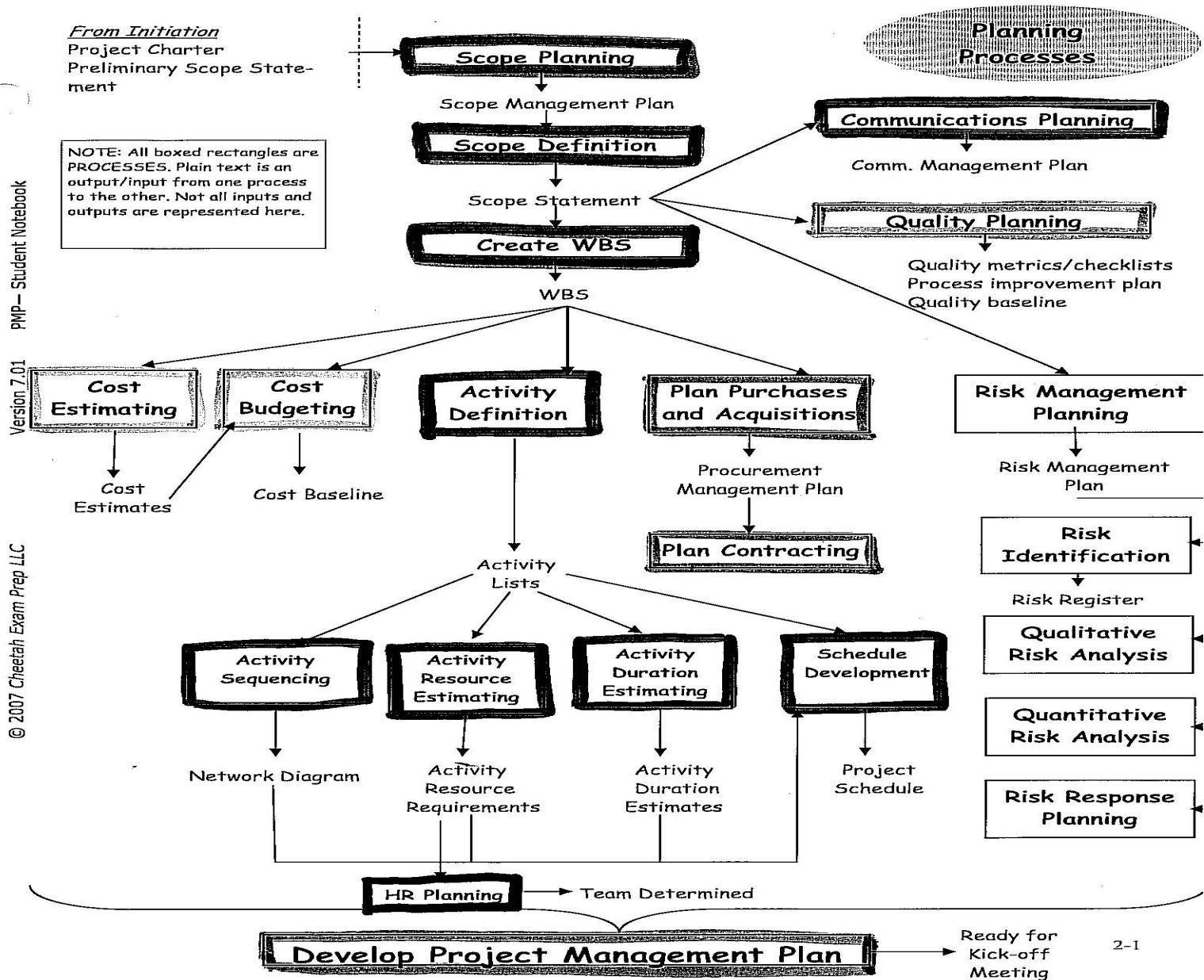


# Project Time Management

## Project Phases and the Areas of Knowledge

	Project Phases				
Areas of Knowledge	Initiation	Planning	Execution	Control	Closure
<b>Project Mgmt Integration</b>	Develop Project Charter Develop Prelim Project Scope Statement	Develop Project Mgmt Plan	Direct and Manage Project Execution	Monitor and Control Project Work Integrated Change Control	Close Project
<b>Project Scope Mgmt</b>		Scope Planning Scope Definition Create WBS		Scope Verification Scope Control	
<b>Project Time Mgmt</b>		<b>Activity Definition Activity Sequencing Activity Resource Estimating Activity Duration Estimating Schedule Development</b>		<b>Schedule Control</b>	
<b>Project Cost Mgmt</b>		Cost Estimating Cost Budgeting		Cost Control	
<b>Project Quality mgmt</b>		Quality Planning	Perform Quality Assurance	Perform Quality Control	
<b>Project Human Resource Mgmt</b>		Human Resource Planning	Acquire Project Team Develop Project Team	Manage Project Team	
<b>Project Communications mgmt</b>		Communications Planning	Information Distribution	Performance Reporting Manage Stakeholders	
<b>Project Risk Mgmt</b>		Risk Management Planning Risk Identification Qualitative risk Analysis Quantitative Risk Analysis Risk Response Planning		Risk Monitoring and Control	
<b>Project Procurement Mgmt</b>		Plan Purchases and Requisitions Plan Contracting	Request Seller Responses Select Sellers	Contract Administration	Contract Closeout



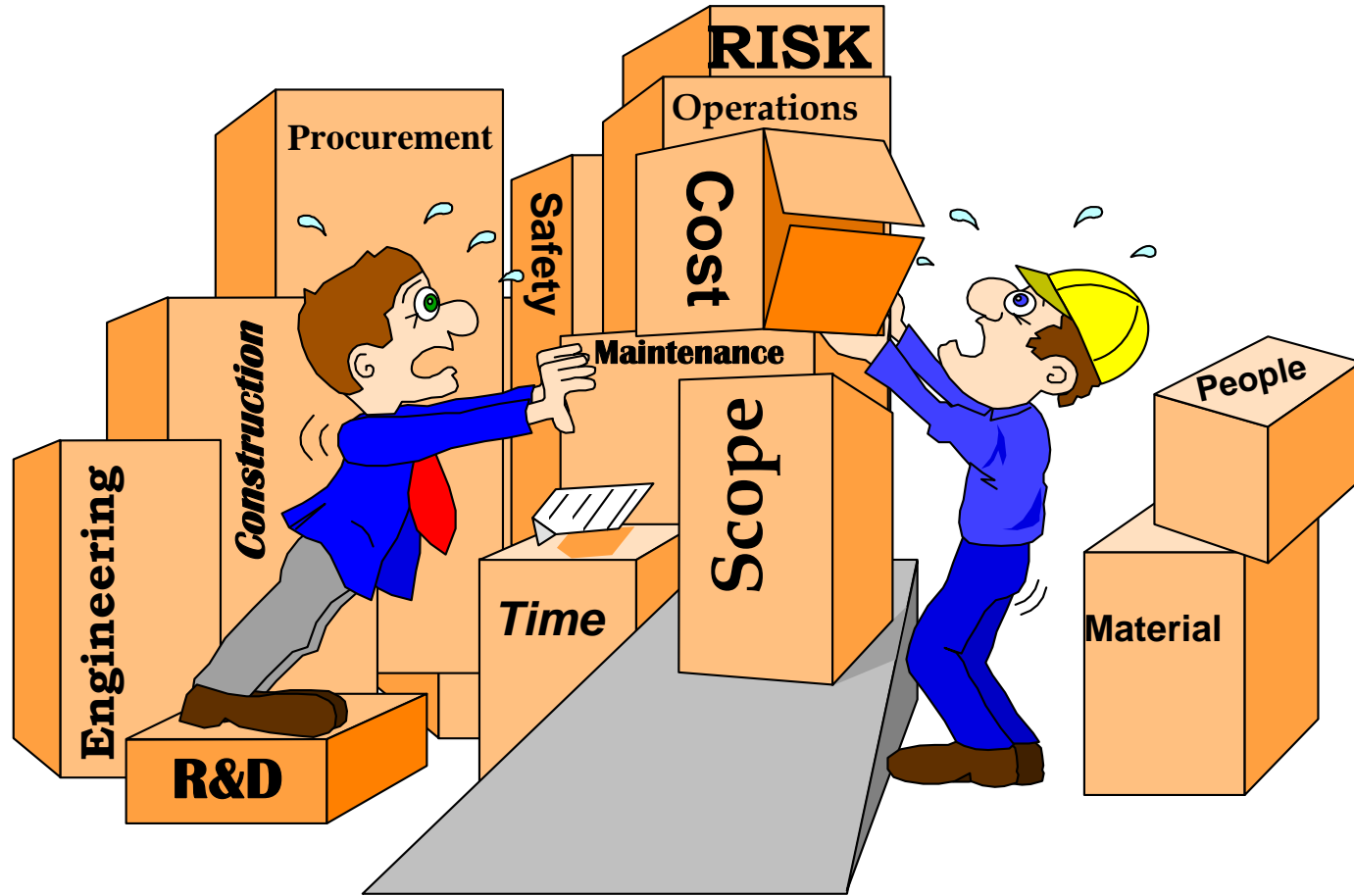
# Scope Planning

## Difference between a Plan and a Schedule

A *Plan* is a logical sequence of events to accomplish a goal.

A *Schedule* incorporates durations and dates into the sequence of events necessary to accomplish the Plan.

# Planning



# Activity Definition

- **Inputs**
  - Project Scope Statement
  - Project Management Plan
  - WBS (deliverable oriented)
- **Outputs**
  - Activity list, Activity Attributes, Milestone List
- **For each work package (typically lowest level of WBS) develop a list of activities, using tools of decomposition and templates**
  - Activities are action statements leading to a deliverable (WBS element)
  - Details of activities should be easily able to be estimated
    - Durations
    - Resources
    - Costs

Remember to consider how you are going to take earned value when defining activities.

# Activity Sequencing

- Precedence relationships
  - Finish-to-start – activity cannot start until preceding activity finishes (most typical)
  - Start-to-start- activity cannot start until preceding activity starts
  - Finish-to-finish- activity cannot finish until preceding activity finishes
  - Start-to-finish- activity cannot finish until preceding activity starts (rare)
- “Lag” – waiting time used when there must be a delay in a precedence. Used for things like need for concrete to cure for several days).
- “Lead” – allows an acceleration of the successor activity

# Activity Resource Estimating

- Key tools are
  - Expert judgment
  - Alternatives analyses – make or buy, use of different processes for accomplishing work
  - Published estimating data
  - Bottoms-up estimating

## **Cost estimating**

- Key output – activity resource requirements, resource breakdown structure



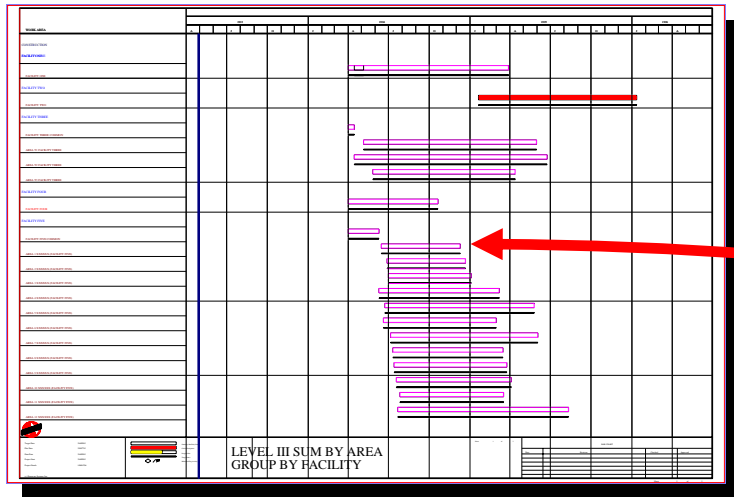
# Activity Duration Estimating

- Develop duration for activities on activity list based on:
  - Work effort or number of work periods required to complete the activity. Consider:
    - Resources (number, availability, skill level)
    - Productivity and risks (environment, weather, holidays, skill level)
    - Assumptions/constraints (physical, external)
    - Historical information and benchmarks

# Activity Duration Estimating (cont'd)

- Key tools
  - Expert judgment
  - Analogous estimating – results of previous projects
  - Parametric estimating – math models of projects, order of magnitude (quantity of work x production rate)
  - 'Three Point' estimates – most likely, optimistic and pessimistic
  - Bottoms-up – quantitative based (# of units desired/unit rate)
- Reserve time – added to duration based on risks (contingency – known risks, management reserve – unknown risks)

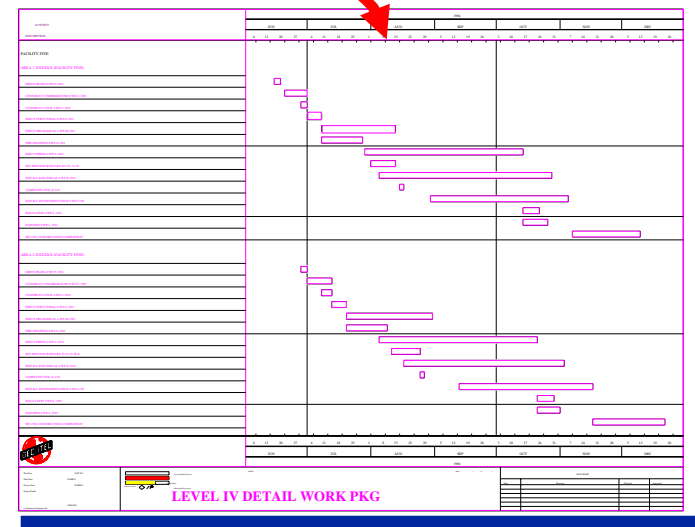
# Level III vs. Level IV Schedules



**Level III  
Daily calendar**

**SEPARATE P3 FILES**

**Level IV  
Hourly calendar**



# **Schedule Development**

## **Scheduling consists of:**

- **Determining activity durations**
- **Sequencing individual plans together**
- **Timing of activities**
- **Minimizing resource conflicts**
- **Identifying critical activities**
- **Establishing the baseline**
- **Providing a tool for project evaluation**
- **Creating outputs for analysis**
- **Monitoring and analyzing progress**
- **Assisting in developing work-arounds**

# Schedule Development – Tools

- CPM identifies the path of project activities based on dependencies that requires the most time to complete
  - Calculated using logical network
  - ‘forward pass’ calculations identify the early start and finish dates (and the critical path)
  - ‘backward pass’ calculations identify the late start and finish dates (and float)
  - Used by most schedule software (e.g., P3, Microsoft ‘Project’)

# CRITICAL PATH

**One or more continuous chains of zero or negative float activities running from the start event to the finish event in the schedule.**

**The Critical Path is normally the Longest Path (longest series of continuous activities) in the schedule.**

**Any activity on the critical path is called a Critical Activity.**

# What is Schedule Float?

## **Total Float**

Amount of time an activity can exceed its early finish date without affecting the project end date or other imposed dates.

## **Free Float**

Amount of time by which an activity can exceed its early finish date without affecting the early start date of any successor(s).

## **Negative Float**

Amount of time that the start or finish of any activity exceeds the time allowed.

# Float

## Disadvantages of Displaying Total Float

- End user may delay the start of an activity thinking there is slack time
- May cause false sense of security
- Once used as an activity -- it's gone forever
- Assumes CPM is complete with correct logic



# Float

## Disadvantages of **Not** Displaying Total Float

- End user may work on low priority items
- Too much emphasis on non-critical activities
- May consume resources on non-critical activities
- Precludes line supervisor's opportunity to efficiently manage the work

# Importance of the Schedule

- Displays the Scope of work.
- Improves the probability for the project team to meet its goals.
- Aids in determining staffing requirements.
- Identifies long lead items.
- Highlights areas of risk and concern. (Critical Path)
- Facilitates determination of schedule conflicts.
- Serve as a record of the project's progress

# Importance of the Schedule

- Must have sufficient detail to control the project
  - Too much detail is cumbersome to maintain.
  - Not enough detail and the analysis of the schedule is difficult.
- Communication Tool
  - The schedule is the **Primary** tool used to Communicate the status of the Project to others.
  - Should be the agenda for regular project team meeting

# **Scheduling Process**

# Scheduling Process

- Set objectives
- Gather information
- Develop the schedule
- Evaluate the schedule
- Communicate the schedule
- Implement the schedule



# Scheduling Process

## Set Objectives

- The Prime Objective is that the Schedule will support the **Plan** and that **ALL** involved will support the Schedule.

# Scheduling Process

## Schedule Development

- After identifying the Activities and Logic, **Time Analyze** the Schedule.
- Review the Schedule and confirm that the Schedule supports the PLAN.
- Review the **Resource Loading** and **Level** as much as possible without deviating from the PLAN.
- Review the **Critical Path** and confirm that it is reasonable.
- Review the Schedule with **ALL** interested parties and get agreement that it is **THEIR** Schedule and it is achievable and reasonable.

# Scheduling Process

## *Evaluating the Schedule*

- Key questions to ask:
  - Has adequate information for measuring and managing schedule performance been provided, and does it make sense?
  - Have resources for accomplishing scheduled activities been defined?
  - Have drivers and roadblocks (requirements and uncertainties) been identified and appropriately reflected?
  - Have assumptions been identified and appropriately reflected?
  - Has schedule contingency been included and justified?  
(Weather, resource availability, stakeholder involvement, funding limitations, familiarity with the activity)



# Why use Resource Scheduling?

- Analytically manage and use schedule float
- Analyze staffing requirements
- Evaluate effects of limited staffing
- Avoid wide fluctuations in daily need for various resources (leveling)

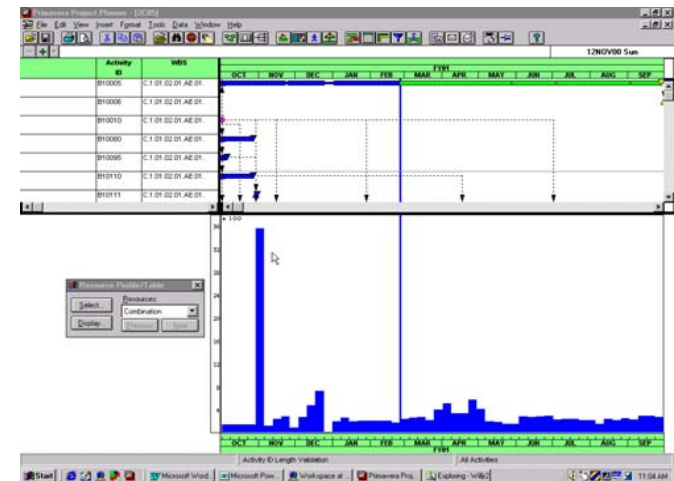
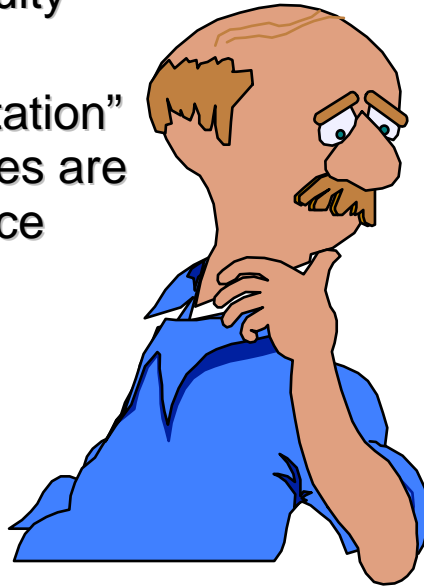
- **Produce more realistic schedules**
- **Produce progress & resource curves**
- **Comply with client requirements**

# Resource Leveling

- Optimizes resource use
- Helps maximize utilization of resources
- Produces realistic start/finish dates
- Avoids peaks and valleys in staff

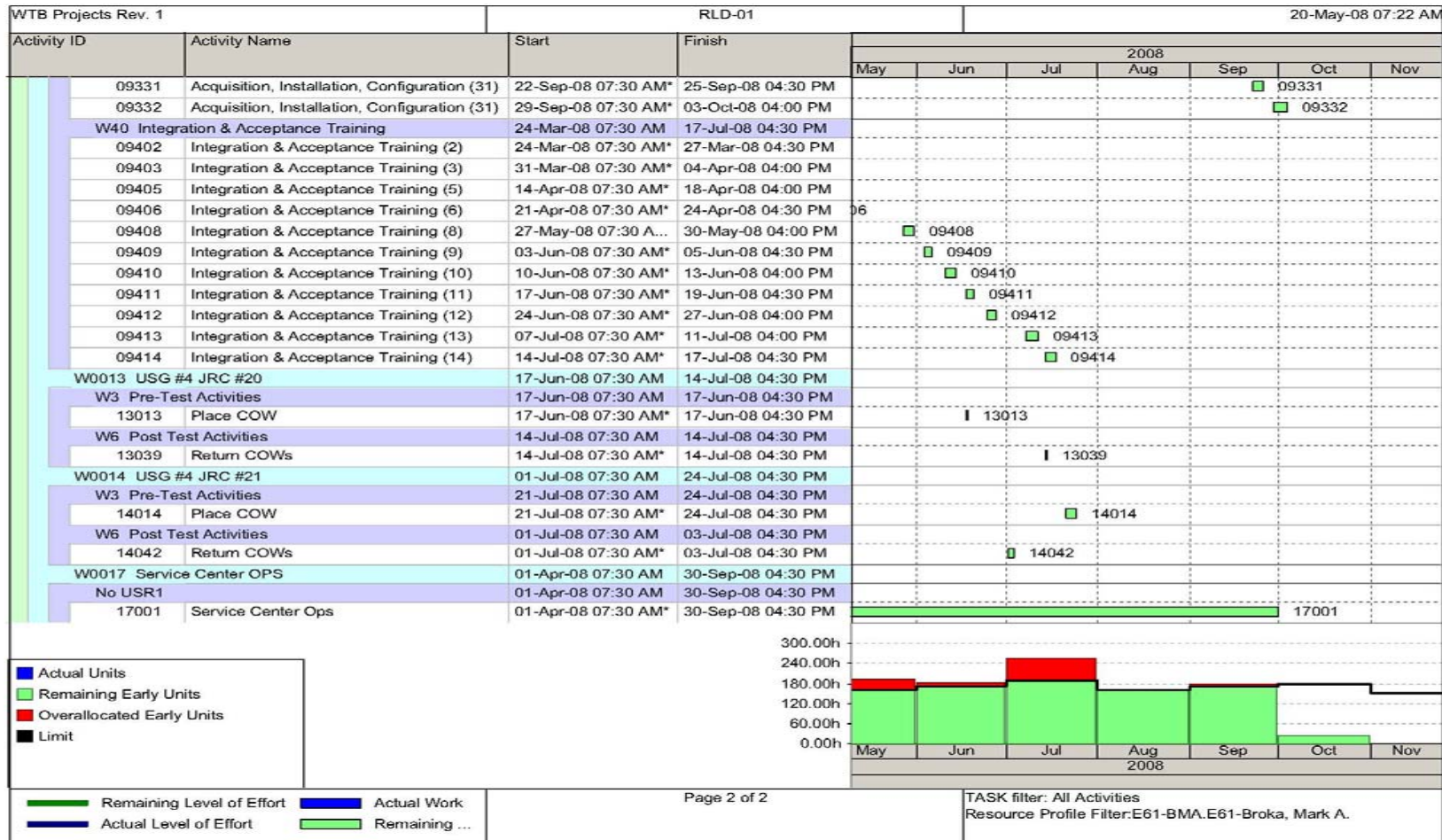
# Computer Resource Leveling Pitfalls

- It can extend activities once they have started
- It may create discontinuity among crews or tasks
- May result in “fragmentation” when a chain of activities are spread apart by resource leveling program



***Strong Advice... Don't level your schedule without help!!!***

# Resource Forecasting Example



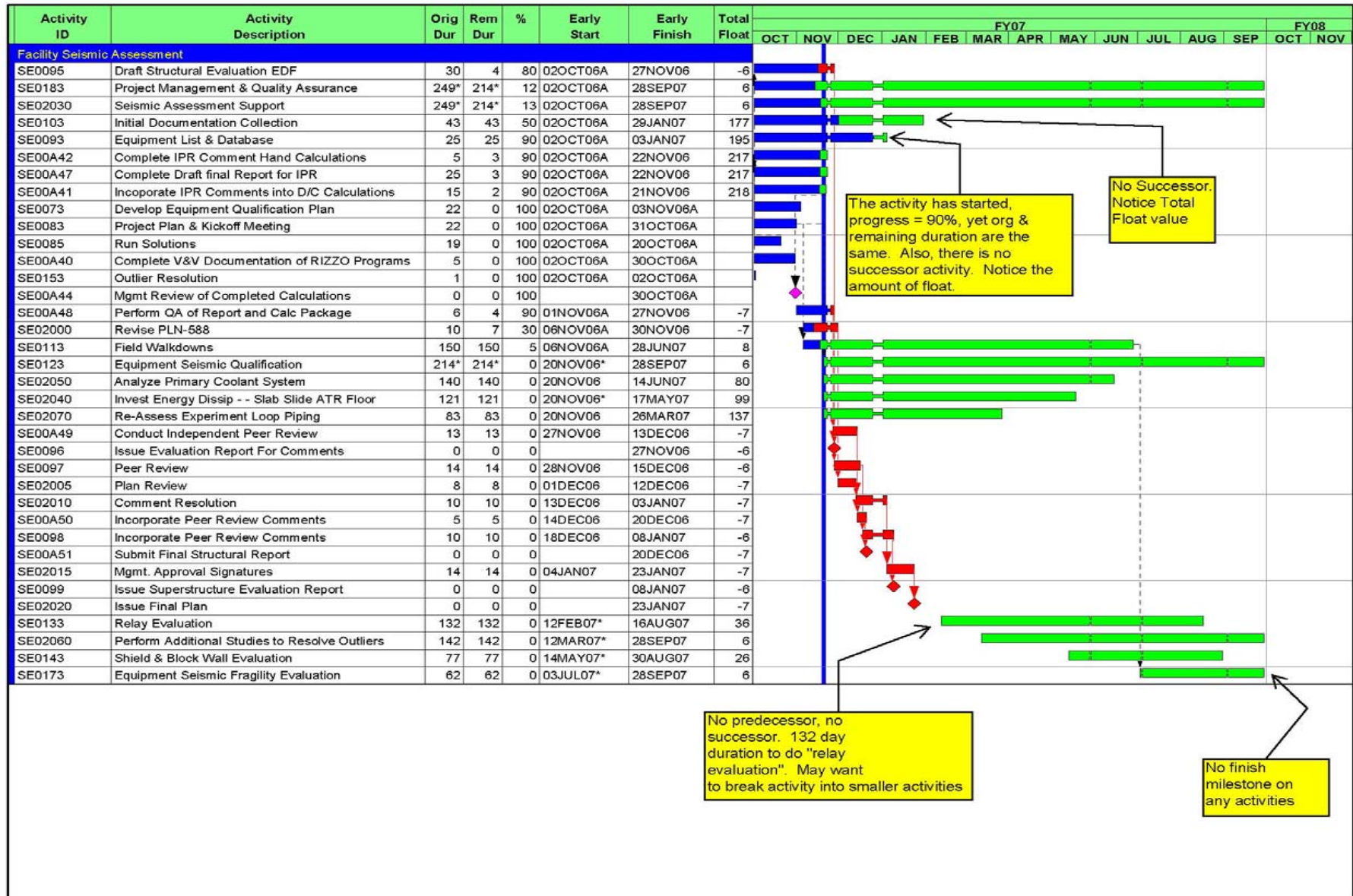
# Common Scheduling Failures

- Lack of buy-in by all project team members
- Lack of PLANNING
- Poorly defined activities
- Inappropriate scheduling detail
- Inadequate logic ties
- Poor duration estimating
- Lack of information
- Failure to disseminate the proper information to all parties
- Stove piped projects not in common data base
- PM's that do not rely on schedules to manage the project

# What I look for when evaluating a project schedule

- ❖ All scheduled activities should be linked directly or indirectly to the project start and finish milestones.
- ❖ The project finish milestone should have a late finish constraint.
- ❖ Does each activity have an assigned person. This person should agree to the duration of the activity and understand the predecessors and successors to their assigned activity. (Show the assigned person on the scheduled activity so it is clear who is responsible for what)
- ❖ Does the earned value method applied to each schedule activity make sense (How is percent complete reported?).
- ❖ Is the schedule being used during regular project meeting as the agenda tool.
- ❖ Does the PM constantly validate the critical path activities to confirm the level of detail is adequate to avoid surprises.
- ❖ Does the schedule activities associated with project risk have contingency built into them
- ❖ Does the critical path activities make sense?
- ❖ Resource availability as forecasted in the schedule?

# Schedule Example



Questions?