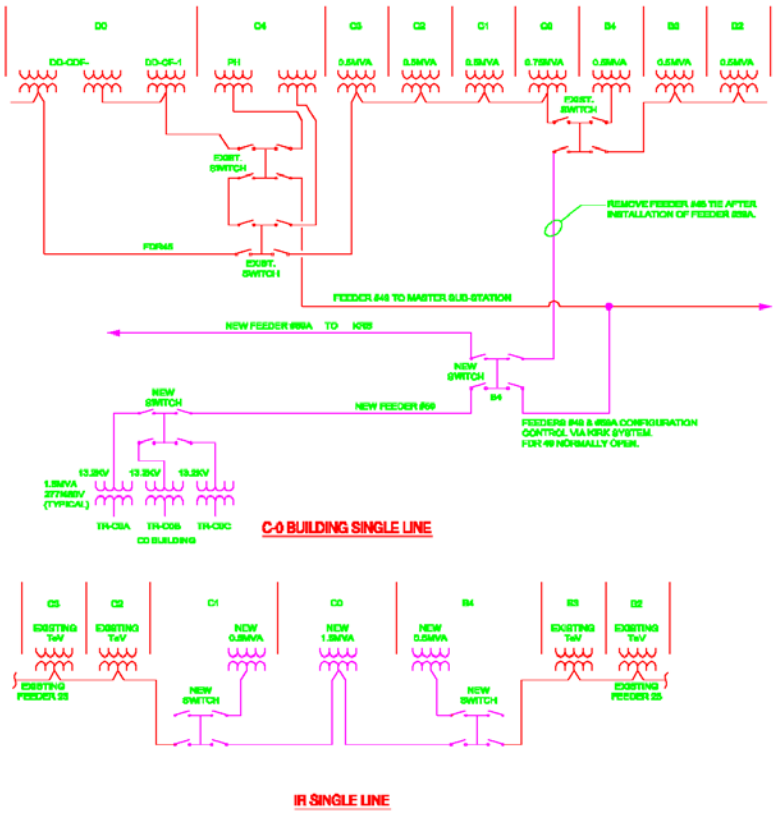
- In 1998 Fermilab constructed a Collision Hall and very basic building shell at the Main Ring C-0 Station.
- The project “C-0 Test Area” was constructed safely, on time, and within budget.
- UIP project stubbed in adequate ICW (Fire Protection water), Domestic Water, Sanitary Sewer, and natural gas.

C-0 Outfitting Phase I



- The scope of Phase I is those items of work required to give Beneficial Occupancy of the Assembly Hall at El. 715 and the Receiving Area to allow magnet and torroid construction to begin.
- Installs the Mezzanine and concrete block partitions, stairs, elevator, toilet rooms, fire protection, fire detection and power to test analysis magnets.
- This work is requesting 3a approval. Beneficial Occupancy Ready by Mar. 22, 2006. Beneficial Occupancy need by: July 28, 2006

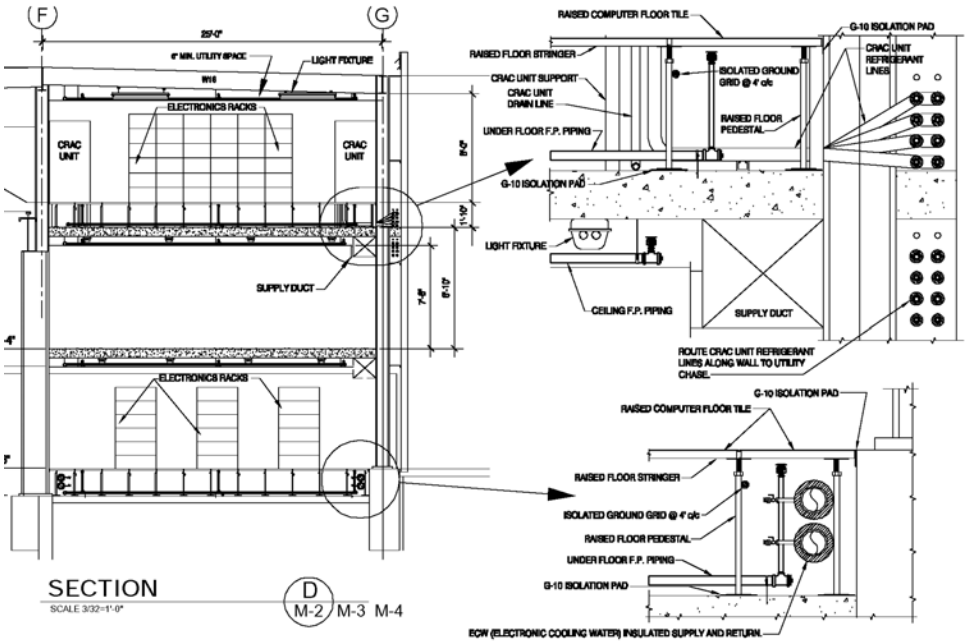
C Sector High Voltage Upgrade



- Installs IR feeder connections to existing TeV feeder 23 at C-0, B-4 and C-1.
- Installs new feeder 59A from KRS to B-4 for C-0.

C-0 Outfitting Phase II

- Completes remainder of scope in and around C-0 Building.
- Installs HVAC, chilled water, high density computer room cooling, raised computer floors, finishes, remaining primary power, user and house power distribution.
- The delay in the start of this work will allow us to take advantage of the continuing development of high density cooling systems technology.



Misc. Quantities

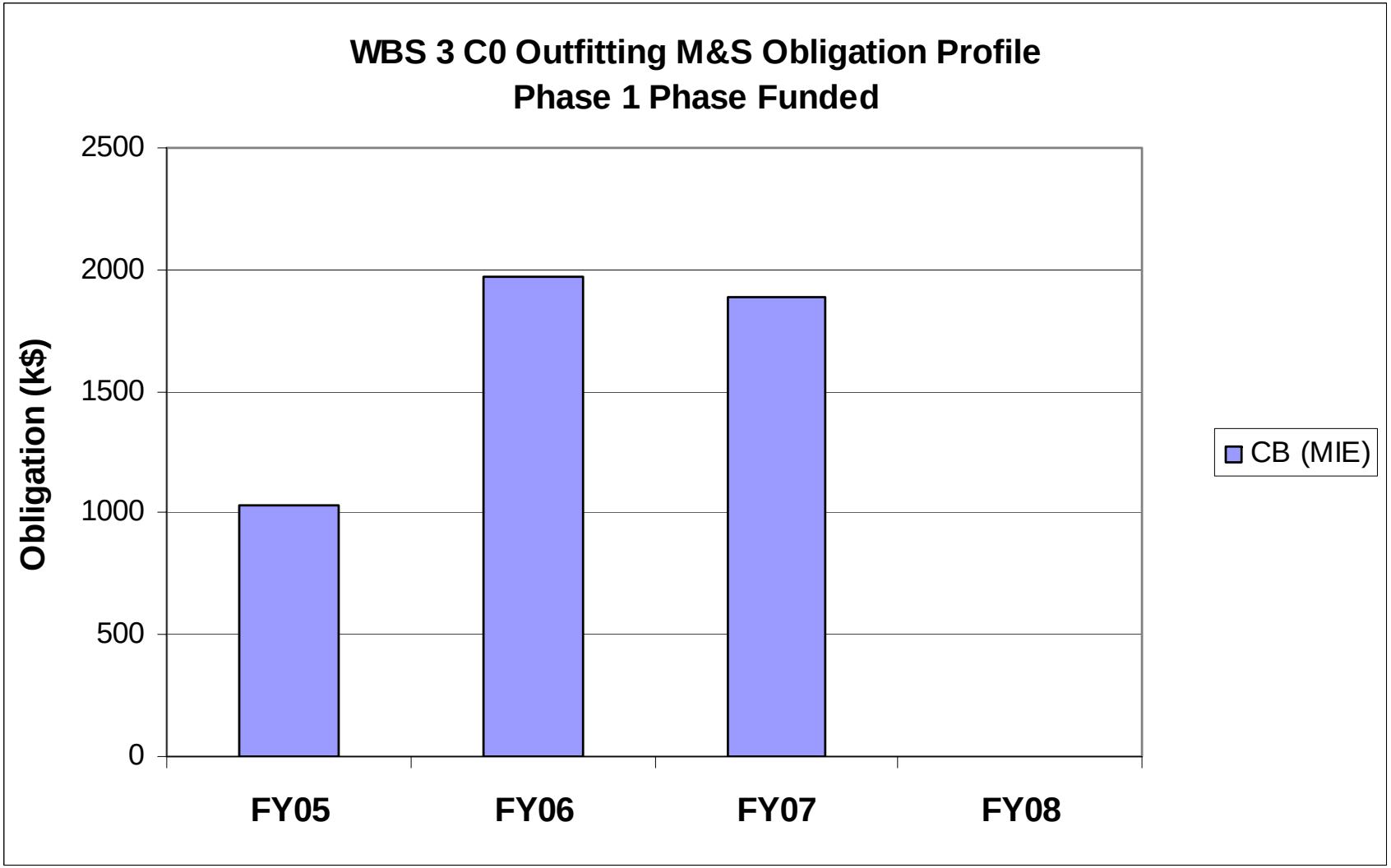
- Structural Steel – 22.7 tons
- Structural Concrete – 160 cubic yards
- Concrete Masonry – 8400 sf
- Chillers – 120 tons
- High Density Cooling - 120 tons
- Major HVAC systems - 2
- New Fire Protection coverage – 10,650 sf
- Installed Primary Power – 7 MVA
- 13.8 kv Feeder - 11,000 ft.
- 2000 amp switchboards – 4
- Electrical Distribution Panels – 22

Construction Cost

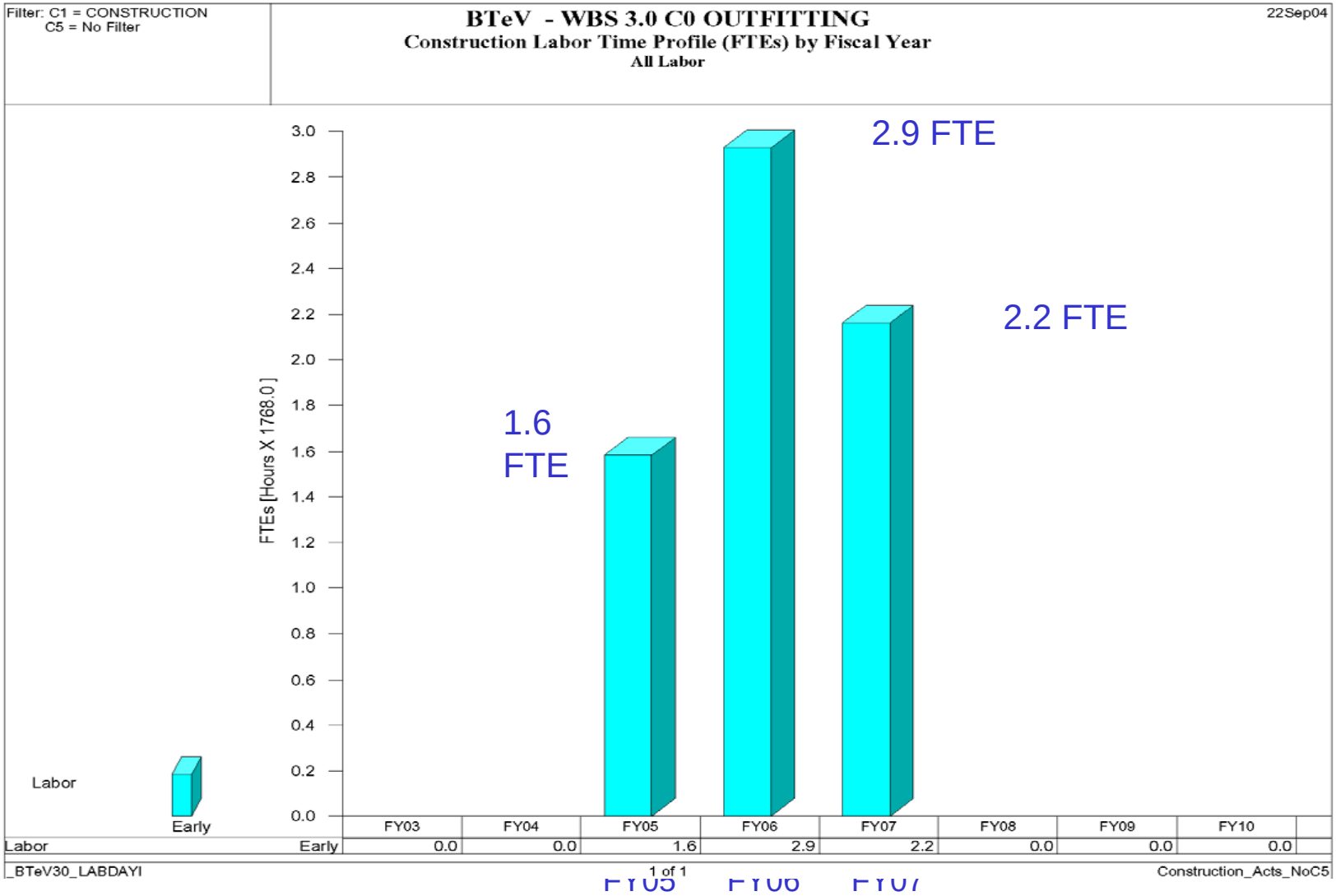
Activity ID	Activity Name	Base Cost ($)	Material Contingency (%)	Labor Contingency (%)	Total FY05	Total FY06	Total FY07	Total FY08	Total FY09	Total FY10	Total FY05-10
3.1	C-0 Outfitting Phase 1	2,010,685	20	20	1,126,651	1,281,727	4,519	0	0	0	2,412,896
3.2	C-0 Outfitting Phase 2	2,379,540	24	20	0	280,303	2,650,017	0	0	0	2,930,320
3.3	C Sector High Voltage Power Upgrade	774,720	20	20	0	837,933	91,731	0	0	0	929,664
3.4	Pre Procured Items	663,685	20	20	159,820	636,601	0	0	0	0	796,422
3.5	CDR ACDR & Project Reviews	57,985	0	0	57,985	0	0	0	0	0	57,985
3	**file_30_092004**	**5,886,614**	**22**	**19**	**1,344,456**	**3,036,565**	**2,746,267**	**0**	**0**	**0**	**7,127,287**

M&S Obligation Profile by Fiscal Year

(Phase 1, Phased Funded)



Labor Profile by Fiscal Year



Partial Gantt Chart

BTeV - WBS 3.0 C0 Building Outfitting

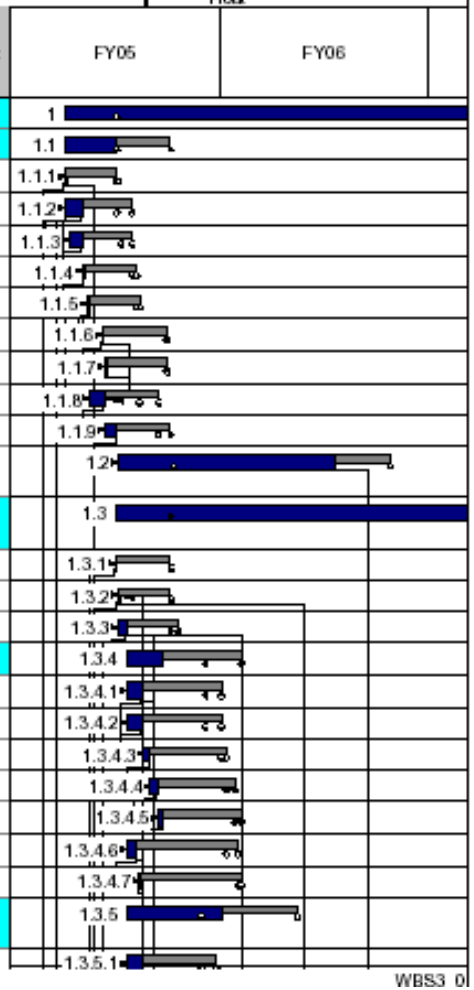
Total Construction Obligation Profile (FY05$K) by Institution & Fiscal Year

Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead
Non-Fermilab Labor: Salary, Benefits & Overhead
Contingency Not Included, Material Burdened

20Sep04

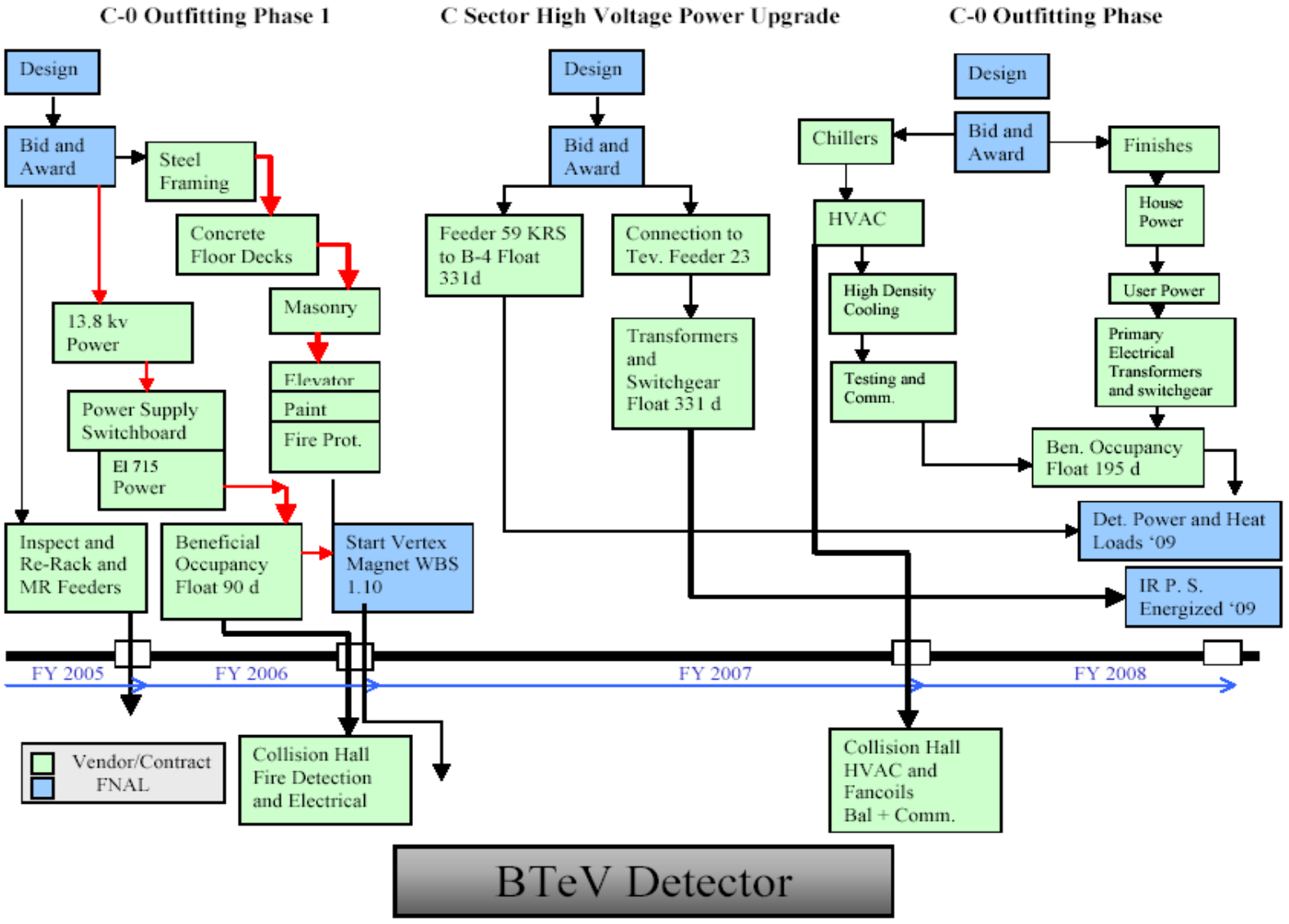
Planned
Critical
Late Dates
Milestone
Progress
Summary
Float

Activity ID	Activity Description	Materials & Services Costs	Labor Costs	Total Cost	Early Start	Early Finish	Float
1	C-0 Outfitting Phase 1	$1,734,280	$276,404	$2,010,685	04Jan05	10Apr07	64d
1.1	Design to Award C-0 Phase 1	$6,651	$16,653	$23,305	04Jan05	05Apr05	64d
1.1.1	SC: Delay Proj. Start	$0	$0	$0	04Jan05	04Jan05	64d
1.1.2	Title II EDIA FESS Phase 1	$0	$16,653	$16,653	04Jan05	01Feb05	64d
1.1.3	Title II EDIA Consultant Phase 1	$6,651	$0	$6,651	11Jan05	01Feb05	64d
1.1.4	Construction Req.	$0	$0	$0	02Feb05	08Feb05	64d
1.1.5	Release for Bid	$0	$0	$0	09Feb05	15Feb05	64d
1.1.6	Pre-Bid Meeting	$0	$0	$0	09Mar05	09Mar05	78d
1.1.7	Establish Source Criteria	$0	$0	$0	16Mar05	18Mar05	74d
1.1.8	Receive Proposals	$0	$0	$0	16Feb05	15Mar05	64d
1.1.9	Source Selection& Award	$0	$0	$0	16Mar05	05Apr05	64d
1.2	Title 3 EDIA C-0 Outfitting Phase 1	$0	$259,750	$259,750	06Apr05	19Apr06	69d
1.3	C-0 Outfitting Phase 1 Construction Contract	$1,727,628	$0	$1,727,628	01Apr05	10Apr07	64d
1.3.1	SC: Delayed Const. Start	$0	$0	$0	01Apr05	01Apr05	67d
1.3.2	Notice to Proceed	$0	$0	$0	06Apr05	06Apr05	64d
1.3.3	Mobilize	$18,580	$0	$18,580	07Apr05	20Apr05	64d
1.3.4	Site Concrete	$30,423	$0	$30,423	21Apr05	23Jun05	95d
1.3.4.1	S & A Concrete Mix	$0	$0	$0	21Apr05	19May05	95d
1.3.4.2	S & A Rebar	$0	$0	$0	21Apr05	19May05	95d
1.3.4.3	FBP Foundations at Stair	$7,047	$0	$7,047	20May05	31May05	95d
1.3.4.4	Construct Hardstands	$14,227	$0	$14,227	01Jun05	14Jun05	95d
1.3.4.5	Site Utilities	$5,568	$0	$5,568	15Jun05	23Jun05	95d
1.3.4.6	Rework Temp Power	$0	$0	$0	21Apr05	11May05	122d
1.3.4.7	Demo Int. Stair Enclosure	$3,580	$0	$3,580	12May05	16May05	122d
1.3.5	Structural Steel & Weather Enclosures	$236,396	$0	$236,396	21Apr05	07Oct05	90d
1.3.5.1	S & A Steel Shop Drawings	$0	$0	$0	21Apr05	18May05	90d



BTeV30 ALLPRO 1 of 28 WBS3 0

Description of Project Flow



Key Milestones

Performance Measurement Baseline

Activity ID	Activity Description	Early Start	Early Finish
7.1	T5M: MS-1 Start Engineering	2-Feb-05	2-Feb-05
7.2	T4M: MS-2 Start Construction	4-May-05	4-May-05
7.3	T5M: MS-3 Side Bay. Struct. Complete	17-Oct-05	17-Oct-05
7.4	T5M: MS-4 Temo Power Operational (Fdr 45)	22-Jun-06	22-Jun-06
7.5	T4M: MS-5 Beneficial occupancy of lower level and upper staging area	19-May-06	19-May-06
7.6	T5M: MS-6 Collision Hall Complete	30-Jul-07	30-Jul-07
7.7	T5M: MS-7 Mechanical Systems Complete (Except CH)	2-Oct-07	2-Oct-07
7.8	T5M: MS-8 Electrical Systems Complete	28-Jan-08	28-Jan-08
7.9	T4M: MS-9 Assembly, Service Building Construction Complete	28-Jan-08	28-Jan-08
7.1	T5M: MS-10 Engineering Complete	1-Apr-08	1-Apr-08

Critical Path Analysis

- C-0 Outfitting Phase 1
  - Float is 90 days. Float calculated targeting the Level 1 Milestone, **"Beneficial Occupancy of lower level and upper staging area".** The completion of Phase 1 allows the start of the Vertex Magnet construction in C-0 .
- C Sector High Voltage Upgrade
  - Float is 331 days, completing in Oct. '06, float is calculated with respect to 'Need by" date, T2M25: C0 Outfitting Construction Complete.
- C-0 Outfitting Phase 2
  - Float is 195d, completing in July '07, float is calculated with respect to 'Need by" date, T2M25: C0 Outfitting Construction Complete.

Recommendations from CD-1 Review

- 1.) Define and document boundaries and interfaces with both Integration (1.10) and Interaction Region (2.0) in time for CD-2 Review.
  - Continued participation at Collaboration meetings, BTeV Technical Board meetings and the Project Management Group meetings provide a structured format for maintaining communications between subprojects.
  - Less formal meetings between the three subprojects provide for specific transfer of criteria. Criteria documented in the BTeV database.
  - MOU documenting the "Boundaries / Division of Responsibilities" and "Source of Requirements" is included in the Title l appendix.

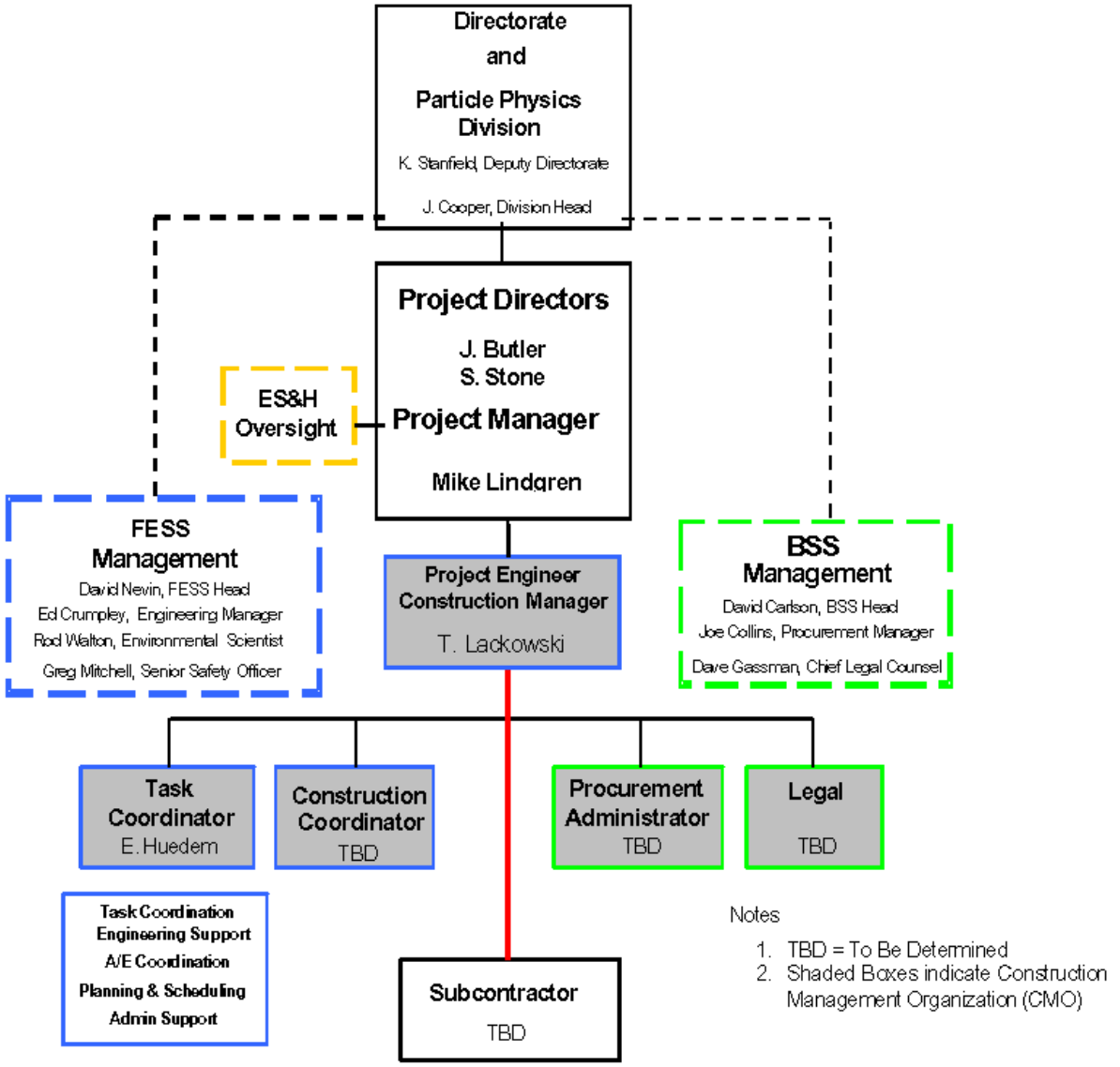
Recommendations from CD-1 Review

- 2.) Involve key procurement personnel and approving official in advance to allow for rapid placement of the large Phase l procurement at project approval (CD-2).
  - Ongoing meetings between procurement, BTeV Project management, and WBS 2.0, WBS 3.0 subproject are held periodically to update status of long lead procurements.
  - Procurement has assembled a list of procurement activities specific for C-0 Outfitting Phase l. This document is included in the Title l Appendix entitled "Recommended Milestones for Solicitation C0 Phase 1 Construction"
  - The importance of continued involvement and updating of the procurement group, while the design continues to develop, is recognized to achieve a prompt contract solicitation and award.

Risk Analysis

- Schedule
  - CD-2/3a approval date has a direct relation to the available float for C-0 Outfitting Phase 1.
- Technical
  - The methods of construction, materials and installation conditions are consistent with industry standards.
- Economic Factors
  - Fermilab is continuing to receive competitive proposals at or below the engineers estimate. Contingency on C-0 Outfitting Phase 2 has been raised to 26% for computer cooling and electrical and 22% for all other items.

Line Management



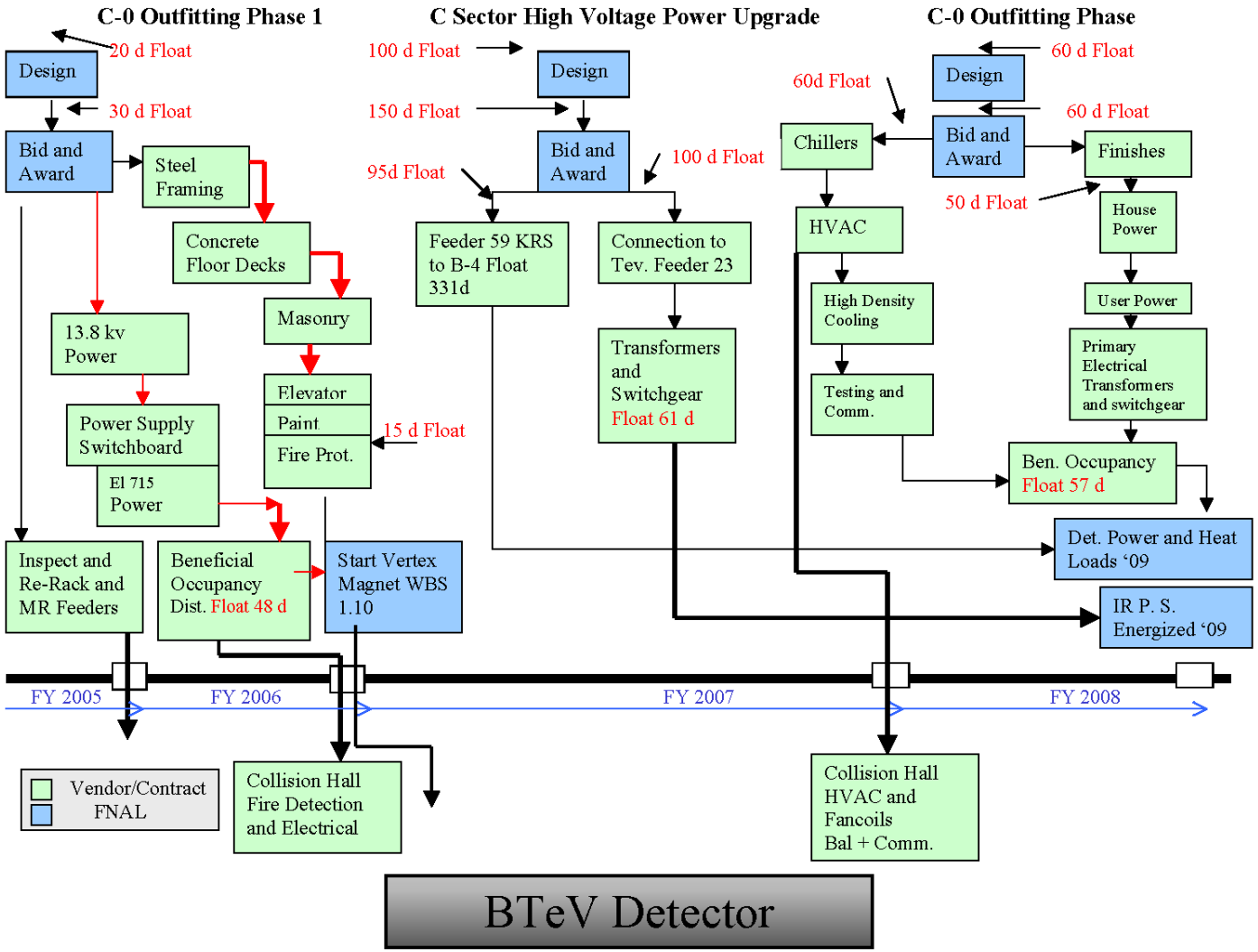
ES&H

- The Construction Manager shall be the first line of contact with the Construction Subcontractor's organization.
- During construction the Subcontractors will use Project Hazard Analyzes (PHA) approach to plan the work and mitigate hazards.
- Goal is zero accidents.

- Project NEPA has been approved as a Categorical Exclusion (CX).

Glossary of Terms

Description of Project Flow WBS 1.8 With Distributed Float



M&S Obligation Profile by Fiscal Year