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ALS Project Management Manual

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ALS PROJECT MANAGEMENT MANUAL

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Contents

Introduction

This manual has been prepared to help establish a consistent baseline of management practices across all ALS projects. It describes the initial process of planning a project, with a specific focus on the production of a formal project plan. We feel that the primary weakness in ALS project management efforts to date stems from a failure to appreciate the importance of 'up-front' project planning. In this document, we present a guide (with examples!) to preparing the documents necessary to properly plan, monitor, and control a project's activities. While following the manual will certainly not guarantee good project management, failure to address the issues we raise will dramatically reduce the chance of success. Here we define success as meeting the technical goals on schedule and within the prescribed budget.

Project Plan Overview

Conceptually, a project plan is simple–what are the objectives and deliverables, how much will it cost, how long will it take. To be complete, it should also include information about how the project will be managed and controlled. For example, how will progress be measured and reported and who will approve changes via what process?

In general, preparation of the project plan is the responsibility of the Project Manager *(see Roles and Responsibilities)*. For the plan to be worthwhile, however, it should embody input from as many members of the team as is practical—the stakeholders, scientists, engineers, designers, etc., who have a real interest in the project.

Normally the team will be starting with more than a blank sheet of paper. The essential scope of work, total budget, funding profile, and even a completion date may already be in the minds of the sponsor. In fact, some of these elements might even be 'hard' constraints. In any case, these data form the outline of an initial plan. The project team will have to perform its own analyses to assess the likelihood of success (risk of failure) embodied within this plan and then propose any necessary modifications. This point is critical—if team members don't believe in the plan, don't agree that it represents reality—they will neither 'own' it nor feel particularly responsible for making it a success. Why bother if the project is doomed to failure?

The plan should address, using a graded approach, (matching the level of effort to the project's scale or importance) all of the elements discussed in this manual. The resulting document will then contain the technical, cost, and schedule baselines against which the project team should be held accountable. In addition, its preparation will force the team to think about the important issues of planning and control.

While the amount of time and effort needed to produce the plan will vary depending upon the project's size and complexity as well as the availability of staff, work on the plan should begin at the very inception of the project. It is unreasonable to set the baselines at this point, but it is dangerous to wait too long. There is an inevitable temptation to put off preparation of the plan until late (or much later) in the project's life—resist this. It is said that 90% of failed projects fail in the beginning, this failure being inextricably linked to inadequate planning. We suggest that no activities other than those related to

No plan equals no control.

conceptual and preliminary design be started before the project plan is complete. Certainly there should be no detail design, no procurements, and no fabrication efforts undertaken, and generally, no more than five percent of a project's budget should have been spent before the plan is finished. □

Statement of Work

Purpose

The statement of work (SOW) is the central pillar on which the project plan is built. It forms the basis for an agreement between the project team and the project customer (or sponsor) by identifying both the project objectives and the major project deliverables. The SOW also provides a documented basis for making future project decisions and for developing or confirming a common understanding of the project's scope among the stakeholders. At a minimum, a scope statement is needed so that you know when the project is done!

Format

The aim should be to produce a short (several-page) statement that details the project objectives and deliverables in a manner that allows team members, sponsors, and other interested parties to readily understand the project's goals. It is especially important that the conditions representing project completion are specified fully and clearly.

Don't confuse the SOW with a conceptual design report (CDR)—they are not the same thing. If a CDR is required, its production should be planned along with the rest of the project activities. In fact, it might be included as one of the deliverables listed in the SOW! But it takes too long to prepare a CDR to try to include it in the project plan.

There is frequently a tension between the desire for a clear definition of a project's scope and the realities of the typical R&D-rich projects common at the ALS. It is sometimes difficult for the scientific staff to provide enough detail to satisfy the requirements normally expected in a detailed scope statement written in the early stages of a project. If this is the case, then it is vital that clear boundaries be drawn around the R&D portion, while the rest of the project is detailed in a conventional fashion. In addition, the assumptions underpinning the planned R&D activities must be clearly stated.

The more defined the statement of work, the more complete and accurate the work breakdown structure (WBS) can be. This is an important point. If the work scope is hazy, unclear, and/or incomplete, the rest of the project plan is suspect. A sample SOW follows. □

Super Bends Project
Baseline Scope

Rev. August 27, 1999
Change Number :____

This document shall serve to define the core scope of the Super Bend Project.

The scope includes the design, test, fabrication and installation of three super conducting dipole magnets to replace the center bend magnets in sectors 4, 8 and 12. These magnets shall produce a peak field of 6 Tesla which will generate a 10^0 bend in the electron beam. The magnets shall be cooled by a cryocooler and shall utilize dewars as a back up system.

The scope includes design, fabrication, testing and installation of 6 QDA magnets (one on either side of each new super bend magnet) which will replace the defocusing component of the removed center bend magnets.

The scope includes the design, procurement and installation of a separate power supply for each pair of QFA magnets that are immediately upstream and downstream of the new super bend magnet.

The scope includes development of a magnet measurement system and performing magnet measurements on the new quadrupoles and the super conducting dipole magnets.

The scope includes the design, purchase and installation of all utilities, controls and diagnostics necessary to install and operate the above noted equipment.

Work Breakdown Structure

Purpose

The work breakdown structure (WBS) is an outline numbering system which organizes and defines the total project scope, with each descending level representing an increasingly detailed definition of a project component. A successful WBS will identify all of the activities that need to be accomplished, or conversely, "If it's not in the WBS, it's not in the project." The WBS then provides a common basis for preparing the rest of the project documentation, including the estimate and schedule, and for subsequent tracking of project activities.

Format

As the name suggests, the WBS provides a structure into which the project's scope of work can be broken down. The overall project is considered to be Level 1. Each of the project's major subsystems are identified and assigned a separate Level 2 designation. Common descriptions for the various levels of a WBS, moving from the highest to the lowest, are project, subproject, function or process, activity, task, and subtask.

Because the WBS will be used to assign project IDs (cost accounts), consideration should be given to how the cost information should be broken out for project status tracking as well as for recovering cost information at some later date. Each section should contain the relevant categories, including engineering and design (EDI), fabrication, procurement, and assembly. Installation can be included with each subsystem or summarized in a separate WBS category.

As a rule, the level of detail for each section should be commensurate with the significance of the work (i.e., more importance requires more detail). Large projects can have up to six or eight levels, but paths need not all go to the same depth. A sample WBS follows. □

Identify all activities to measurable detail.

HHMI Beamlines Draft WBS

WBS #	Description	Rev. 1/31/00
1.1	**Project Management**	
1.2	**Front End**	
1.2.1	ED&I	
1.2.2	VVR-1 Assembly	
1.2.3	PS Assembly	
1.2.4	PSS Assembly	
1.2.5	Installation	
1.3	**Beamlines**	
1.3.1	M1	
1.3.1.1	EDI	
1.3.1.2	Fabrication/Procurements	
1.3.1.3	Assemble & Installation	
1.3.2	Misc. Beamline Components	
1.3.2.1	ED&I	
1.3.2.2	Vacuum Components & Stands	
1.3.2.3	Radiation Shielding	
1.3.2.4	Diagnostics	
1.3.2.5	Misc. Mechanical Utilities	
1.3.2.6	Assembly/Installation	
1.3.3	Monochromator	
1.3.3.1	ED&I	
1.3.3.2	Monochromator Procurement	
1.3.3.3	Crystals	
1.3.3.4	Sagittal Bender	
1.3.3.5	Assembly/Installation	
1.3.4	M2 Mirror	
1.3.4.1	ED&I	
1.3.4.2	Fabrication/Procurements	
1.3.4.3	Assembly/Installation	
1.4	**End Station**	
1.4.1	ED&I	
1.4.2	Swing Arm	
1.4.3	Hutch (no account)	
1.4.4	Assembly/Installation	
1.5	**Electrical, EPS & RSS**	
1.5.1	Power & Raceway	
1.5.2	EPS	
1.5.3	RSS	
1.6	**Controls**	
1.7	**Super Bend**	

Schedule

Purpose

One of the defining characteristics of a project, and what differentiates project efforts from operations, is the fact that a project has a well-defined endpoint. The schedule portion of a project plan should document the activities that lead up to, and ultimately culminate in, project completion. A schedule is necessary to

- communicate to the project team what has been agreed upon;
- communicate to management when resources are needed;
- communicate scope and methods of procurement;
- identify time-critical activities;
- define/establish logic ties among activities; and
- provide a means to measure progress.

Format

To be complete, the schedule must contain at least three pieces of information for each activity: a description or name, a duration in either workdays or elapsed time, and relationships to other activities (i.e., which, if any, must precede and which must follow). It should be clear how each activity chain tracks all the way through to the completion of the project and how each separate chain is related to the others. Because, in many cases, our projects are engineering-resource-limited, schedules are often built around the sequence of activities for particular project personnel working on long-lead items (for example, designer A will detail this part first and then that one second). The level of detail described in the schedule should be well matched to the complexity of the project. It can vary from a simple one-pager with a few key milestones to a resource-loaded-several-hundred-activity-critical-path behemoth. Schedules for on-going ALS projects are posted on the ALS Intranet Web site under the Project Management link. These schedules can be used as a resource for actual times and activities of similar projects.

Once the initial information has been entered into Microsoft Project 98, the current ALS standard scheduling package, the critical path should be displayed and the entire schedule analyzed to confirm the most efficient use of resources. For example, are the most critical and long-lead-time activities scheduled appropriately? Corrections and adjustments should be made as necessary and then the schedule should be redistributed to the project team for additional input. Once the team is satisfied (possibly requiring two or three

The first rule of planning is "be prepared to replan."

more versions), the schedule should be broadly distributed to stakeholders and posted on the ALS Project Management Web site. ALS Project Office staff will provide whatever assistance is required to facilitate any part of this process.

A few words about milestones — they are important. They can provide a simple, clear metric for measuring progress and status. It is a good idea to choose them carefully so that they are both meaningful and achievable. Analyze the schedule and select activities of consequence — activities that, when complete, represent real progress to members of the team. When the schedule process is complete, the project should have a list of key milestones, perhaps one every other month, which can be used to easily monitor project progress.

Since no schedule remains static, the updating process is critical. The schedule and milestones should be reviewed monthly and complete schedule updates should be made either quarterly or semiannually. The following point is also covered in the Reporting section for emphasis: it is vitally important that all interested parties be kept apprised of real schedule expectations. When there are delays — and there will be — make sure that project team members, and the sponsor/customer, are kept up to date on changes to key milestone dates and/or project completion. A sample schedule follows. □

Cost Estimate

Purpose

One of the cornerstones of the project plan is the cost estimate. A realistic baseline estimate is important so that a) the sponsor has the information necessary to make an informed decision about whether or not to pursue the project and b) adequate funding can be secured. At regular intervals throughout the life of the project, estimates-to-complete (ETC) should be prepared to evaluate the financial health of the project. We recognize that a more conservative approach would have the estimate produced at the completion of design, but such a condition is almost never possible. The baselines (technical, schedule, and cost) are needed at a reasonably early stage in order to set the boundaries within which the project's activities should remain.

Guidelines

The estimate should be a realistic evaluation of the expected costs and thus should be neither optimistic nor pessimistic. (Expected costs related to uncertainty and risk should be included in a separate estimate of contingency, which becomes part of the overall project budget.) The base estimate should include all costs *directly* attributable to the project, including material, labor, and project management, as well as the costs that are *indirectly* related, including overheads and escalation.

Format

The following sample estimate shows the preferred format for a cost estimate. Some historical material cost information can be obtained from the ALS cost database (located on the ALS Web site). Other sources include vendor quotations, supplier catalogues, and engineering estimates. Materials should be estimated based on current-year costs. The labor rate look-up table is updated by the ALS Budget Office each year based on published rates from support divisions (Engineering and Facilities) and represents average current-year salaries and overhead rates. This table can be obtained in electronic form from the ALS Project Management Web site.

Assumptions should be clearly defined at the bottom of the estimate. Escalation should be added to the bottom line of the estimate based on the DOE guidelines listed on the ALS Web site.

Contingency should be estimated at the appropriate WBS level to adequately describe the cost uncertainty and/or risk. (See the Risk section for further details.) The entire contingency budget is held by the Project Manager and allocated through the change control process. (See the Change Control section for further details.)

Estimate-to-Complete (ETC)

At regular intervals, perhaps every six months, an estimate-to-complete should be prepared. In almost all cases, these estimates will be much quicker and easier to prepare than was the original estimate. The current estimate is used as a basis and is modified so that it only contains estimated costs for the work remaining. Special attention should be paid to job orders that are in process and purchase orders that have been liened so that they are accounted for properly. Costs should be updated where appropriate to reflect new information, including price changes, new quantities, modified scope, etc. *Note:* Formal change requests should be submitted for any estimate changes that exceed the thresholds detailed in the project's change control procedure. ☐

BeamLine 11.0.2 - MES
Cost Estimate

		MATERIAL								LABOR						TOTALS		
	Cost Basis: ose - outside shop estimate, vq - vendor quote, cp- catalog price,eu - estimate undocumente se - shop 77 estimate, pe-previous experience	Unit Meas	Material No. Units	Cost Basis	Unit Cost	Total Material K$	Labor No. Units	Labor Unit Hours	Labor Total Hours	Craft Code	Labor Rate $/Hr.	Total Labor K$	Total Labor + Material	Overhead Total	Sub Total	Cntng %	Cntng K$	Totals K$
1.3	**Front End**					**287.92**						**204.67**	**492.59**	**73.47**	**566.1**	**15%**	**84.9**	**650.97**
1.3.1	EDI (Mech + Elect)																	
	Mechanical												113.5					
1	SR Vac Cbr Protect Eng.(CC) - See EPU estimate																	
2	SR Vac Cbr Protect Des.(KR) - See EPU estimate																	
3	FE LO-Inc. Str & Brems. Eng (JC)						1	200	200	ME	72.67	14.53	**14.53**					
4	FE LO-Inc. Str & Brems. Des (CC)						1	320	320	MD	50.06	16.02	**16.02**					
5	Update FE Spec. Eng.(JC)						1	120	120	ME	72.67	8.72	**8.72**					
6	Update FE Spec. Des. (KR)						1	160	160	MD	50.06	8.01	**8.01**					
7	Place & Monitor Orders Eng (JC)						1	160	160	ME	72.67	11.63	**11.63**					
8	Place & Monitor Orders Des.(KR)						1	80	80	MD	50.06	4.00	**4.00**					
9	Travel 6 Trips	ea	6	eu	2,000	12.00							**12.00**					
10	Shield wall Penetration Eng (JC)						1	40	40	ME	72.67	2.91	**2.91**					
11	Shield wall Penetration Des.(KR)						1	60	60	MD	50.06	3.00	**3.00**					
12	Det/Assy/Install Dwgs Eng (JC)						1	40	40	ME	72.67	2.91	**2.91**					
13	Det/Assy/Install Dwgs Des (CC-KR)						1	260	260	MD	50.06	13.02	**13.02**					
14	Miscel Eng (JC)						1	120	120	ME	72.67	8.72	**8.72**					
15	Miscel Des (CC-KR)						1	160	160	MD	50.06	8.01	**8.01**					
	Electrical												**43.37**					
16	PSS Electrical (Art R.)						1	250	250	EC	51.99	13.00	**13.00**					
17	Electrical Facilities (Barry B.)						1	224	224	EC	51.99	11.65	**11.65**					
18	EPS (Ken W.)						1	160	160	EC	51.99	8.32	**8.32**					
19	EPS programming						1	160	160	CP	65.08	10.41	**10.41**					
						12.00						**144.85**						
1.3.2	First Isolation Valve (VVR1)																	
1.3.2.1	Aperature Plate (AP001)												5.32					
1	Aperture Upstream Flange, 10" REM	ea	1	eu	100	0.10	1.0	14.0	14	MS	51.40	0.72	**0.82**					
2	Aperture Downstream Flange, 8" CF	ea	1	cp	110	0.11	1.0	8.0	8	MS	51.40	0.41	**0.52**					
3	Aperture, Copper Plate, water cooled	ea	1	eu	150	0.15	1.0	24.0	24	MS	51.40	1.23	**1.38**					
4	Protective cover	ea	2	eu	10	0.02	2.0	1.0	2	MU	38.06	0.08	**0.10**					
5	Inspection						1.0	1.0	1	MU	38.06	0.04	**0.04**					
6	UHV Clean parts prior to brazing	set	1	eu	20	0.02	3.0	1.0	3	MB	51.40	0.15	**0.17**					
7	Fixturing & Brazing of Assembly (existing f	assy	1	eu	50	0.05	1.0	16.0	16	MS	51.40	0.82	**0.87**					
8	REM Seal Fabrication	ea	1	eu	10	0.01	2.0	4.0	8	MS	51.40	0.41	**0.42**					
9	Vacuum & Water Leak Check	assy	1	eu	50	0.05	1.0	6.0	6	MU	38.06	0.23	**0.28**					
10	Misc Fixturing & Hardware	set	1	eu	200	0.20	1.0	10.0	10	MS	51.40	0.51	**0.71**					
						0.71						**4.61**						
1.3.2.2	Bellows Assy (B1)												**4.19**					
1	Welded Bellows Assy. with 8"CF, Flanges	ea	1	eu	2,200	2.20	1.0	2.0	2	LI	45.53	0.09	**2.29**					
2	Inspection						1.0	4.0	4	MS	51.40	0.21	**0.21**					

Page 5
File Name = CostEstSample.xls, Printed on 5/15/00
Tom Henderson

Change Control

Purpose

The control of change is absolutely crucial to the ultimate success of a project. It is also one of the most difficult tasks facing the project team. An otherwise perfectly reasonable plan can be rendered worthless if the team ignores the dangers inherent in unmanaged and uncontrolled change. A typical project team may be faced with decisions regarding a few suggested improvements to a major system, or more commonly, to a long series of small, seemingly innocuous 'good ideas' whose implementation could result in the project being late and over budget. The concept here is not to try to prohibit changes – that is an unreasonable approach. A project is a dynamic enterprise and change is natural and expected. But since a project involves commitments to a customer normally made under fixed constraints (funds, schedule, effort, etc.), change must be managed to serve the project's (read *customer's*) interests.

Guidelines

Managing change requires a reasonable level of formality, starting with documentation of the requested change, including a justification and description of any technical, cost, and/or schedule impacts. Further, the process should include formal review, approval, implementation, and tracking procedures.

Of course, every project change should not trigger this level of control. Good management practice teaches that a graded approach should be used. But in this case, because control of change is so critical, the graded approach should be written down and codified in a formal procedure based on thresholds that, once breached, trigger the formal change control process. For example, the trigger for the formal process could be set for any change that causes a slip in a major milestone equal to or greater than one month or that causes an increase in cost equal to or greater than $25k at WBS level two. In all cases, the appropriate thresholds for each project should be established in consultation with the customer.

Sample forms follow. □

ALS Project Change Authorization Procedure

Rev 8/25/99

Purpose

The purpose of this procedure is to define how the Change Authorization form is to be completed and to define the limits of the Change Authorization process.

Process

The Change Authorization form can be initiated by anyone on the project who identifies a change in the scope, schedule or budget that would affect a project baseline beyond the threshold limits noted below. The completed form must be approved by the Project Lead Engineer, Project Manager, and Project Leader. The form is then given to the Project Coordinator for assignment of a change number, logging and distribution.

At the start of the project the Project Lead Engineer, Project Manager, Project Leader and Project Coordinator will work together with the project team to develop a project core scope document (defining the important deliverables for the project), project baseline schedule (including milestones) and a project Total Estimated Cost (TEC). These items will then be approved by ALS Management and will define the project baseline against which all changes will be made.

Thresholds

The Change Authorization form must be filled out and approved before any of the following thresholds are exceeded:

1) An increase of $25K or more to any of the WBS level 2 categories. This increase will be deducted from the approved contingency funds for the project.

2) A delay in the completion of any of the baseline milestones greater than 1 month.

3) Any change to the project core scope document.

4) Any change to the project TEC or to the project completion date must be approved by ALS Management.

Berkeley Lab
ALS Planning and Administration

Super Bends Project
Change Authorization

Rev: April 1, 2000

Change Number: ____________

Change Originated By: ____________

Change Description:

Change Justification:

Schedule Change (current and revised milestone dates [see attached]**):**

Budget Change Description:

Approvals:

Project Lead Engineer: ______________________ R. Schlueter ________ Date

Project Manager: ______________________ J. Krupnick ________ Date

Project Leader: ______________________ D. Robin ________ Date

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Copies: A. Paterson

Risk Management

Purpose

Risk can be defined as any uncertain event that, should it occur, would have an effect on achieving the objectives. This introduces the dual nature of risk: uncertainty (defined as the probability that a risk might occur) and effect (the potential impact on objectives if the risk does occur). The goal we are seeking is the active management of project risk. The chances of project success can be improved by minimizing the potentially negative effects of uncertainty.

Process

While individuals or small groups of engineers and scientists routinely address instances of technical uncertainty as they arise, we recommend a more focused and deliberate approach. Much of this process could take place at one or two dedicated 'brainstorming' sessions attended by team members as well as other appropriate personnel. Participants should make a deliberate effort to identify all sources of risk, objectively analyze their significance (probability and impact if they should occur), prioritize the events according to probability × impact, plan an appropriate response for each event, and then assign responsibility for each response. The results of this process should be written down and then included in the project plan. This process will only be truly effective if the responses are actually carried out—they must be managed along with the rest of regular project activities.

There are typically four strategic responses to risk:

- **Avoid**—eliminate uncertainty (change scope, choose different design or vendor, etc.).
- **Transfer**—transfer responsibility or liability to a third party (contract to vendor or other Lab, buy insurance, etc.).
- **Mitigate**—reduce the size of the risk exposure (order spare, add 2nd designer, etc.).
- **Accept**—recognize residual risk, plan to monitor and control (contingency planning, risk budget, schedule contingency, etc.).

Most responses to project risk at the ALS will fall into the last two categories. This means that active management of risk is required throughout the life of the project. □

Manage the risk and the project will take care of itself.

Reporting

Purpose

The project team should regularly report the status of project work, including technical progress, schedule/milestone performance, and costs to date. While everyone likes to report good news, it is bad news that ALS management most needs to hear. For example, it is often the case that the problems that arise during the life of a project are related to resources in one way or another—either an insufficient quantity is made available, or they are made available too late. It is even sometimes true that the need for resources changes from what had originally been planned. ALS management has the ability *and the responsibility* to help deal with these sorts of issues. But the project team must alert management as soon as possible so that solutions can be found to keep the project on track.

Format

A monthly reporting frequency is appropriate for most ALS projects. An hour-long meeting attended by members of the project team, ALS project management staff, and any other customers is a good setting for discussion. Particular attention should be given to open issues of concern: technical challenges, missed milestones, scope changes, etc. As was stated above, an open and frank discussion of issues is necessary—the earlier a problem surfaces, the better. These meetings should always feature at least a short discussion of schedule and cost performance. It is important to specifically direct attention to these areas lest people's natural interest in the technical details causes them to forget the sum total of their responsibilities. *The project team owes it to the customer to be honest about important issues that may affect the project's outcome.*

In a general sense, it helps to write things down. This is especially true in project work because communication among team members (and with interested parties) is so critical.

Therefore, it is appropriate for the Project Manager (or designee) to prepare, each month, a short written report that summarizes the project's status, including technical, cost, schedule, and milestone issues.

On the cost reporting side, even though we don't have detailed budgets for each activity broken down on a monthly basis, it is still useful to let people know how much money is being spent each month. It is surprising

What gets measured gets done.

how often staff are unaware of the spending rate generated by tasks for which they are responsible. Frequently, even a simple monthly cost report sorted by Project ID (cost account) provides enough information to alert the responsible party if there is a problem. ALS Project Office staff can provide substantial help in setting up a Project ID structure that parallels the WBS and is useful for generating cost reports. □

Roles and Responsibilities

Purpose

It is important to specify roles and responsibilities for project team members—people need to have a clear picture of what is expected, as well as what are the limits of their authority. The project team has been mentioned several times, but how is such a group constituted? The project management part of the team consists of a project leader or project scientist, project manager, and project or lead engineer. The project teams themselves usually include multiple engineers, designers, coordinators, and technicians and are often assisted by members of the ALS Project Office.

Details

1. Project Leader (PL). *External focus:* The PL is responsible for achievement of the project objectives, including all technical performance, cost, and schedule goals. The PL will also represent the project in interactions with ALS management and any outside users/customers. *Internal focus:* The PL is responsible for providing the overall scientific vision and technical goals to the project team. The PL is responsible for approving the project plan.
2. Project Manager (PM). The PM has primary responsibility for planning, organizing, and controlling the project in order to meet the goals as specified by the PL. To this end, the PM will prepare, for PL approval, a project plan that includes the following documentation: scope of work, work breakdown structure, schedule with milestones, cost estimates, change control procedures, and status reports. The PM will monitor and control costs and schedules in accordance with the project plan in order to meet project objectives. The PM's responsibility for beamline projects extends through the successful completion of the Beamline Readiness Review (BRR).
3. Project Engineer(s) (PE). PEs are responsible for the technical integrity of project deliverables, as well as for meeting cost and schedule objectives. PEs have responsibility for managing the engineering effort, including design supervision, engineering staff assignments, and preparation of engineering documentation, including specifications, design analyses, cost estimates, schedules, design reviews, etc.

Ninety precent of project management is managing people.

For many of our projects, one person will hold two of these assignments. For example, the PL and PM or the PM and PE roles may be performed by the same person. Also, there may be more than one PE assigned to any one particular project.

Members of the ALS Project Office will monitor the cost and schedule performance of all ALS projects. They will also be involved in project management activities as required to support the efficiency of project work. □

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