Fermilab
FY2002 Self-assessment
Process Assessment Report
For
Technical Division

09-Aug-2002

Division/Section performing assessment

Technical Division

Name of organization that owns assessed process

Engineering & Fabrication Department

Organization Strategy

The mission of the Engineering & Fabrication Department is to service the High Energy Physics field in the areas of engineering and fabrication. This type of work lends itself to rigorous work process controls, and so the Department strives to continually analyze its efforts and to make improvements. One of the areas in which the Department is trying to improve is in its ability to estimate and report on the status of fabrication jobs.

Names of Personnel on Assessment team

David Harding, TD/BD Liaison
John Carson, Production and Engineering Manager
TJ Gardner, Project Coordinator
Dan Smith, IB2 Production Leader
Jamie Blowers, Quality Assurance Officer

Name of process assessed

Accelerator component management, specifically the methodology used to estimate and report on the status of fabrication jobs.

Brief description of process to be assessed

The work in the EF Department lends itself to a typical "customer-supplier" relationship. I.e., the Department has customers which request engineering and fabrication services. The Department has recognized that their reporting to the customer has been inconsistent, and so effort has recently been put into improving the methodology used to estimate jobs and report to the customers. The process assessed is this process of estimating jobs and reporting on job status to the customer.

Are metrics associated with this process? If so, what are they?

At this point in time there are no metrics associated with this process. However, we do see the opportunity to develop metrics so that we can better track our progress.

What are the names of the procedures associated with this process?

The procedure associate with this process is TD-2060 Project Management of Fabrication Jobs (currently in draft form).

Are these procedures being followed? Are they current?

This procedure is currently in draft form, and so is being updated as the overall process is continually developed. It is acknowledged that the structured methodology of estimating and reporting job status to the customer is new to this process, and so it is currently not covered in the draft document.

Describe the methodology used to assess this process.

This process was assessed by having discussions, over a period of several months, regarding how we think the process should work. We also reviewed fabrication projects which were currently in process in the EF Department, and developed reporting templates to use in gathering and publishing project status data. Our goal in this assessment was to develop and document the methodology we choose to use in estimating and reporting for all jobs, large or small.

Results of the assessment:

As a result of the assessment, this process is given an overall rating of **good**. The Division has a good track record when it comes to managing large construction projects (e.g. Main Injector). Project estimating and reporting for large projects has been systematic, structured and very effective. Managing small projects has proven to be a tougher job. Recently our primary customer (Beams Division) voiced concerns over how job estimating and status are communicated.

It was agreed that the Division's approach to managing small jobs has been too casual, and in need of improvement. The formal systems which had been used and were successful for managing large projects, had not been implemented for small projects. The results of this lack of systematic planning methodology were some unsatisfied customers.

One notable practice is that the Division listened to the voice of its customer. That is, when the customer (Beams Division) communicated their lack of satisfaction to the Technical Division, the Division responded by making it a priority to fix the process. Starting in the fall of 2001, the Division assembled a team of people, and gave them the responsibility to improve this process. Many improvements have been made, and more are currently being planned and implemented.

A few of the improvements already implemented include:

1. Adjusting the workload of one person so that he can now fill the role of “Project Coordinator.” This role is responsible for coordinating the planning and reporting on all fabrication jobs.
2. Defined a portion of the planning methodology in document TD-2060.
3. Held weekly meetings with the customer (Booster) over the last few months on three fabrication projects. The purpose of these meetings was to improve the communication between the TD and the customer.
4. Developed templates to begin the work of collecting data, comparing the data to our estimates, and communicating progress to the customer.

It is recognized that all this methodology needs to be incorporated into TD-2060, or other such policy/procedure documents. As the work practices are further defined and refined, the documentation will also be updated.

This process has not been assessed before, and so there is no prior comparison to be made. We have not compared ourselves to other labs. There was some talk over how industry does this work, but we did not make any effort to benchmark against industry.

In summary, the assessment showed that the job estimating and planning process needed improvement, and the process being used to improve it is working.

Identified opportunities for improvement

Improvements are centered on the continual learning that is done when implementing a new process. It is important to continue to hear the voice of the customer during this process. As stated above, as improvements are developed and implemented, they will be incorporated into the appropriate policy/procedure documentation.

Schedule for implementation of improvements

The improvements to the process are ongoing, and so no schedule has been developed.

Status of improvements from previous assessment

N/A

Attachments (supporting data, worksheets, reports, etc.

The following documentation have been incorporated into this report:

"TD Policy TD-2060" - This is the draft document which is being put together to describe the overall project management process for fabrication jobs

"Recent estimates" - These are examples of the new process, including a project schedule and a monthly estimate

Fermi National Accelerator Laboratory

Technical Division

Project Management of Fabrication Jobs

TD-2060

Version 1 - DRAFT

Approved, TD Quality Assurance Officer	Date
Approved, Engineering & Fabrication Head	Date
Approved, Development & Test Head	Date
Approved, Material Control Head	Date
Approved, Technical Division Head	Date

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Revision History

Version	Date	Section No.	Specifics
1	07-Feb-2002	All	First version

Controlled Distribution

Technical Division Library

Introduction

Background

The Technical Division was originally organized as the Technical Support Section in the early 1980s. It was at this time that Technical Services (consisting of the Conventional Magnet Facility and the Machine Shops) and the Energy Saver Section (consisting of the Superconducting Magnet Facility and the Magnet Test Facility) were combined to create the Technical Support Section. In the mid 1990s a reorganization of the laboratory occurred and the Technical Support Section became the "Technical Division". Although research was a part of the work as a section, the change to become a division made research a major portion of the mission of the organization.

The Technical Division maintains a diverse work force that has a very wide range of core competencies. In support of the R&D the division has experts in the fields of engineering, fabrication, tooling, machining/welding, procurement, calibration, testing, operations, maintenance, QA/QC and systems integration. The division also provides services in project management, project planning, resource management and scheduling. The Technical Division is heavily involved in the work of repairing and refurbishing existing devices, as well as design, fabrication and project management of a wide variety of HEP projects, including the next generation of particle accelerators, detectors, and astrophysics experiments.

Project Management

Due to the level of complexity of the work done in the Technical Division it was decided to implement a formal, documented program, which describes the practices used by the division to plan fabrication projects. The methods used by the division are based on standard project management tools.

This document defines division policy and overall procedures for the organization. Although it covers the entire system, it is not meant to describe every detail of the system. Some details are left up to the discretion and competence of the people working within this system.

The purpose of the system is to aid the division in meeting the needs of our customers. This is accomplished by applying systematic thinking and planning to the work that we do, and maintaining a good level of communication both internally within the division, and externally with our customers. In using this system, we also track our actual work versus our estimates. This allows us to find areas in which we do very well, and areas in which we should improve.

Our desire is to have all division employees constantly challenge and push our activities to higher levels of performance, which enables us to continually innovate, improve, and learn. We strive to continually learn and improve in all that we do, which includes this system.

1.0 Methodology

Our methodology for defining this system began by defining the overall project planning process, and the roles of various people working within the process. After defining the roles and the process, we then defined the inputs and outputs for each step. Defining the inputs and outputs included defining and who is responsible for each step.

This document is our method to formally issue and institutionalize this project management system. It is meant to describe the system, and is not intended to be a work instruction that describes every detail of the process. This document can be used as a reference tool to aid the user in understanding how we do the business of project management.

This system is meant to evolve as the need arises. Please contact the TD Quality Assurance Manager with feedback on this system, and with any ideas on how to make it better.

2.0 System Scope

The scope of this system is the design, planning and implementation of fabrication, or potential fabrication, projects. Fabrication can include making new devices as well as repairing or upgrading old devices.

3.0 Mindset

Fermilab has developed a culture that tries to foster creativity and freethinking. These are two strengths of our culture, and of the people that work at the Laboratory. These strengths, however, can work against attempts to systematically define a methodology of work. In essence, this mindset makes it difficult to implement a project management system. We are much more comfortable when we "shoot from the hip", than defining responsibilities and schedules. However, just by being aware of this mindset, we are then in a position to begin the process of changing that mindset, and our culture. And we acknowledge that, until we begin the work of changing our minds, this system will not function to its potential.

4.0 Mechanics

It was identified that there is a need to keep track of two types of data: schedule data and project-specific data. To this end, we use two pieces of software to keep track of this data. It is conceivable, after becoming more proficient with MS-Project, that these two systems will be merged into one. However, at this time it is easier to use MS-Project for keeping track of schedules, and using MS-Access to keeping track of all other project information.

4.1 Microsoft Project

MS-Project is used in TD to keep track of individual project schedules, and for combining the individual schedules into an integrated schedule. MS-Project was chosen because of its previous use within TD, for its ease of use, and for its cost.

4.2 Project Tracking Database

Other project related data is maintained in a TD-built MS-Access database. This database is accessible from the web, and is used to generate various reports. The main report generated is the "E&F Job List", which identifies the current jobs in TD, and their status. Other, more detailed, reports can be generated as well.

The following lists some of the information maintained in this database:

Job Number -
Project Name -
Descriptor - e.g. EDBB, TSHH
Description of work -
Quantity Needed -
Serial Numbers completed - used to state number of devices completed
Date Requested -
Priority - set by the customer
Scheduled Completion Date -
Budget Code -
Estimated Cost -
Final Cost -
Customer Contact Information -
Project Engineer contact information -
Existing device IDs -
Assembly drawing number -
Traveler number -
Job History -

5.0 <u>Scheduling Methodology</u>

Although we utilize standard project planning techniques, we thought it important to document a few of the specifics for communication and training purposes.

5.1 WBS Thinking

WBS, which stands for Work Breakdown Structure, is a *deliverable-oriented grouping of project elements which organizes and defines the total scope of the project*. When defining and organizing the schedule, it is good to think in terms of a WBS. This will help to ensure that all the appropriate project elements will be thought about and included in the schedule.

Our practice is to organize the schedule by grouping tasks together. For example, all tasks that are related to design are placed together in the schedule, and all tasks related to procurement are placed together in the schedule. This means that the tasks may not be laid out in chronological order. By placing tasks together in this way, we are in a better position to judge whether or we have addressed all the needs (i.e. WBS thinking) and that we have allowed enough time to get the work done.

5.2 Standard Milestones

In our project scheduling process, we make a practice of including standard milestones. These serve as a template when creating the project schedule. Of course, these can, and are, adjusted as needed to meet the requirements of the specific projects.

Preliminary Design Review(s) - The primary purpose of preliminary design reviews is to present and agree to design requirements. Design requirements are then translated into actual designs.

Final Design Review(s) - The primary purpose of final design reviews is to present and agree to the actual design. The Project Engineer presents drawings that describe how the design requirements have been met.

Readiness Review(s) - The primary purpose of readiness reviews is to ensure that Engineering & Fabrication is ready to begin production. This entails the review and publication of drawings, travelers, tooling and parts. We also ensure that a Device Service Record is created for each device (refer to TD-2030 Device Data Management).

5.3 Task Durations

We do not want to present schedules that are too tight to fulfill. Because of this, in general, task durations are defined as "worst-case" scenarios. We also incorporate certain tasks into the schedule to demonstrate what could happen, but may not happen. Examples of this may be to include time in the schedule for adjusting a lamination die after the sample laminations have been measured, or to include time for re-machining a solid core after a first article has been magnetically measured.

5.4 Establishing the Baseline

In an effort to define reasonable commitments, a baseline is set for each project schedule. Actual progress will be compared to the baseline. In this way, we will track our progress towards our commitments, as well as learn to improve our scheduling methodology.

The question is, when do we set the baseline? In principle, the baseline is set when we have reached an appropriate level of comfort with the schedule data. This comfort level is normally reached after many iterations between the Schedule Coordinator and the other project personnel, and should occur at some point prior starting fabrication.

6.0 Roles and Responsibilities

The project management system involves many interdependent roles. These roles, and their respective responsibilities, are defined below.

6.1 Customer

The *Customer* is the person(s) who have requested the work, and who will receive the deliverables from Technical Division. The customer should provide the following:

- Specific requirements to define the work of the project, which include:
  - Description of work;
  - Quantity needed;
  - Need-by date;
  - Priority, as it relates to other work for the Customer.
- A contact person for coordinating communication on project needs and status;
- Devices to repair or upgrade, as required;
- Budget code.

6.2 Process Engineering

Process Engineering is a Group within the Engineering & Fabrication Department. Working with the Process Engineering Group are Traveler Coordinators and the Schedule Coordinator. Their roles are defined as follows:

Traveler Coordinator:

- Working with Production and Engineering to maintain travelers and parts kits for each fabrication project (see TD-2050 for a detailed description of the traveler system);
- Organizing Production Readiness Review(s);

Schedule Coordinator:

- Designing and maintaining the project tracking database;
- Coordinating all work related to each job, which includes:
  - Assigning a job number for each job;
  - Interfacing with all people involved with the project to maintain accurate data related to the project.

- Maintaining the project schedules, which includes:
  - Maintaining a schedule for each project;
  - Interfacing with all people involved with the project to maintain accurate schedules;
  - Integrating all schedules into a master schedule.
- Issuing reports on project status.

6.3 Project Engineer

The *Project Engineer* is the central figure in the project management system, and so has many roles to fill:

- Along with the Beams Division Liaison, the Project Engineer is the main contact for communication with the customer, which includes:
  - Working with the customer to define and document project requirements;
  - Providing initial cost and schedule estimates to the customer.
- Providing detailed design drawings for release;
- Providing schedule input to the Schedule Coordinator through regular meetings;
- Organizing Design Review(s);
- Providing all technical input for the creation and use of the traveler(s);
- Reviewing/revising initial cost estimates using more mature design input.

6.4 Production Manager

The *Production Manager* is responsible for the following:

- Providing schedule input to the Schedule Coordinator through regular meetings;
- Allocating appropriate resources to fulfill the schedule requirements;
- Providing input to Traveler Coordinators for the creation and maintenance of travelers;

6.5 Material Control Department

The Material Control Department is responsible for providing procurement, incoming inspection and storage services to the Division and Laboratory. For the purposes of the project management system, the roles of Material Control include:

- Providing design input relating to the use of various machining methods;
- Procuring and inspecting the parts needed for the project;
- Providing schedule input to the Schedule Coordinator through regular meetings, which includes:
  - Maintaining appropriate information regarding the procurement status of parts needed for the project.

6.6 Magnet Test Facility

The *Magnet Test Facility (MTF*) is operated by the Development & Test Department. MTF is responsible for conducting cold and warm measurements of devices to measure characteristics such as quench currents and magnetic strength & harmonics. For the purposes of the project management system, the roles of MTF include:

- Measuring devices, as required for the project;
- Issuing reports on the results of the device measurements;
- Providing schedule input to the Schedule Coordinator.

7.0 Structure

The overall structure is defined in the process flow diagram (last page).

The process flow is iterative. This means that we continually go through the process of planning, implementing, checking and adapting, until we are finished with the project.

The process flow diagram is a very broad look at the project management process. Following are more details about each of the steps in the process.

It is understood that each step involves updating the information in the Jobfile.

7.1 Request for Work

Remarks:

- Work could involve initial estimates, or other info, as well as fabricating a device;
- Requests for work could be very informal, e.g. a question over lunch. The rule of thumb is if you have to get back to the requester (i.e. you cannot answer the question on the spot), then a Jobfile should be created.

Inputs:

- A need for something

Outputs:

- Job request
- Jobfile

Roles:

- **Customer** - provides the request to TD
- **Schedule Coordinator** - assists the Customer in developing the request, and then assigns a job number and creates the Jobfile

7.2 Decide next step, or Plan

Remarks:

- Project Engineer is assigned to project
- Questions to ask, and answer include:
  - "Is design required, and if so, how much?"
  - "Is engineering effort required, and if so, how much?"
  - "Is procurement required, and if so, how much?"
  - "What are the tooling needs?"
  - "What are the limiting factors?"
- Develop initial schedule and work plan
- Identify meeting routines and project review milestones
- Identify resources needed to complete project

Inputs:

- Job request

Outputs:

- Decisions and plans

Roles:

- **Project Engineer** - coordinates making decisions and plans, based on the job request
- **Schedule Coordinator** - assists Project Engineer in the creation of initial schedule and work plan

7.3 Implement Plan

Remarks:

- Work is done on the project. This may entail gathering information and creating a report, or it may entail design, procurement and fabrication;
- Project data is recorded in the Jobfile and tracking database.

Inputs:

- Job request
- Plans

Outputs:

- Cost and schedule estimates
- Revisions to cost and schedule estimates
- Design specifications and drawings
- Procurement of parts
- Fabrication of device(s)

Roles:

- **Project Engineer** - coordinates all work done on the project
- **Schedule Coordinator** - maintains appropriate records to reflect up-to-date work on project; serves as link between all personnel working on project
- **Traveler Coordinator** - develops travelers
- **Production Manager** - coordinates all fabrication-related work
- **Material Control** - procures and inspects needed parts
- **Magnet Test Facility** - measures devices

7.4 Review work and provide feedback

Remarks:

- On a regular basis, the work on the project is reviewed and compared to the plan;
- Based on the review, the plans are adjusted as needed;
- Status reports are generated and information is communicated internally within the Division and back to the Customer;
- Reports could take the form of formal reports, e-mail messages, or other formal and informal communications.

Inputs:

- Jobfile
- Tracking database
- Schedule

Outputs:

- Updates to plans
- Report(s)

Roles:

- **Project Engineer** - Works with Schedule Coordinator to review work and update records
- **Schedule Coordinator** - Works with all personnel on project to review work and update records
- **Production Manager** - Works with Schedule Coordinator to review work and update records
- **Magnet Test Facility** - issues report(s) stating the results of their measurements
- **All others** - provide feedback to Schedule Coordinator on work progress

7.5 Project complete?

Remarks:

- In order to closeout the project, we must determine if we have met the requirements of the project. This decision ultimately comes from the Customer;
- Upon review, if it is determined that the project is not complete, then the iterative cycle continues with planning (7.2 above).

Inputs:
- Jobfile
- Tracking database
- Schedule

Outputs:
- Decision to close project or to continue

Roles:
- **Customer** - decides whether or not the project is complete to their satisfaction

7.6 Project closeout

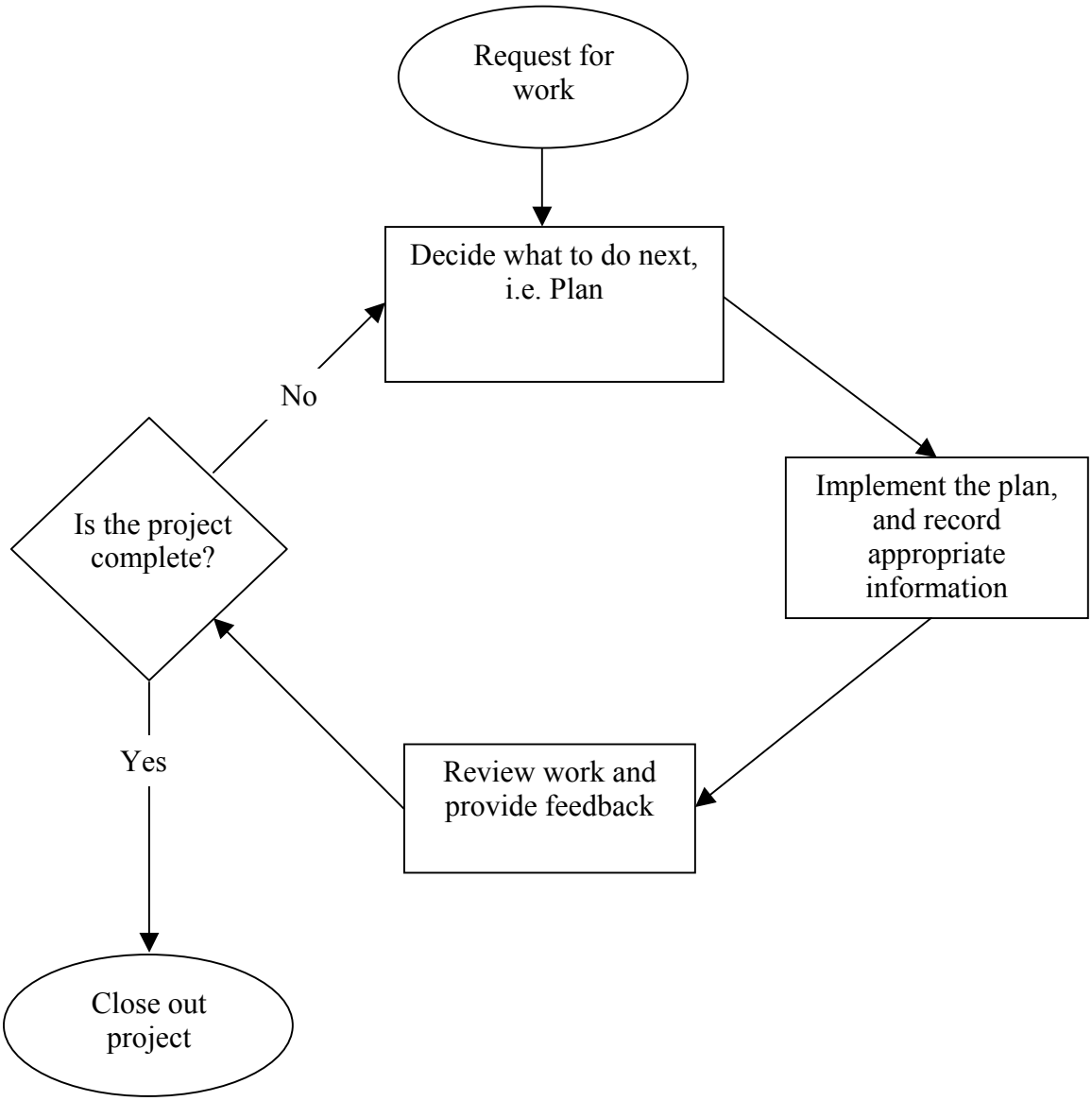
Remarks:
- A final review is completed to compare are actual cost and schedule to our estimates. This is done so that we can improve our planning methodology.
- Although all deliverables have been completed, it is important to ensure that the project records are also completed.
- Everyone working on the project needs to ensure that their records are complete and accurate.

Inputs:
- Decision to close project

Outputs:
- Complete and accurate project records
- Knowledge gained from reviewing degree of success versus our plan

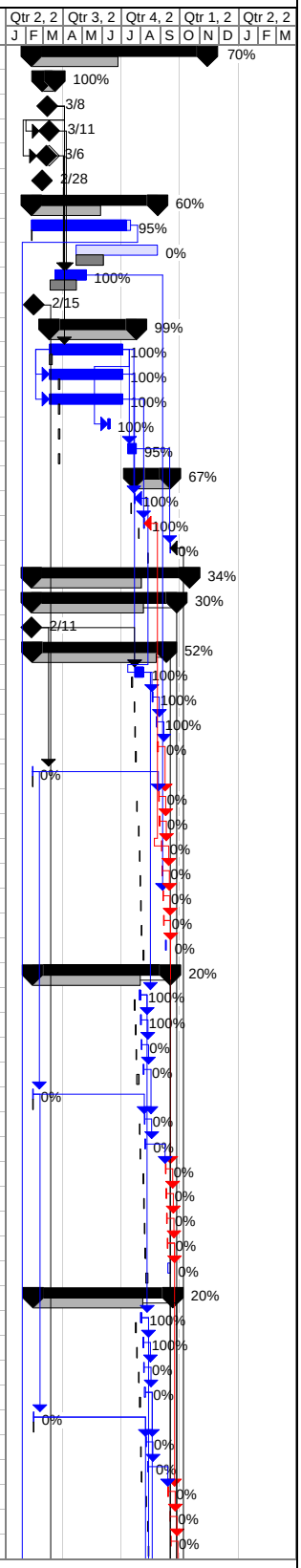
Roles:
- **Project Engineer** - works with the Schedule Coordinator to closeout the project files
- **Schedule Coordinator** - works with project personnel to closeout the project files; provides a summary of our degree of success in meeting our estimates
- **Production Manager** - ensures that Device Service Records are up-to-date
- **All others** - ensure that their records are appropriately closed out

Process Flow Diagram



IQD New Design with Potted Coils

ID	Task Name	Responible	Duration	Start	Finish	% Comp	Predecessors
1	**IQD254**		**195 days**	**2/11/02**	**11/13/02**	**70%**	
2	**Design effort**	**Robotham**	**13.81 days**	**2/28/02**	**3/19/02**	**100%**	
3	Magnet designed	Robotham	1 day	3/8/02	3/8/02	100%	
4	Curing tooling designed	Robotham	6.81 days	3/11/02	3/19/02	100%	3
5	Potting tub designed	Robotham	0 days	3/6/02	3/6/02	100%	3
6	Final Design review	Robotham	1 day	2/28/02	2/28/02	100%	
7	**Procurement**	**Alsip**	**140 days**	**2/11/02**	**8/27/02**	**60%**	
8	Magnet assembly parts available	Alsip	110 days	2/11/02	7/16/02	95%	
9	Fiberglass tape	Schmidt	90 days	4/22/02	8/27/02	0%	
10	Curing tooling modification / tub fab'd	Alsip	35 days	3/19/02	5/7/02	100%	4,5
11	Stacking tooling available	Alsip	1 day	2/15/02	2/15/02	100%	
12	**Traveler development**	**Blowers**	**97 days**	**3/11/02**	**7/25/02**	**99%**	
13	Winding traveler	Cullen	82 days	3/11/02	7/3/02	100%	3
14	Coil prep traveler	Cullen	82 days	3/11/02	7/3/02	100%	13SS
15	Impregnation traveler	Cullen	82 days	3/11/02	7/3/02	100%	13SS
16	Core stacking traveler	Cullen	3 days	6/11/02	6/13/02	100%	13FS+5 days
17	Final assembly traveler	Cullen	10 days	7/12/02	7/25/02	95%	13FS+5 days
18	**Readiness reviews**	**Blowers**	**40 days**	**7/22/02**	**9/17/02**	**67%**	
19	Winding	Blowers	1 day	7/22/02	7/23/02	100%	13,26SF
20	Potting & curing	Blowers	1 day	8/6/02	8/7/02	100%	15,33SF
21	Final assembly	Blowers	1 day	9/16/02	9/17/02	0%	17,90SF
22	**Production**	**D Smith**	**175 days**	**2/11/02**	**10/16/02**	**34%**	
23	**Coil work**	**D Smith**	**161 days**	**2/11/02**	**9/26/02**	**30%**	
24	Copper available	Alsip	1 day	2/11/02	2/11/02	100%	
25	**Coil 1**	**D Smith**	**148 days**	**2/12/02**	**9/10/02**	**52%**	
26	Wind coil	D Smith	10 days	7/23/02	8/5/02	100%	24,14
27	Prep main coils	D Smith	1 day	8/19/02	8/19/02	100%	26
28	Blast main coils	D Smith	1 day	8/26/02	8/26/02	100%	27
29	Insulate main coils	D Smith	2 days	8/27/02	8/28/02	0%	28
30	Wind trim coils	D Smith	1 day	2/12/02	2/12/02	0%	24
31	Assemble trim coils to main coils	D Smith	1 day	8/29/02	8/29/02	0%	30,29
32	Insulation overwrap	D Smith	1 day	8/30/02	8/30/02	0%	31
33	Position coils in cure tooling	D Smith	1 day	9/3/02	9/3/02	0%	32
34	Impregnate coils	D Smith	1 day	9/4/02	9/4/02	0%	33
35	Cure impregnated assembly	D Smith	1 day	9/5/02	9/5/02	0%	34,10
36	Liberate coils from tooling	D Smith	1 day	9/6/02	9/6/02	0%	35
37	Clean up and inspect coil package	D Smith	2 days	9/9/02	9/10/02	0%	36
38	**Coil 2**	**D Smith**	**151 days**	**2/13/02**	**9/16/02**	**20%**	
39	Wind coil	D Smith	2 days	7/30/02	7/31/02	100%	26
40	Prep main coils	D Smith	1 day	8/1/02	8/1/02	100%	39
41	Blast main coils	D Smith	1 day	8/2/02	8/2/02	0%	40
42	Insulate main coils	D Smith	2 days	8/5/02	8/6/02	0%	41
43	Wind trim coils	D Smith	1 day	2/13/02	2/13/02	0%	30
44	Assemble trim coils to main coils	D Smith	1 day	8/7/02	8/7/02	0%	43,42
45	Insulation overwrap	D Smith	1 day	8/8/02	8/8/02	0%	44
46	Position coils in cure tooling	D Smith	1 day	9/9/02	9/9/02	0%	45,36
47	Impregnate coils	D Smith	1 day	9/10/02	9/10/02	0%	46
48	Cure impregnated assembly	D Smith	1 day	9/11/02	9/11/02	0%	47
49	Liberate coils from tooling	D Smith	1 day	9/12/02	9/12/02	0%	48
50	Clean up and inspect coil package	D Smith	2 days	9/13/02	9/16/02	0%	49
51	**Coil 3**	**D Smith**	**154 days**	**2/14/02**	**9/20/02**	**20%**	
52	Wind coil	D Smith	2 days	8/1/02	8/2/02	100%	39
53	Prep main coils	D Smith	1 day	8/5/02	8/5/02	100%	52
54	Blast main coils	D Smith	1 day	8/6/02	8/6/02	0%	53
55	Insulate main coils	D Smith	2 days	8/7/02	8/8/02	0%	54
56	Wind trim coils	D Smith	1 day	2/14/02	2/14/02	0%	43
57	Assemble trim coils to main coils	D Smith	1 day	8/9/02	8/9/02	0%	56,55
58	Insulation overwrap	D Smith	1 day	8/12/02	8/12/02	0%	57
59	Position coils in cure tooling	D Smith	1 day	9/13/02	9/13/02	0%	49,58
60	Impregnate coils	D Smith	1 day	9/16/02	9/16/02	0%	59
61	Cure impregnated assembly	D Smith	1 day	9/17/02	9/17/02	0%	60

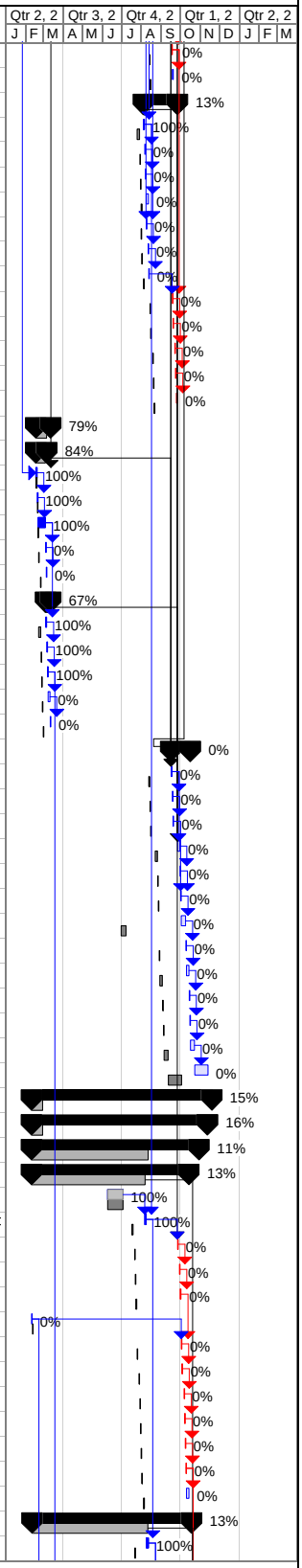


Project: IQD Potted Coil Magnet
Date: 10/1/02

Critical		Baseline		Project Summary	
Critical Split		Baseline Split		External Tasks	
Critical Progress		Baseline Milestone		External Milestone	
Task		Milestone		Deadline	
Split		Summary Progress			
Task Progress		Summary			

IQD New Design with Potted Coils

ID	Task Name	Responible	Duration	Start	Finish	% Comp	Predecessors
62	Liberate coils from tooling	D Smith	1 day	9/18/02	9/18/02	0%	61
63	Clean up and inspect coil package	D Smith	2 days	9/19/02	9/20/02	0%	62
64	**Coil 4**	**D Smith**	**38 days**	**8/5/02**	**9/26/02**	**13%**	
65	Wind coil	D Smith	2 days	8/5/02	8/6/02	100%	52
66	Prep main coils	D Smith	1 day	8/7/02	8/7/02	0%	65
67	Blast main coils	D Smith	1 day	8/8/02	8/8/02	0%	66
68	Insulate main coils	D Smith	2 days	8/9/02	8/12/02	0%	67
69	Wind trim coils	D Smith	1 day	8/9/02	8/9/02	0%	56,55
70	Assemble trim coils to main coils	D Smith	1 day	8/12/02	8/12/02	0%	69
71	Insulation overwrap	D Smith	1 day	8/13/02	8/13/02	0%	70
72	Position coils in cure tooling	D Smith	1 day	9/19/02	9/19/02	0%	62,71
73	Impregnate coils	D Smith	1 day	9/20/02	9/20/02	0%	72
74	Cure impregnated assembly	D Smith	1 day	9/23/02	9/23/02	0%	73
75	Liberate coils from tooling	D Smith	1 day	9/24/02	9/24/02	0%	74
76	Clean up and inspect coil package	D Smith	2 days	9/25/02	9/26/02	0%	75
77	**Core work**	**D Smith**	**16.81 days**	**2/18/02**	**3/12/02**	**79%**	
78	**1st core**	**D Smith**	**12.81 days**	**2/18/02**	**3/6/02**	**84%**	
79	Stack core	D Smith	2 days	2/18/02	2/19/02	100%	11,8
80	Weld core	D Smith	1 day	2/20/02	2/20/02	100%	79
81	Inspect	Proc Eng	7.81 days	2/21/02	3/4/02	100%	80
82	Prepaint (non-welded areas)	D Smith	1 day	3/4/02	3/5/02	0%	81
83	Install insulation	D Smith	1 day	3/5/02	3/6/02	0%	82
84	**2nd core**	**D Smith**	**6 days**	**3/4/02**	**3/12/02**	**67%**	
85	Stack core	D Smith	2 days	3/4/02	3/6/02	100%	81
86	Weld core	D Smith	1 day	3/6/02	3/7/02	100%	85
87	Inspect	Proc Eng	1 day	3/7/02	3/8/02	100%	86
88	Prepaint (non-welded areas)	D Smith	1 day	3/8/02	3/11/02	0%	87
89	Install insulation	D Smith	1 day	3/11/02	3/12/02	0%	88
90	**Coil/core assembly**	**D Smith**	**22 days**	**9/17/02**	**10/16/02**	**0%**	
91	Position coils in 1st core	D Smith	2 days	9/17/02	9/18/02	0%	25,38,78
92	Various inspections	Proc Eng	1 day	9/19/02	9/19/02	0%	91
93	Star tube in lower assembly	D Smith	1 day	9/20/02	9/20/02	0%	92
94	Position coils in 2nd core	D Smith	2 days	9/27/02	9/30/02	0%	51,64,84,91
95	Various inspections	Proc Eng	1 day	10/1/02	10/1/02	0%	94
96	Assemble magnet halves	D Smith	1 day	10/2/02	10/2/02	0%	95,93
97	Corona test	D Smith	5 days	10/3/02	10/9/02	0%	96
98	Weld magnet assembly	D Smith	1 day	10/10/02	10/10/02	0%	97
99	Manifolding	D Smith	2 days	10/11/02	10/14/02	0%	98
100	Paint exterior of magnet	D Smith	1 day	10/15/02	10/15/02	0%	99
101	Final inspection	Proc Eng	1 day	10/16/02	10/16/02	0%	100
102	MTF	Glass	5 days	10/17/02	10/23/02	0%	101
103	Contingency	All	15 days	10/24/02	11/13/02	0%	102
104	**IQD255**		**199 days**	**2/11/02**	**11/19/02**	**15%**	
105	**Production**	**D Smith**	**194 days**	**2/11/02**	**11/12/02**	**16%**	
106	**Coil work**	**D Smith**	**185 days**	**2/11/02**	**10/30/02**	**11%**	
107	**Coil 1**	**D Smith**	**173 days**	**2/11/02**	**10/14/02**	**13%**	
108	Wind		18 days	6/10/02	7/3/02	100%	
109	Wind coil	D Smith	2 days	8/7/02	8/8/02	100%	65,\\tdserver1\prc
110	Prep main coils	D Smith	1 day	9/27/02	9/27/02	0%	109,23
111	Blast main coils	D Smith	1 day	9/30/02	9/30/02	0%	110
112	Insulate main coils	D Smith	2 days	10/1/02	10/2/02	0%	111
113	Wind trim coils	D Smith	1 day	2/11/02	2/11/02	0%	
114	Assemble trim coils to main coils	D Smith	1 day	10/3/02	10/3/02	0%	112,113
115	Insulation overwrap	D Smith	1 day	10/4/02	10/4/02	0%	114
116	Position coils in cure tooling	D Smith	1 day	10/7/02	10/7/02	0%	115
117	Impregnate coils	D Smith	1 day	10/8/02	10/8/02	0%	116
118	Cure impregnated assembly	D Smith	1 day	10/9/02	10/9/02	0%	117
119	Liberate coils from tooling	D Smith	1 day	10/10/02	10/10/02	0%	118
120	Clean up and inspect coil package	D Smith	2 days	10/11/02	10/14/02	0%	119
121	**Coil 2**	**D Smith**	**176 days**	**2/12/02**	**10/18/02**	**13%**	
122	Wind coil	D Smith	2 days	8/9/02	8/12/02	100%	109

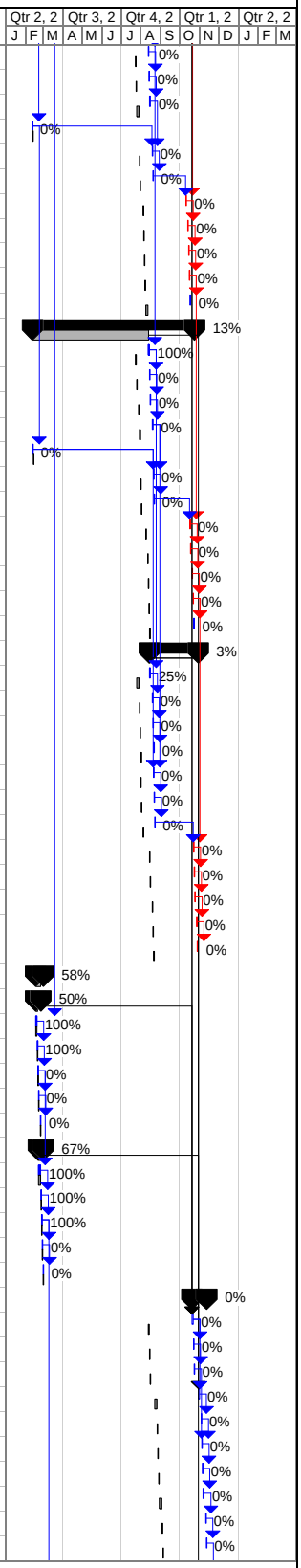


Project: IQD Potted Coil Magnet
Date: 10/1/02

Critical		Baseline		Project Summary	
Critical Split		Baseline Split		External Tasks	
Critical Progress		Baseline Milestone		External Milestone	
Task		Milestone		Deadline	
Split		Summary Progress			
Task Progress		Summary			

IQD New Design with Potted Coils

ID	Task Name	Responible	Duration	Start	Finish	% Comp	Predecessors
123	Prep main coils	D Smith	1 day	8/13/02	8/13/02	0%	122
124	Blast main coils	D Smith	1 day	8/14/02	8/14/02	0%	123
125	Insulate main coils	D Smith	2 days	8/15/02	8/16/02	0%	124
126	Wind trim coils	D Smith	1 day	2/12/02	2/12/02	0%	113
127	Assemble trim coils to main coils	D Smith	1 day	8/19/02	8/19/02	0%	125,126
128	Insulation overwrap	D Smith	1 day	8/20/02	8/20/02	0%	127
129	Position coils in cure tooling	D Smith	1 day	10/11/02	10/11/02	0%	119,128
130	Impregnate coils	D Smith	1 day	10/14/02	10/14/02	0%	129
131	Cure impregnated assembly	D Smith	1 day	10/15/02	10/15/02	0%	130
132	Liberate coils from tooling	D Smith	1 day	10/16/02	10/16/02	0%	131
133	Clean up and inspect coil package	D Smith	2 days	10/17/02	10/18/02	0%	132
134	**Coil 3**	**D Smith**	**179 days**	**2/13/02**	**10/24/02**	**13%**	
135	Wind coil	D Smith	2 days	8/13/02	8/14/02	100%	122
136	Prep main coils	D Smith	1 day	8/15/02	8/15/02	0%	135
137	Blast main coils	D Smith	1 day	8/16/02	8/16/02	0%	136
138	Insulate main coils	D Smith	2 days	8/19/02	8/20/02	0%	137
139	Wind trim coils	D Smith	1 day	2/13/02	2/13/02	0%	126
140	Assemble trim coils to main coils	D Smith	1 day	8/21/02	8/21/02	0%	138,139
141	Insulation overwrap	D Smith	1 day	8/22/02	8/22/02	0%	140
142	Position coils in cure tooling	D Smith	1 day	10/17/02	10/17/02	0%	132,141
143	Impregnate coils	D Smith	1 day	10/18/02	10/18/02	0%	142
144	Cure impregnated assembly	D Smith	1 day	10/21/02	10/21/02	0%	143
145	Liberate coils from tooling	D Smith	1 day	10/22/02	10/22/02	0%	144
146	Clean up and inspect coil package	D Smith	2 days	10/23/02	10/24/02	0%	145
147	**Coil 4**	**D Smith**	**54 days**	**8/15/02**	**10/30/02**	**3%**	
148	Wind coil	D Smith	2 days	8/15/02	8/16/02	25%	135
149	Prep main coils	D Smith	1 day	8/19/02	8/19/02	0%	148
150	Blast main coils	D Smith	1 day	8/20/02	8/20/02	0%	149
151	Insulate main coils	D Smith	2 days	8/21/02	8/22/02	0%	150
152	Wind trim coils	D Smith	1 day	8/21/02	8/21/02	0%	138,139
153	Assemble trim coils to main coils	D Smith	1 day	8/22/02	8/22/02	0%	152
154	Insulation overwrap	D Smith	1 day	8/23/02	8/23/02	0%	153
155	Position coils in cure tooling	D Smith	1 day	10/23/02	10/23/02	0%	145,154
156	Impregnate coils	D Smith	1 day	10/24/02	10/24/02	0%	155
157	Cure impregnated assembly	D Smith	1 day	10/25/02	10/25/02	0%	156
158	Liberate coils from tooling	D Smith	1 day	10/28/02	10/28/02	0%	157
159	Clean up and inspect coil package	D Smith	2 days	10/29/02	10/30/02	0%	158
160	**Core work**	**D Smith**	**10 days**	**2/18/02**	**3/1/02**	**58%**	
161	**1st core**	**D Smith**	**6 days**	**2/18/02**	**2/25/02**	**50%**	
162	Stack core	D Smith	2 days	2/18/02	2/19/02	100%	87
163	Weld core	D Smith	1 day	2/20/02	2/20/02	100%	162
164	Inspect	Proc Eng	1 day	2/21/02	2/21/02	0%	163
165	Prepaint (non-welded areas)	D Smith	1 day	2/22/02	2/22/02	0%	164
166	Install insulation	D Smith	1 day	2/25/02	2/25/02	0%	165
167	**2nd core**	**D Smith**	**6 days**	**2/22/02**	**3/1/02**	**67%**	
168	Stack core	D Smith	2 days	2/22/02	2/25/02	100%	164
169	Weld core	D Smith	1 day	2/26/02	2/26/02	100%	168
170	Inspect	Proc Eng	1 day	2/27/02	2/27/02	100%	169
171	Prepaint (non-welded areas)	D Smith	1 day	2/28/02	2/28/02	0%	170
172	Install insulation	D Smith	1 day	3/1/02	3/1/02	0%	171
173	**Coil/core assembly**	**D Smith**	**17 days**	**10/21/02**	**11/12/02**	**0%**	
174	Position coils in 1st core	D Smith	2 days	10/21/02	10/22/02	0%	107,121,161
175	Various inspections	Proc Eng	1 day	10/23/02	10/23/02	0%	174
176	Star tube in lower assembly?	D Smith	1 day	10/24/02	10/24/02	0%	175
177	Position coils in 2nd core	D Smith	2 days	10/31/02	11/1/02	0%	134,147,167,174
178	Various inspections	Proc Eng	1 day	11/4/02	11/4/02	0%	177
179	Assemble magnet halves	D Smith	1 day	11/5/02	11/5/02	0%	176,178
180	Weld magnet assembly	D Smith	1 day	11/6/02	11/6/02	0%	179
181	Manifolding	D Smith	2 days	11/7/02	11/8/02	0%	180
182	Paint exterior of magnet	D Smith	1 day	11/11/02	11/11/02	0%	181
183	Final inspection	Proc Eng	1 day	11/12/02	11/12/02	0%	182

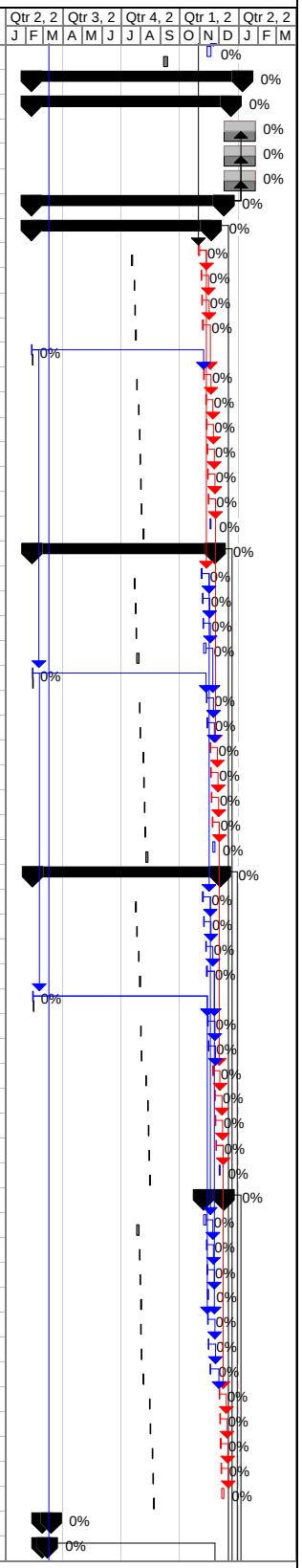


Project: IQD Potted Coil Magnet
Date: 10/1/02

Critical		Baseline		Project Summary	
Critical Split		Baseline Split		External Tasks	
Critical Progress		Baseline Milestone		External Milestone	
Task		Milestone		Deadline	
Split		Summary Progress			
Task Progress		Summary			

IQD New Design with Potted Coils

ID	Task Name	Responible	Duration	Start	Finish	% Comp	Predecessors
184	MTF	Glass	5 days	11/13/02	11/19/02	0%	183
185	**IQD256**		**225 days**	**2/11/02**	**1/7/03**	**0%**	
186	**Production**	**D Smith**	**220 days**	**2/11/02**	**12/20/02**	**0%**	
187	Spare IQD coil set #1		27 days	12/10/02	1/27/03	0%	190
188	Spare IQD coil set #1		27 days	12/10/02	1/27/03	0%	190
189	Spare IQD coil set #1		27 days	12/10/02	1/27/03	0%	190
190	**Coil work**	**D Smith**	**211 days**	**2/11/02**	**12/9/02**	**0%**	
191	**Coil 1**	**D Smith**	**199 days**	**2/11/02**	**11/19/02**	**0%**	
192	Wind coil	D Smith	2 days	10/31/02	11/1/02	0%	147
193	Prep main coils	D Smith	1 day	11/4/02	11/4/02	0%	192
194	Blast main coils	D Smith	1 day	11/5/02	11/5/02	0%	193
195	Insulate main coils	D Smith	2 days	11/6/02	11/7/02	0%	194
196	Wind trim coils	D Smith	1 day	2/11/02	2/11/02	0%	
197	Assemble trim coils to main coils	D Smith	1 day	11/8/02	11/8/02	0%	195,196
198	Insulation overwrap	D Smith	1 day	11/11/02	11/11/02	0%	197
199	Position coils in cure tooling	D Smith	1 day	11/12/02	11/12/02	0%	198
200	Impregnate coils	D Smith	1 day	11/13/02	11/13/02	0%	199
201	Cure impregnated assembly	D Smith	1 day	11/14/02	11/14/02	0%	200
202	Liberate coils from tooling	D Smith	1 day	11/15/02	11/15/02	0%	201
203	Clean up and inspect coil package	D Smith	2 days	11/18/02	11/19/02	0%	202
204	**Coil 2**	**D Smith**	**202 days**	**2/12/02**	**11/25/02**	**0%**	
205	Wind coil	D Smith	2 days	11/4/02	11/5/02	0%	192
206	Prep main coils	D Smith	1 day	11/6/02	11/6/02	0%	205
207	Blast main coils	D Smith	1 day	11/7/02	11/7/02	0%	206
208	Insulate main coils	D Smith	2 days	11/8/02	11/11/02	0%	207
209	Wind trim coils	D Smith	1 day	2/12/02	2/12/02	0%	196
210	Assemble trim coils to main coils	D Smith	1 day	11/12/02	11/12/02	0%	208,209
211	Insulation overwrap	D Smith	1 day	11/13/02	11/13/02	0%	210
212	Position coils in cure tooling	D Smith	1 day	11/18/02	11/18/02	0%	202,211
213	Impregnate coils	D Smith	1 day	11/19/02	11/19/02	0%	212
214	Cure impregnated assembly	D Smith	1 day	11/20/02	11/20/02	0%	213
215	Liberate coils from tooling	D Smith	1 day	11/21/02	11/21/02	0%	214
216	Clean up and inspect coil package	D Smith	2 days	11/22/02	11/25/02	0%	215
217	**Coil 3**	**D Smith**	**205 days**	**2/13/02**	**12/3/02**	**0%**	
218	Wind coil	D Smith	2 days	11/6/02	11/7/02	0%	205
219	Prep main coils	D Smith	1 day	11/8/02	11/8/02	0%	218
220	Blast main coils	D Smith	1 day	11/11/02	11/11/02	0%	219
221	Insulate main coils	D Smith	2 days	11/12/02	11/13/02	0%	220
222	Wind trim coils	D Smith	1 day	2/13/02	2/13/02	0%	209
223	Assemble trim coils to main coils	D Smith	1 day	11/14/02	11/14/02	0%	221,222
224	Insulation overwrap	D Smith	1 day	11/15/02	11/15/02	0%	223
225	Position coils in cure tooling	D Smith	1 day	11/22/02	11/22/02	0%	215,224
226	Impregnate coils	D Smith	1 day	11/25/02	11/25/02	0%	225
227	Cure impregnated assembly	D Smith	1 day	11/26/02	11/26/02	0%	226
228	Liberate coils from tooling	D Smith	1 day	11/27/02	11/27/02	0%	227
229	Clean up and inspect coil package	D Smith	2 days	12/2/02	12/3/02	0%	228
230	**Coil 4**	**D Smith**	**20 days**	**11/8/02**	**12/9/02**	**0%**	
231	Wind coil	D Smith	2 days	11/8/02	11/11/02	0%	218
232	Prep main coils	D Smith	1 day	11/12/02	11/12/02	0%	231
233	Blast main coils	D Smith	1 day	11/13/02	11/13/02	0%	232
234	Insulate main coils	D Smith	2 days	11/14/02	11/15/02	0%	233
235	Wind trim coils	D Smith	1 day	11/14/02	11/14/02	0%	221,222
236	Assemble trim coils to main coils	D Smith	1 day	11/15/02	11/15/02	0%	235
237	Insulation overwrap	D Smith	1 day	11/18/02	11/18/02	0%	236
238	Position coils in cure tooling	D Smith	1 day	12/2/02	12/2/02	0%	228,237
239	Impregnate coils	D Smith	1 day	12/3/02	12/3/02	0%	238
240	Cure impregnated assembly	D Smith	1 day	12/4/02	12/4/02	0%	239
241	Liberate coils from tooling	D Smith	1 day	12/5/02	12/5/02	0%	240
242	Clean up and inspect coil package	D Smith	2 days	12/6/02	12/9/02	0%	241
243	**Core work**	**D Smith**	**10 days**	**2/28/02**	**3/13/02**	**0%**	
244	**1st core**	**D Smith**	**6 days**	**2/28/02**	**3/7/02**	**0%**	



Project: IQD Potted Coil Magnet
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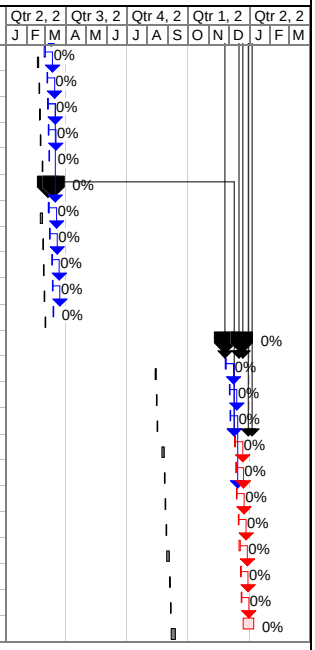
Critical		Baseline		Project Summary	
Critical Split		Baseline Split		External Tasks	
Critical Progress		Baseline Milestone		External Milestone	
Task		Milestone		Deadline	
Split		Summary Progress			
Task Progress		Summary			

IQD New Design with Potted Coils

ID	Task Name	Responible	Duration	Start	Finish	% Comp	Predecessors
245	Stack core	D Smith	2 days	2/28/02	3/1/02	0%	170
246	Weld core	D Smith	1 day	3/4/02	3/4/02	0%	245
247	Inspect	Proc Eng	1 day	3/5/02	3/5/02	0%	246
248	Prepaint (non-welded areas)	D Smith	1 day	3/6/02	3/6/02	0%	247
249	Install insulation	D Smith	1 day	3/7/02	3/7/02	0%	248
250	**2nd core**	**D Smith**	**6 days**	**3/6/02**	**3/13/02**	**0%**	
251	Stack core	D Smith	2 days	3/6/02	3/7/02	0%	247
252	Weld core	D Smith	1 day	3/8/02	3/8/02	0%	251
253	Inspect	Proc Eng	1 day	3/11/02	3/11/02	0%	252
254	Prepaint (non-welded areas)	D Smith	1 day	3/12/02	3/12/02	0%	253
255	Install insulation	D Smith	1 day	3/13/02	3/13/02	0%	254
256	**Coil/core assembly**	**D Smith**	**17 days**	**11/26/02**	**12/20/02**	**0%**	
257	Position coils in 1st core	D Smith	2 days	11/26/02	11/27/02	0%	191,204,244
258	Various inspections	Proc Eng	1 day	12/2/02	12/2/02	0%	257
259	Star tube in lower assembly?	D Smith	1 day	12/3/02	12/3/02	0%	258
260	Position coils in 2nd core	D Smith	2 days	12/10/02	12/11/02	0%	217,230,250,257
261	Various inspections	Proc Eng	1 day	12/12/02	12/12/02	0%	260
262	Assemble magnet halves	D Smith	1 day	12/13/02	12/13/02	0%	259,261
263	Weld magnet assembly	D Smith	1 day	12/16/02	12/16/02	0%	262
264	Manifolding	D Smith	2 days	12/17/02	12/18/02	0%	263
265	Paint exterior of magnet	D Smith	1 day	12/19/02	12/19/02	0%	264
266	Final inspection	Proc Eng	1 day	12/20/02	12/20/02	0%	265
267	MTF	Glass	5 days	12/23/02	1/7/03	0%	266



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Critical Progress		Baseline Milestone		External Milestone	
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Task Progress		Summary			

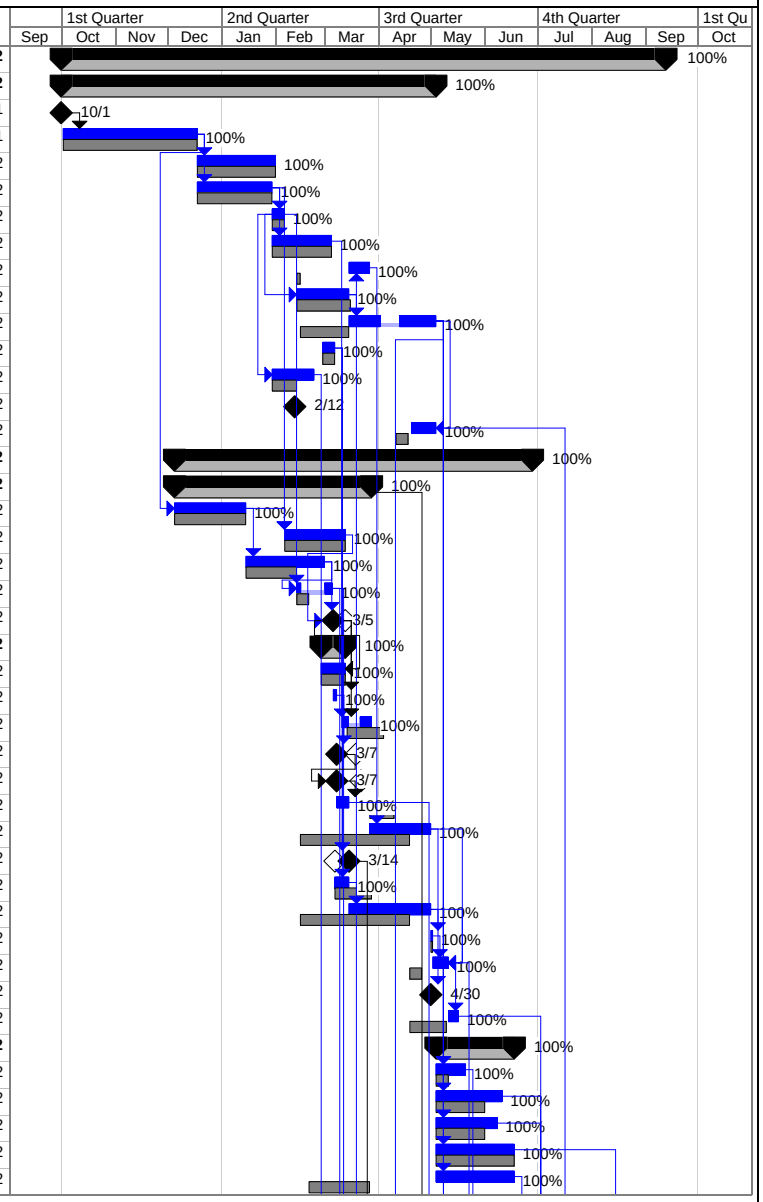
Status Through----------	Jul-02
WDF 0170	
IQC & D Magnets	

Produce 4 IQC and 4 IQD magnets plus 5 coil sets of each using the potted coil configuration (v. potted magnet).

				Actual Cost + Obligations		Estimate To Complete		Estimated Cost At Completion	% of Estimate at Completion	Original Estimate
Labor And M&S				**$ 277,348**				**$ 727,121**	**119%**	**$ 610,079**
Labor	$ 65	$ 36	$ 22	**$ 150,320**	**100%**			**$ 558,535**	**141%**	**$ 395,162**
monthly	791			**$ 51,212**						
weekly		2451.5		**$ 89,120**						
Contract Labor			463.5	**$ 9,988**						
	M hrs	W hrs	C hrs			M hrs	W hrs			
Eng and Des	592	699		**$ 63,739**	**42%**	320	40	**$ 85,910**		
Contract Labor										
Battista, M		477								
Belko, P										
Borissov, E										
Brown, H		222								
Davis, G										
Jablonski, J										
Kashikin, V										
Makarov, S										
Robatham, W	592									
Zielbauer, G										
Travelers	78	322.5		**$ 16,774**	**11%**	40	400	**$ 33,905**		
Contract Labor										
Blowers, J										
Cullen, M		235.5								
Gardner, T		87								
Jensen, R	78									
Tooling		117		**$ 4,253**	**3%**	40	300	**$ 17,749**		
Assell, D		8								
Connolly, D		10								
Elementi, L										
Robatzak, W		48								
Smith, R		14								
Strysik, S		37								
Production	121	1113.5	463.5	**$ 58,301**	**39%**	380	8600	**$ 395,541**		
Contract Labor			463.5							
Brooks, H		108								
Gallo, P										
Hill, R		174.5								
Jones, J		141.5								
Ostrum, W		54								
Phelps, M		152								
Pribyl, C		240.5								
Samayavong, I		162								
Sanchez, P		33								
Sanchez, S										
Schmitt, J		48								
Smith, D	121									
Sorensen, D										
Inspection, production		190		**$ 6,907**	**5%**		500	**$ 25,084**		
Contract Labor										
Gaw, D		71								
Szal, J		119								
Inspection, incoming		9.5		**$ 345**	**0%**			**$ 345**		
Contract Labor										
Beale										
Ghanta										
Juravic										
Merkler		9.5								
Riley										
M&S				**$ 127,029**	**100%**		hours	**$ 168,586**	**78%**	**$ 214,917**
Machine shop		136.00		$ 6,800	**5%**			$ 6,800		
Welders		83		$ 4,150	**3%**		96	$ 8,950		
						$$$				
38 **spec. proc. spares**				$ 19,244	**15%**	**36757**		$ 56,001		
40 **stores issue**				$ 453	**0%**			$ 453		
41 **material purchases**				$ 38,710	**30%**			$ 38,710		
43 **Sub -Contract services**								$ -		
50 **Freight**				$ 1,608	**1%**			$ 1,608		
77 **Fab procurement**				$ 56,064	**44%**			$ 56,064		
51 **Fees**								$ -		

Booster Septum - BSE

ID		Task Name	Responible	Duration	Start	Finish	% Comp	Predecesso	Base Fin
1	✓	**BSE102**		**238 days**	**10/1/01**	**9/12/02**	**100%**		**7/11/02**
2	✓	**Design**	**Makarov**	**146.81 days**	**10/1/01**	**5/3/02**	**100%**		**3/14/02**
3	✓	Discuss preliminary design	Makarov	1 day	10/1/01	10/1/01	100%		10/1/01
4	✓	Lamination for bid	Makarov	55 days	10/2/01	12/17/01	100%	3	12/17/01
5	✓	Preliminary design review	Makarov	25 days	12/18/01	1/31/02	100%	4	1/31/02
6	✓	Final lamination design	Makarov	23 days	12/18/01	1/29/02	100%	4	1/29/02
7	✓	Lamination sheared blanks	Makarov	5 days	1/30/02	2/5/02	100%	6	2/5/02
8	✓	End laminations	Makarov	24 days	1/30/02	3/4/02	100%	6	3/4/02
9	✓	Brazed inner conductor	Makarov	8 days	3/14/02	3/26/02	100%	10	2/14/02
10	✓	Brazed outer conductor	Makarov	21.81 days	2/13/02	3/14/02	100%	7SS+10 day	3/15/02
11	✓	Balance of detail drawings	Makarov	27 days	3/14/02	5/3/02	100%	10	3/14/02
12	✓	Corona test core & conductor	Makarov	5 days	2/28/02	3/6/02	100%		3/6/02
13	✓	Lamination stacking tooling	Makarov	17.81 days	1/30/02	2/22/02	100%	7SS	2/12/02
14	✓	Final Design Review	Makarov	1 day	2/12/02	2/12/02	100%		2/12/02
15	✓	Power lead termination	Makarov	10 days	4/19/02	5/3/02	100%	11FF	4/17/02
16	✓	**Procurement**	**Steinke**	**138.31 days**	**12/5/01**	**6/28/02**	**100%**		**5/16/02**
17	✓	**Laminations**	**Steinke**	**72.81 days**	**12/5/01**	**3/27/02**	**100%**		**4/9/02**
18	✓	Bid & award die fabrication	Steinke	22 days	12/5/01	1/14/02	100%	4	1/14/02
19	✓	Fabricate stamping die	Steinke	25 days	2/6/02	3/12/02	100%	6FS+5 days	3/12/02
20	✓	Procure lamination steel	Steinke	32 days	1/15/02	2/28/02	100%	18	2/12/02
21	✓	Vendor provides sheared blanks	Steinke	5 days	2/13/02	3/5/02	100%	7,20	2/19/02
22	✓	Stamp sample laminations	Steinke	0 days	3/5/02	3/5/02	100%	19,20	3/13/02
23	✓	**Inspect samples**	**Steinke**	**10 days**	**2/27/02**	**3/12/02**	**100%**		**3/18/02**
24	✓	Preprogram lam coordinates	Steinke	10 days	2/27/02	3/12/02	100%	22SF	3/13/02
25	✓	Perform inspection	Steinke	2 days	3/5/02	3/7/02	100%	22	3/18/02
26	✓	Procure End laminations	Steinke	8 days	3/11/02	3/27/02	100%	8,22	4/3/02
27	✓	Adjust die & re-submit samples	Steinke	0 days	3/7/02	3/7/02	100%	25	3/21/02
28	✓	Inspect sample laminations	Steinke	0 days	3/7/02	3/7/02	100%	27	3/26/02
29	✓	Stamp laminations	Steinke	5 days	3/7/02	3/14/02	100%	28	4/9/02
30	✓	Inner copper conductor	Steinke	25 days	3/26/02	4/30/02	100%	9	4/18/02
31	✓	Corona test core	Steinke	0 days	3/14/02	3/14/02	100%	12	3/13/02
32	✓	Test conductor	Steinke	5.81 days	3/7/02	3/14/02	100%	12	3/27/02
33	✓	Outer conductor	Steinke	33 days	3/14/02	4/30/02	100%	10	4/18/02
34	✓	Braze tooling	Steinke	1 day	4/30/02	5/1/02	100%	33	5/1/02
35	✓	Vacuum braze conductor	Steinke	7 days	5/1/02	5/10/02	100%	33FF,30FF,	4/25/02
36	✓	Procure ground cutter for septum	Steinke	0 days	4/30/02	4/30/02	100%	30	4/30/02
37	✓	Final conductor machining	Steinke	4 days	5/10/02	5/16/02	100%	35	5/9/02
38	✓	**Procure fabricated components**	**Steinke**	**30 days**	**5/3/02**	**6/17/02**	**100%**		**5/9/02**
39	✓	Inner conductor insulator	Steinke	11 days	5/3/02	5/20/02	100%	11	5/10/02
40	✓	Sagitta plate	Steinke	25 days	5/3/02	6/10/02	100%	11	5/31/02
41	✓	Bal of vacuum plates	Steinke	24 days	5/3/02	6/7/02	100%	11	5/31/02
42	✓	Bal of fabricated parts	Steinke	30 days	5/3/02	6/17/02	100%	11	6/17/02
43	✓	Procure purchase parts	Steinke	30 days	5/3/02	6/17/02	100%	11	3/26/02

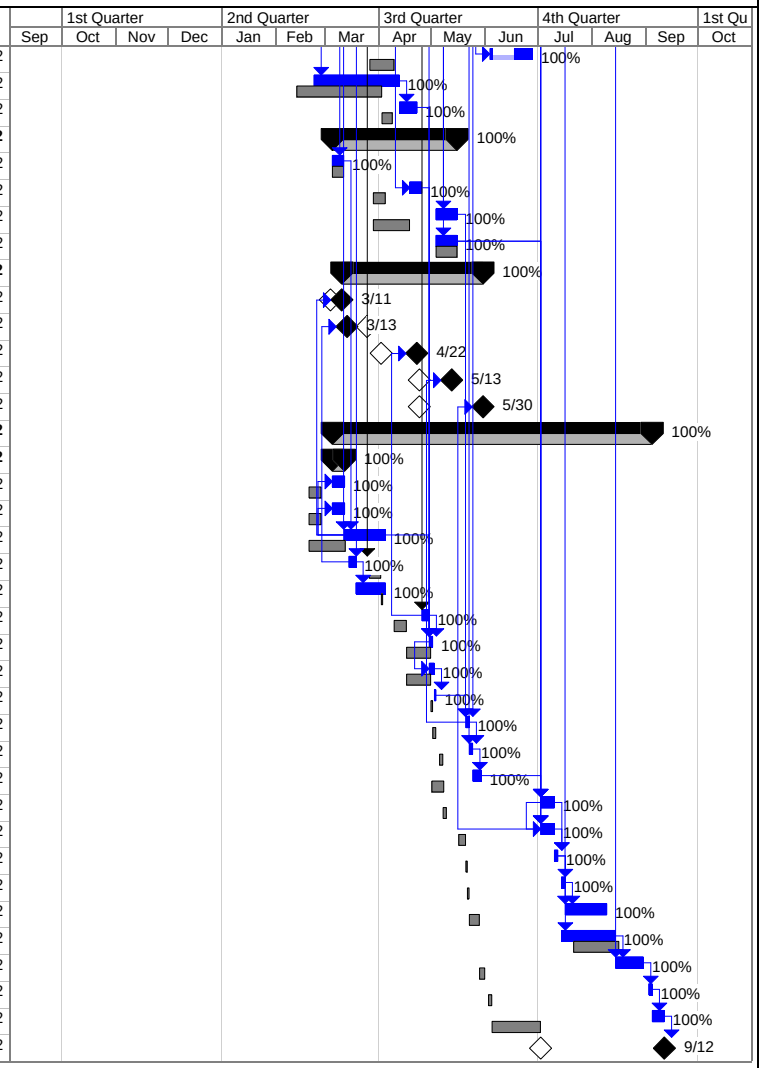


Project: Booster Pulsed Septum
Date: 10/1/02

Critical	Split	Baseline Milestone	Project Summary
Critical Split	Task Progress	Milestone	External Tasks
Critical Progress	Baseline	Summary Progress	External Milestone
Task	Baseline Split	Summary	Deadline

Booster Septum - BSE

ID	Task Name	Responible	Duration	Start	Finish	% Comp	Predecesso	Base Fin
44	Residual purchased components	Steinke	10 days	6/3/02	6/28/02	100%	43	4/9/02
45	Procure tooling	Steinke	35 days	2/22/02	4/12/02	100%	13	4/2/02
46	Inspect tooling	Steinke	6 days	4/12/02	4/22/02	100%	45	4/8/02
47	**Develop production travelers**	**Cullen**	**51.31 days**	**3/5/02**	**5/15/02**	**100%**		**3/5/02**
48	Practice lamination stack	Cullen	4.31 days	3/5/02	3/11/02	100%	21	3/11/02
49	Lamination stacking	Cullen	5 days	4/18/02	4/25/02	100%	11	4/4/02
50	Inner assembly	Cullen	8 days	5/3/02	5/15/02	100%	11	4/18/02
51	Final assembly	Cullen	8 days	5/3/02	5/15/02	100%	11	5/15/02
52	**Readiness review**	**Blowers**	**57.81 days**	**3/11/02**	**5/30/02**	**100%**		**3/12/02**
53	Practice lamination stacks	Blowers	3.81 days	3/11/02	3/14/02	100%	62SS-1 day	3/5/02
54	Assemble corona test core	Blowers	1 day	3/13/02	3/14/02	100%	63SS-1 day	3/26/02
55	Lamination stacking	Blowers	1 day	4/22/02	4/23/02	100%	65SS-1 day	4/3/02
56	Inner assembly	Blowers	1 day	5/13/02	5/13/02	100%	69SS-1 day	4/25/02
57	Final assembly	Blowers	0 days	5/30/02	5/30/02	100%	73SS-1 day	4/25/02
58	**Production**	**D Smith**	**128.5 days**	**3/5/02**	**9/4/02**	**100%**		**6/4/02**
59	**Tooling set-up**	**D Smith**	**5 days**	**3/5/02**	**3/12/02**	**100%**		**3/19/02**
60	Clean-o-mat	D Smith	5 days	3/5/02	3/12/02	100%	62SS	2/26/02
61	Epoxy coater	D Smith	5 days	3/5/02	3/12/02	100%	62SS	2/26/02
62	Practice stack with sheared blanks	D Smith	18 days	3/12/02	4/4/02	100%	21,48	3/12/02
63	Assemble corona test core & conduct	Makarov	2 days	3/14/02	3/18/02	100%	31,32	4/2/02
64	Corona test on test core	D Smith	13 days	3/18/02	4/4/02	100%	63	4/3/02
65	Clean laminations	D Smith	2 days	4/26/02	4/29/02	100%	17	4/16/02
66	Coat Lams with epoxy	D Smith	1.81 days	4/30/02	5/1/02	100%	29,49,46,62	4/30/02
67	Wet stack lam core (multi iterations)	D Smith	2.81 days	4/30/02	5/2/02	100%	66SS	4/30/02
68	Inspect core	Proc Eng	1 day	5/2/02	5/3/02	100%	67	5/1/02
69	Install core insulator	D Smith	2 days	5/20/02	5/22/02	100%	68,50,39	5/3/02
70	Install inner conductor	D Smith	2 days	5/22/02	5/24/02	100%	35,69	5/7/02
71	Corona test core w/ inner conductor	D Smith	2 days	5/24/02	5/29/02	100%	70	5/8/02
72	Install & weld outer conductor	D Smith	5 days	7/3/02	7/10/02	100%	71,37,51	5/9/02
73	Prep/insulate vacuum box	D Smith	5 days	7/3/02	7/10/02	100%	41,40,51,72	5/20/02
74	Position core in vacuum box	D Smith	2 days	7/11/02	7/12/02	100%	73,72	5/21/02
75	Various inspections	Proc Eng	2 days	7/15/02	7/16/02	100%	74	5/22/02
76	Assemble & weld vacuum box	D Smith	18 days	7/17/02	8/9/02	100%	75,15	5/28/02
77	Remanufacture PEEK tubes		23 days	7/15/02	8/14/02	100%	74	8/16/02
78	Complete cooling circuit	D Smith	12 days	8/15/02	8/30/02	100%	42,77	5/31/02
79	Final inspection	Proc Eng	2 days	9/3/02	9/4/02	100%	78	6/4/02
80	Contingency time	All	5 days	9/5/02	9/11/02	100%	79	7/2/02
81	Ship Finished Device		1 day	9/12/02	9/12/02	100%	80	7/3/02



Project: Booster Pulsed Septum
Date: 10/1/02

Critical
Critical Split
Critical Progress
Task
Split
Task Progress
Baseline
Baseline Split
Baseline Milestone
Milestone
Summary Progress
Summary
Project Summary
External Tasks
External Milestone
Deadline

Status Through----------	Jul-02
FDZ	0176
Pulsed Septum	

Design and fabricate one complete unit and purchase parts for four additional units

				Actual Cost + Obligations		Estimate To Complete		Estimated Cost At Completion	% of Estimate at Completion	Original Estimate
Labor And M&S				**$ 324,706**				**$ 333,337**	**118%**	**$ 282,000**
Labor	$ 54	$ 36	$ 47	**$ 161,177**	**100%**			**$ 164,508**	**90%**	**$ 182,000**
monthly	1587			**$ 85,859**						
weekly		2052.3		**$ 74,377**						
Contract Labor			20	**$ 941**						
	M hrs	W hrs	C hrs			M hrs	W hrs			
Eng and Des	1476	593.5		**$ 101,362**	**63%**	8	16	**$ 102,375**		
Contract Labor										
Battista, M										
Belko, P		220								
Borissov, E										
Brown, H										
Davis, G	298									
Jablonski, J		373.5								
Kashikin, V	234									
Makarov, S	488									
Robatham, W										
Zielbauer, G	456									
Travelers		496		**$ 17,975**	**11%**		12	**$ 18,410**		
Contract Labor										
Blowers, J										
Cullen, M		164								
Gardner, T		256								
Klyukhina, Y		76								
Jensen, R										
Tooling		159.5		**$ 5,780**	**4%**			**$ 5,780**		
Assell, D		33								
Elementi, L										
Robatzak, W		9								
Smith, R		21								
Strysik, S		96.5								
Production	111	523.5	20	**$ 25,919**	**16%**	4	32	**$ 27,295**		
Contract Labor			20							
Brooks, H		7								
Gallo, P										
Hill, R		21								
Jones, J		47.5								
Ostrum, W		19								
Phelps, M		36								
Pribyl, C		104								
Samayavong, I		137								
Sanchez, P		96								
Sanchez, S		4								
Schmitt, J		52								
Smith, D	111									
Sorensen, D										
Inspection, production		74		**$ 2,682**	**2%**		10	**$ 3,044**		
Contract Labor										
Gaw, D		30								
Szal, J		44								
Inspection, incoming		205.8		**$ 7,458**	**5%**		4	**$ 7,603**		
Contract Labor										
Beale										
Ghanta		110								
Juravic		16								
Merkler		56								
Riley		23.8								
M&S				**$ 163,529**	**100%**		hours	**$ 168,829**	**169%**	**$ 100,000**
Machine shop		799.25		$ 42,651	**26%**			$ 42,651		
Welders		63		$ 3,362	**2%**		16	$ 4,162		
						$$$				
38 **spec. proc. spares**				$ 878	**1%**			$ 878		
40 **stores issue**								$ -		
41 **material purchases**				$ 18,068	**11%**	1500		$ 19,568		
43 **Sub -Contract services**								$ -		
50 **Freight**				$ 1,535	**1%**	500		$ 2,035		
77 **Fab procurement**				$ 94,786	**58%**	2500		$ 97,286		
51 **Fees**				$ 2,250	**1%**			$ 2,250		