Construction CPM Conference

Performing a Critical Path Analysis

Presented by

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Critical Path - Agenda

- Introduction
- Roles
- Definitions
- Analysis Methods
- Preparation
- Analysis with Primavera P6
- Avoiding Pit Falls
- Bonus: Color Coding Bars
- Questions

Jonathan Japka, PMP

- 16 years as independent consultant (2004 to present)
  - Consigli, AstraZeneca, Lockheed Martin, Amtrak, Merck
  - 2008 Primavera Excellence Award
    Amtrak Engineering – lead designer
- 14 years with Primavera Systems PAR (1990 to 2004)
  - ETRAC in Cherry Hill NJ
  - Certified Instructor and Implementation Specialist
- Villanova Univ. Instructor (1998 to 2009)
  - PMP Foundations Class Time and Cost Sections
- PMP Certification since 1996
- Rutgers College of Engineering
  - BS Civil Engineering
  - Specialization in Construction Management

Start with a joke . .

Start with a joke . .

Critical Path Roles

- **Scheduler**
  - Perform Critical Path Analysis
  - Present Critical Path Report
  - Narrative
- **Project Management**
  - Consumer of Scheduler work
  - Are We Meeting Key Milestones?
  - What's Driving the Milestones?
  - Use to make decisions !!!

Critical Path Goals

Use Report and Narrative to make decisions!

Story must be clear and concise!

Milestone Management

- **Pick Key Milestones**
- **Monitor those Milestones**

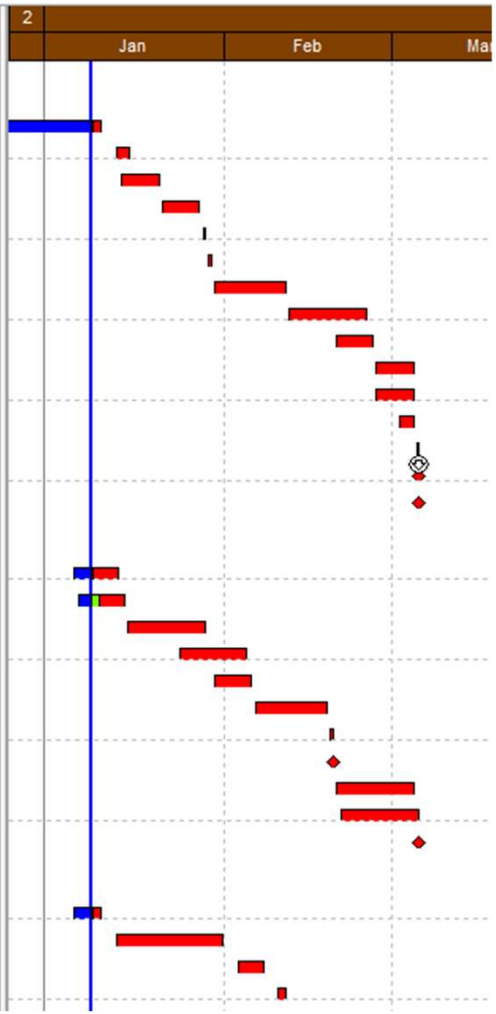
Milestone Management

- **Pick Key Milestones**
- **Monitor those Milestones**

- **Critical Path(s)**
  - **Drives Milestones**

Critical Paths to a Milestone

Activity ID	PATH	RESP	Activity Name	Total Dur	Rem Dur	Start A=Actual	Finish A=Actual	Total Float
Critical Path								
A5400	1	DRY	LEVEL 01 - SERVERY - Wall - Sheetrock / Tape / Sand - clo:	53	2	25-Oct-19 A	10-Jan-20	0
A5410	1	PAIN	LEVEL 01 - SERVERY - Paint	3	3	13-Jan-20	15-Jan-20	0
A5420	1	ACT	LEVEL 01 - SERVERY - Ceiling Grid	5	5	14-Jan-20	20-Jan-20	0
A5440	1	HVAC	LEVEL 01 - SERVERY - Overhead GRD	5	5	21-Jan-20	27-Jan-20	0
A5470	1	INSP	LEVEL 01 - SERVERY - Overhead Inspection	1	1	28-Jan-20	28-Jan-20	0
A5480	1	ACT	LEVEL 01 - SERVERY - Drop in ACT	1	1	29-Jan-20	29-Jan-20	0
A5490	1	TILE	LEVEL 01 - SERVERY - Tile Flooring	9	9	30-Jan-20	11-Feb-20	0
A5600	1	TILE	LEVEL 01 - CAFETERIA - Tile Flooring	9	9	12-Feb-20	25-Feb-20	0
A5610	1	MILL	LEVEL 01 - CAFETERIA - Millwork	5	5	20-Feb-20	26-Feb-20	0
A5620	1	CC	LEVEL 01 - CAFETERIA - Punchlist / Clean-Up	5	5	27-Feb-20	04-Mar-20	0
A5170	1	CC	LEVEL 01 - Commissioning (HVAC, Elec, Data) ** to be replac	5	5	27-Feb-20	04-Mar-20	0
A4900	1	CC	LEVEL 01 - Test Life Safety Systems	3	3	02-Mar-20	04-Mar-20	0
A4910	1	CC	LEVEL 01 - Certificate of Occupancy Walk-thru	1	1	05-Mar-20	05-Mar-20	0
MS-910	1	CC	Substantial Complete Contract (2/13/2020) New 3/5/2020	0	0		05-Mar-20*	0
MS-190	1	CC	LEVEL 01 - Substantial Complete	0	0		05-Mar-20	0
Path 2								
N20-100	2		RFI 182 - Ceiling Detals - Submitted / Responce Received	6	3	06-Jan-20 A	13-Jan-20	0
N20-101	2	FRAM	LEVEL 01 - RM 143 - RFI 182 Soffit Work	6	3	07-Jan-20 A	14-Jan-20	0
A5030	2	ACT	LEVEL 01 - OPEN and TRAINING - Ceiling Grid	10	10	15-Jan-20	28-Jan-20	0
A5000	2	HVAC	LEVEL 01 - OPEN and TRAINING - Overhead GRD	8	8	24-Jan-20	04-Feb-20	0
A5060	2	ACT	LEVEL 01 - OPEN and TRAINING - Drop in ACT	5	5	30-Jan-20	05-Feb-20	0
A5040	2	FLR	LEVEL 01 - OPEN and TRAINING - Carpet Tile	8	8	06-Feb-20	18-Feb-20	0
A5140	2	GS.ARCH	LEVEL 01 - OPEN and TRAINING - Create Punchlist (Arch W	1	1	19-Feb-20	19-Feb-20	0
MS-150	2	GS.FURN	LEVEL 01 - OPEN and TRAINING - Ready for FFE	0	0		19-Feb-20	0
A5120	2	GS.FURN	LEVEL 01 - OPEN - FFE - Furniture - Install	10	10	20-Feb-20	04-Mar-20	0
A4990	2	ELEC	LEVEL 01 - OPEN - FFE - Furniture - ELEC - Connect Whips	10	10	21-Feb-20	05-Mar-20	0
A9500	2	GS.FM	LEVEL 01 - FLOOR - ARCH and FM Sign-Off	0	0		05-Mar-20	0
Path 3								
A7320	3	GLAS	LEVEL 01 - OFFICES / CONF CENTR - Demountable - Install	5	2	06-Jan-20 A	10-Jan-20	0
A7310	3	GLAS	LEVEL 01 - OFFICES / CONF CENTR - Demountable - Feild M	15	15	13-Jan-20	31-Jan-20	0
A5150	3	GLAS	LEVEL 01 - OFFICES / CONF CENTR - Demountable - Install	5	5	03-Feb-20	07-Feb-20	0
A8560	3	GS.ARCH	LEVEL 01 - OFFICES / CONF CENTR - Create Punchlist (Arc	2	2	10-Feb-20	11-Feb-20	0



Definitions

- **Critical Path Method**
  - Creating a logical network of activities
  - Assigning durations to each activity.
  - Flowing the network to calculate; Early dates, Late dates, and total float.
- **Total Float**
  - The difference between the late date minus the early date.
  - Amount of time a single task can be delayed without delaying project completion

Definitions

- **Critical Path**
  - **Path of activities with lowest float and determines the project completion date.**
  - **Longest path of activities through a project**

- **Wikipedia definition**
  - Is the sequence of project network activities which add up to the longest overall duration, regardless if that longest duration has float or not.
  - This determines the shortest time possible to complete the project.
  - There can be 'total float' (unused time) within the critical path

Critical Path Analysis

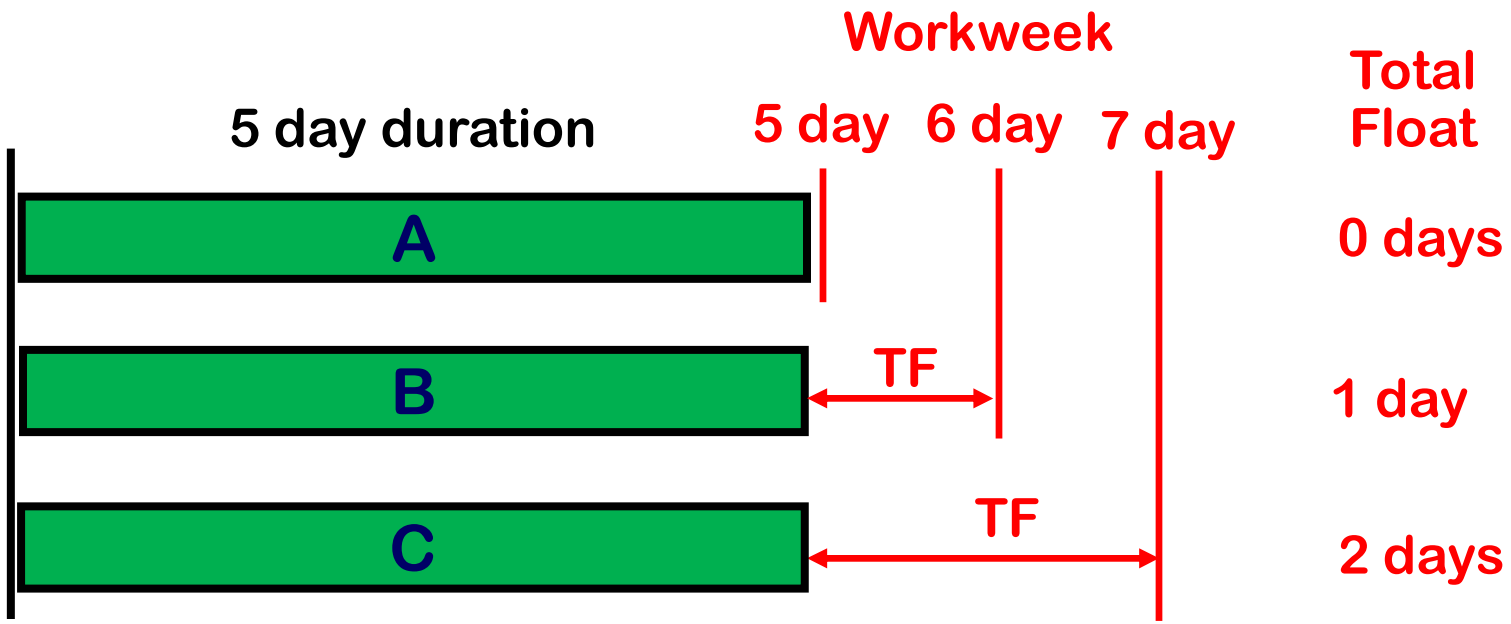
Process of Identifying the Critical Path

- Two basic methods

- **Lowest Float**
  - Sort Activities by Total Float
  - Simple straight forward
  - Does not work with multiple calendars
  - Commingles Parallel Paths
- **Longest Path**
  - Follow Driving Predecessor
  - Only Top path

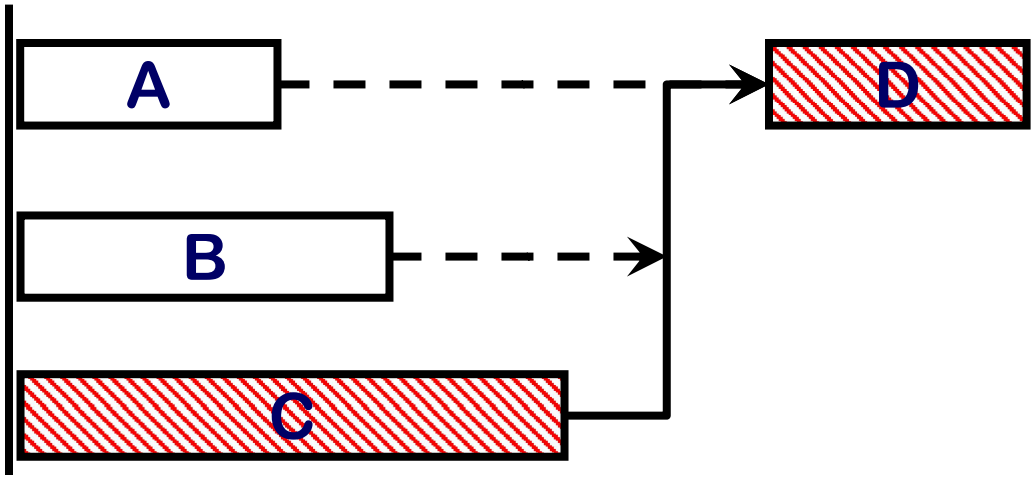
Critical Path by Float

- **Lowest Float Method**
  - Float is Calendar Dependent
  - Does not work with multiple calendars



Critical Path by Longest Path

- **Identifying Longest Path**
  - From the predecessor window
  - Find activity with latest finish
  - "Driving" Predecessor



Preparation

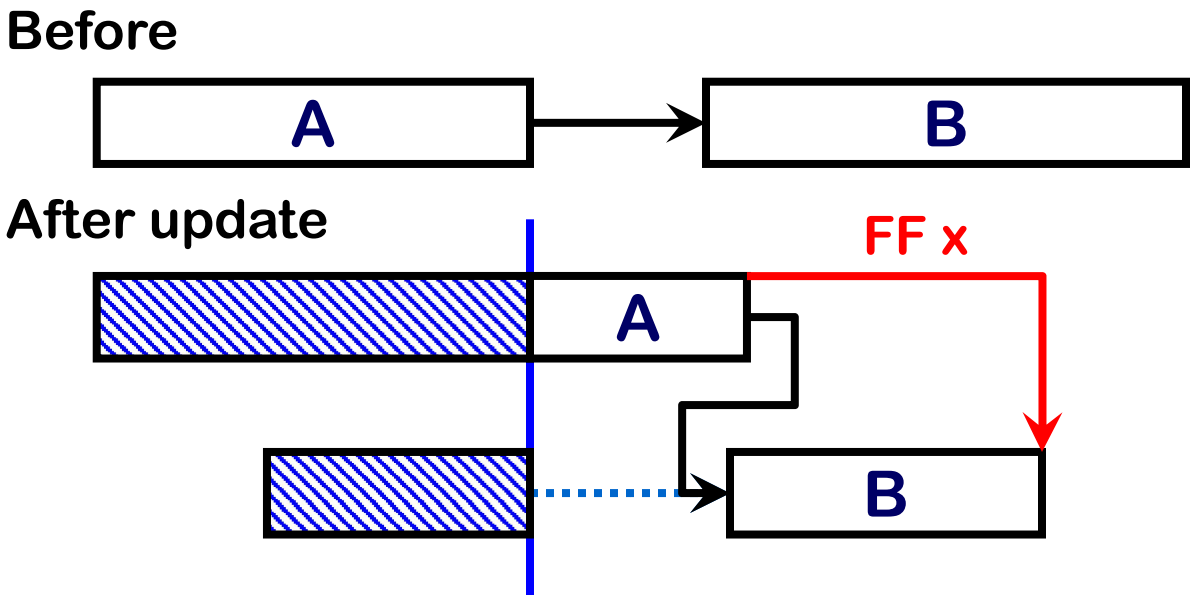
- Clean up all open ends
  - Activities without predecessor
  - Activities without successor
- Find with
  - Report, Filter, and/or Column
- Warning!!
  - Activities with just a Start-to-Start successor are open ends
  - Add a Finish-to-Start and/or Finish-to-Finish
  - Hard to find, export relationships to Excel

Preparation

- Remove “Start On” and “Finish-On” Constraints
  - Activities have zero float no matter what
  - Violates logic
- Use Retained Logic schedule option
  - Progress override creates open ends
- Uncheck “Make open ends critical”
- Clean up Out-of-Sequence errors
  - Find with Schedule “Log” Report
  - Driving predecessor can go “through” a completed activity and then hard to find

Preparation

- **What is an Out-of-Sequence Error?**



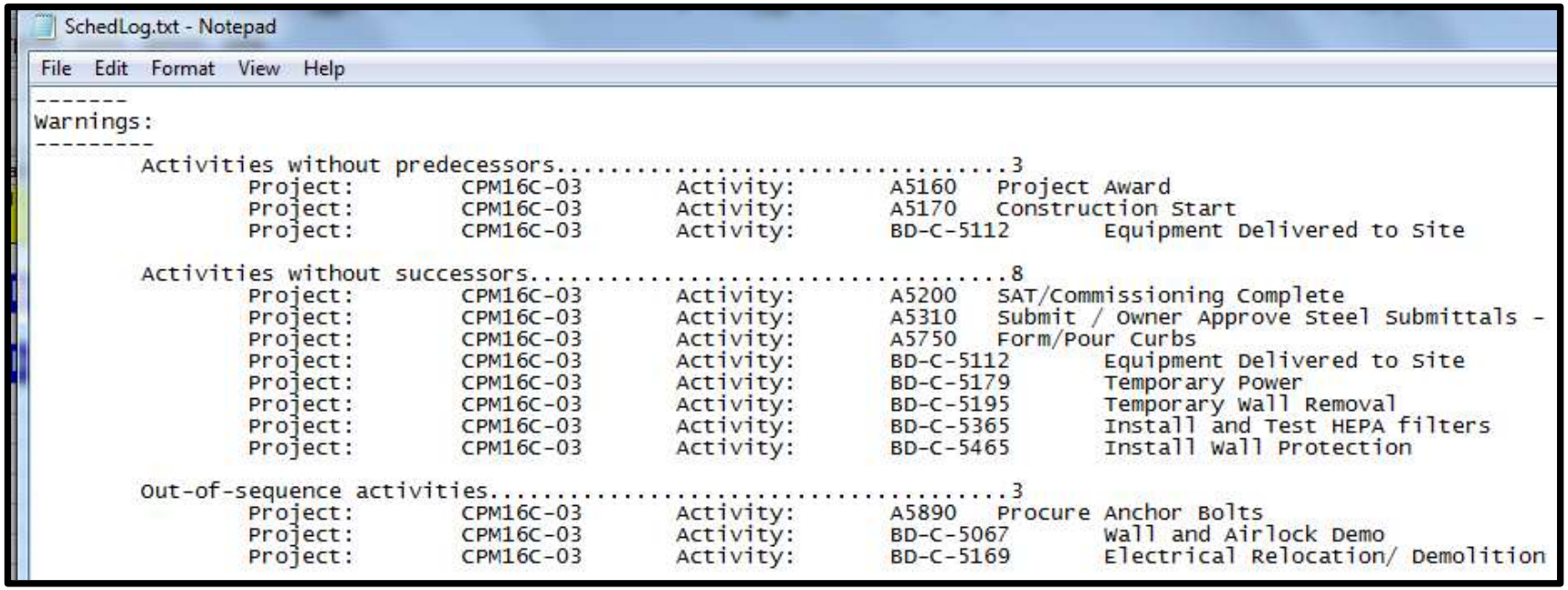
- **Remedy**
  - **Remove logic tie – just wrong, or**
  - **Replace with a Finish-to-Finish**

Preparation

- **Follow Good Scheduling Practice**
  - **Do not use FS with a Lag**
  - **Do not use FS with Negative Lag**

Preparation

- **Log report (Error report)**



SchedLog.txt - Notepad

File Edit Format View Help

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Warnings:
---------
        Activities without predecessors.................................3
                Project:        CPM16C-03       Activity:       A5160   Project Award
                Project:        CPM16C-03       Activity:       A5170   Construction Start
                Project:        CPM16C-03       Activity:       BD-C-5112       Equipment Delivered to Site

        Activities without successors...................................8
                Project:        CPM16C-03       Activity:       A5200   SAT/Commissioning Complete
                Project:        CPM16C-03       Activity:       A5310   Submit / Owner Approve Steel Submittals -
                Project:        CPM16C-03       Activity:       A5750   Form/Pour Curbs
                Project:        CPM16C-03       Activity:       BD-C-5112       Equipment Delivered to Site
                Project:        CPM16C-03       Activity:       BD-C-5179       Temporary Power
                Project:        CPM16C-03       Activity:       BD-C-5195       Temporary Wall Removal
                Project:        CPM16C-03       Activity:       BD-C-5365       Install and Test HEPA filters
                Project:        CPM16C-03       Activity:       BD-C-5465       Install Wall Protection

        Out-of-sequence activities.....................................3
                Project:        CPM16C-03       Activity:       A5890   Procure Anchor Bolts
                Project:        CPM16C-03       Activity:       BD-C-5067       Wall and Airlock Demo
                Project:        CPM16C-03       Activity:       BD-C-5169       Electrical Relocation/ Demolition
```

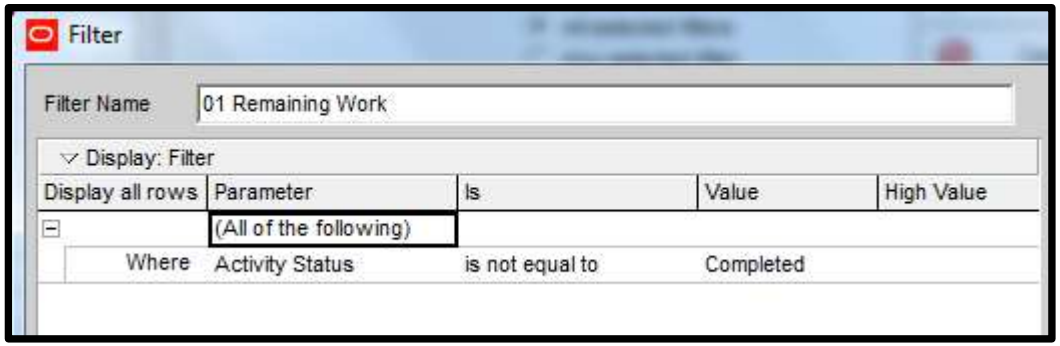
Let's go . . . . .

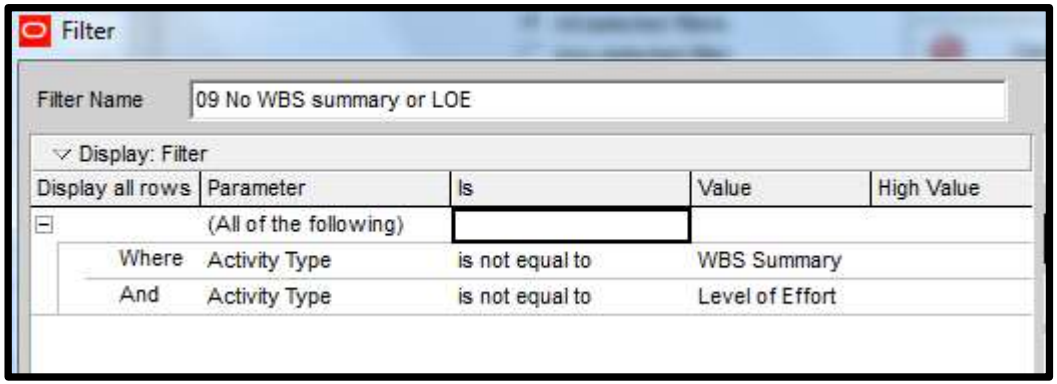
- **First Method**
  - **Lowest Float**
- **Isolate Activities with a Filter**
  - **Hide Completed Activities**
  - **Hide Level of Effort**
  - **Hide WBS / Summary Activity**
- **Group by Total Float**

Let's go . . . . .

- **Second Method**
  - **Longest Path**
- **Isolate Activities with a Filter**
  - **Longest Path = Yes**
  - **Hide Level of Effort**
  - **Hide WBS / Summary Activity**
- **Group by Longest Path**

Presentation with Primavera P6

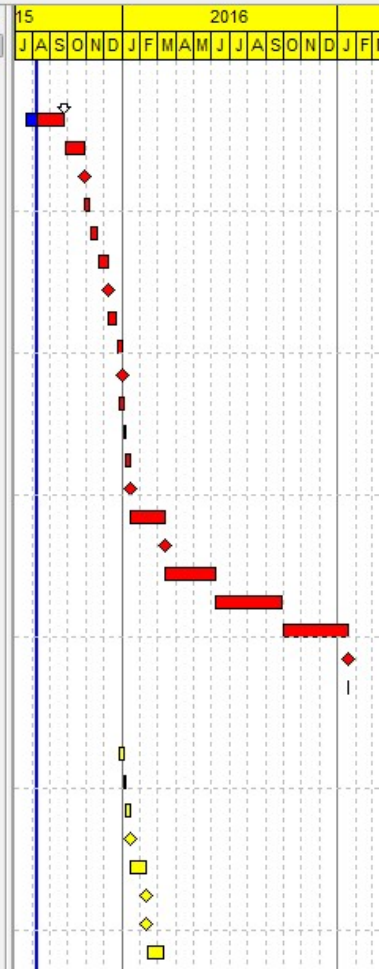




Critical Path by Float

Layout: 03B SCH Critical Path Report Float | Filter All: 01 Remaining Work, 09 No WBS summary or LOE

Activity ID	PATH	RESP	Activity Name	Level	Remaining Duration	Start	Finish	Total Float
Total Float: 0								
A3280	1	Krieg	CITY - SDP Planning Commision Recommend		34	21-Jul-15 A	25-Sep-15	0
A3290	1	Krieg	CITY - SDP City Council Final Approval Process		23	28-Sep-15	28-Oct-15	0
A1250	1	Krieg	CITY - SDP Site Schematic Plan APRROVAL (goal 10/5/15)	L.2	0		28-Oct-15	0
A1280	1	Desman	CITY - FSP - Draft Prepare and Submitt		7	29-Oct-15	06-Nov-15	0
A3300	1	Desman	CITY - FSP - Draft Review by City		10	09-Nov-15	20-Nov-15	0
B1200	1	Desman	CITY - FSP - Draft Incorp Comments		10	23-Nov-15	08-Dec-15	0
A3310	1	Desman	CITY - FSP - Submit FSP to City	L.3	0		08-Dec-15	0
B1210	1	CITY	CITY - FSP - City Initial Review		10	09-Dec-15	22-Dec-15	0
A1240	1	CITY	CITY - FSP - Planning Commision Review		5	23-Dec-15	31-Dec-15	0
A1260	1	CITY	CITY - FSP - APPROVED	L.2	0		31-Dec-15	0
B1340	1	Desman	CITY - Building Permit - Draft Prepare and submit		5	28-Dec-15	04-Jan-16	0
A1590	1	Desman	CITY - Building Permit - Draft Ciity Review		3	05-Jan-16	07-Jan-16	0
B1330	1	Desman	CITY - Building Permit - Draft Incorporate Comments		5	08-Jan-16	14-Jan-16	0
A1520	1	Desman	CITY - Building Permit - Submit Permit Package	L.3	0		14-Jan-16	0
A2410	1	CITY	CITY - Building Permit - Review and Approve		41	15-Jan-16	14-Mar-16	0
A1530	1	CITY	CITY - Building Permit - APPROVED	L.2	0		14-Mar-16	0
A1550	1	Donley's	CONSTR - Site Prep / Foundations		60	15-Mar-16	07-Jun-16	0
A1570	1	Donley's	CONSTR - Deck Erection		80	08-Jun-16	29-Sep-16	0
A3340	1	Donley's	CONSTR - Deck Final Details		80	30-Sep-16	19-Jan-17	0
A1560	1	CM	GARAGE C - COMPLETE (goal 12/31/2016)	L.2	0		19-Jan-17	0
A3010		Donley's	CONSTR - Contingency		0	20-Jan-17	20-Jan-17	0
Total Float: 1								
B1240		Desman	CITY - SITE Permit - Draft Prepare and submit		5	28-Dec-15	04-Jan-16	1
B1250		Desman	CITY - SITE Permit - Draft Ciity Review		3	05-Jan-16	07-Jan-16	1
B1260		Desman	CITY - SITE Permit - Draft Incorporate Comments		5	08-Jan-16	14-Jan-16	1
B1270		Desman	CITY - SITE Permit - Submit Permit Package	L.3	0		14-Jan-16	1
B1280		CITY	CITY - SITE Permit - Review and Approve		20	15-Jan-16	11-Feb-16	1
A1540		Donley's	CONSTR - START	L.2	0		11-Feb-16	1
B1290		CITY	CITY - SITE Permit - APPROVED	L.2	0		11-Feb-16	1
A2390		Donley's	CONSTR - Excavations		20	12-Feb-16	11-Mar-16	1



Critical Path by Float

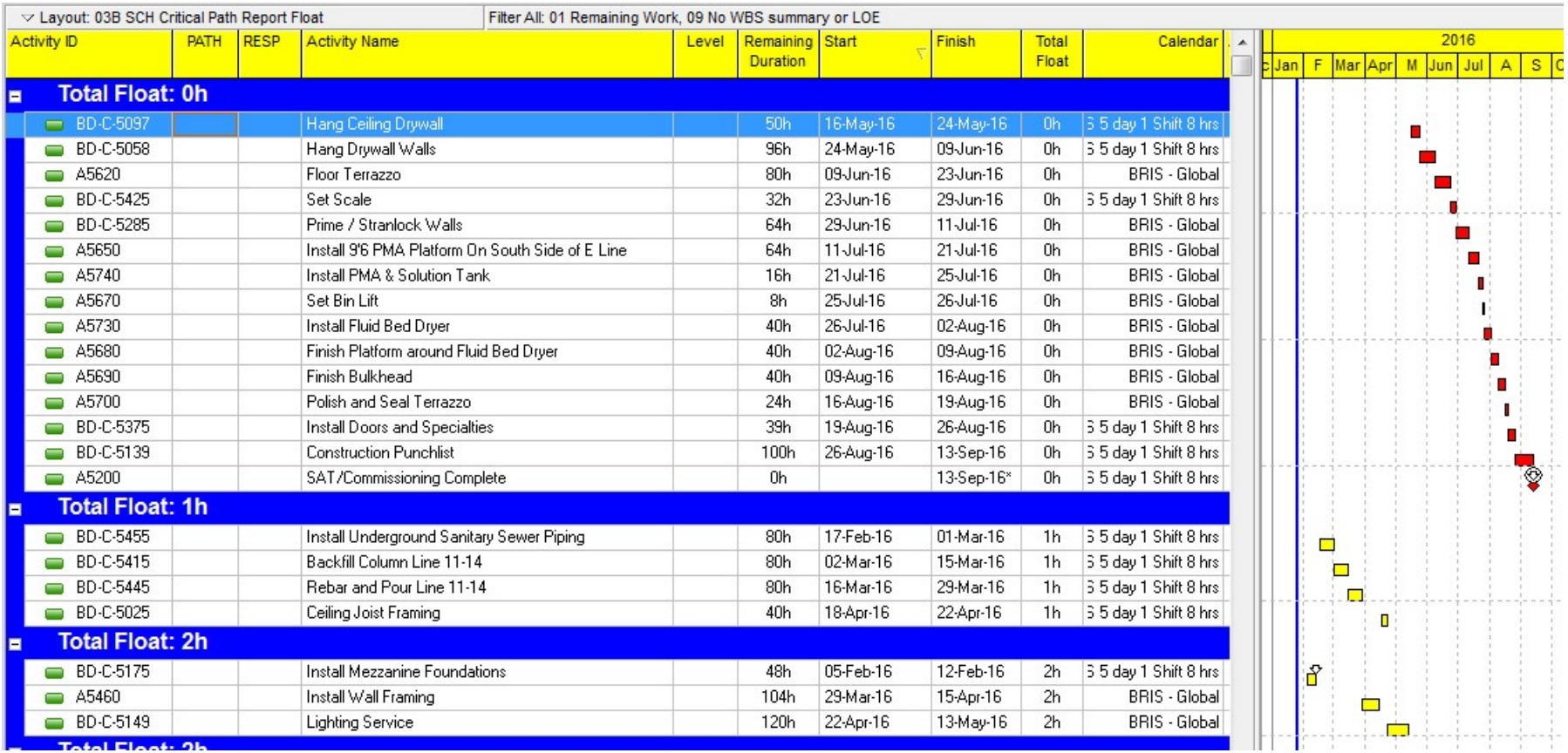
- **Weakness: Multiple Paths Commingled**

Layout: 03B SCH Critical Path Report Float | Filter All: 01 Remaining Work, 09 No WBS summary or LOE

Activity ID	PATH	RESP	Activity Name	Level	Remaining Duration	Start	Finish	Total Float	Calendar
Total Float: 0									
N06-144	2	Hartmar	LINE 1 Dividella SAT Functional Tests (2x1hr, 2x30mins)		4	19-Jan-15	22-Jan-15	0	5 Day w/ Hol
N06-119	1	Hartmar	LINE 2 Dividella IQ OQ Functional Tests		5	07-Jan-15 A	23-Jan-15	0	5 Day w/ Hol
A2780	1	Hartmar	LINE 2 Full Line OQ		5	14-Jan-15 A	23-Jan-15	0	5 Day w/ Hol
N05-156	2	Hartmar	LINE 1 Dividella IQ OQ Calib / PM Verif		1	23-Jan-15	23-Jan-15	0	5 Day w/ Hol
A5490	1	Hartmar	LINE 2 Full Line OQ COMPLETE (1/21/15)	L.2	0		23-Jan-15	0	5 Day w/ Hol
N06-145	2	Hartmar	LINE 1 Dividella IQ OQ SOP Verif		1	26-Jan-15	26-Jan-15	0	5 Day w/ Hol
N06-146	2	Hartmar	LINE 1 Dividella IQ OQ Functional Tests		3	27-Jan-15	29-Jan-15	0	5 Day w/ Hol
A2900	2	Hartmar	LINE 1 Full Line OQ		5	30-Jan-15	05-Feb-15	0	5 Day w/ Hol
A5500	2	Hartmar	LINE 1 Full Line OQ COMPLETE (2/11/15)	L.2	0		05-Feb-15	0	5 Day w/ Hol
A1390	1	Schank	LINE 2 Process Qualification PQ		10	26-Jan-15	06-Feb-15	0	5 Day w/ Hol
A2920	1	Schank	LINE 2 Process Qualification PQ COMPLETE (2/4/15)	L.2	0		06-Feb-15	0	5 Day w/ Hol
A2670	2	Schank	LINE 1 Process Qualification PQ		10	06-Feb-15	19-Feb-15	0	5 Day w/ Hol
A2930	2	Schank	LINE 1 Process Qualification PQ COMPLETE (2/25/15)	L.2	0		19-Feb-15	0	5 Day w/ Hol
N02-102	2	Kroll	LINE 1 Schedule Contingency (Buffer)		1	20-Feb-15	20-Feb-15	0	5 Day w/ Hol
N02-101	1	Kroll	LINE 2 Schedule Contingency (Buffer)		20	09-Feb-15	06-Mar-15	0	5 Day w/ Hol
A2750	2	Tran	LINE 1 Training Runs		30	23-Feb-15	03-Apr-15	0	5 Day w/ Hol
A1870	1	Tran	LINE 2 Training Runs		25	09-Mar-15	10-Apr-15	0	5 Day w/ Hol
N01-102	2	Tran	LINE 1 End to End Runs		15	06-Apr-15	24-Apr-15	0	5 Day w/ Hol
N01-100	1	Tran	LINE 2 End to End Runs		10	13-Apr-15	24-Apr-15	0	5 Day w/ Hol
N01-101	1	Tran	LINE 2 Demo Runs		4	27-Apr-15	30-Apr-15	0	5 Day w/ Hol
N01-103	2	Tran	LINE 1 Demo Runs		4	27-Apr-15	30-Apr-15	0	5 Day w/ Hol
A1410	1	Kroll	LINE 2 COMPLETE Ready for Production	L.2	0		30-Apr-15	0	5 Day w/ Hol
A2580	2	Kroll	LINE 1 COMPLETE Ready for Production	L.2	0		30-Apr-15	0	5 Day w/ Hol
A2590	1	Kroll	Ready for Production (Manufacturing Requirement 4/30/1	L.1	0		30-Apr-15*	0	5 Day w/ Hol
Total Float: 1									

Critical Path by Float

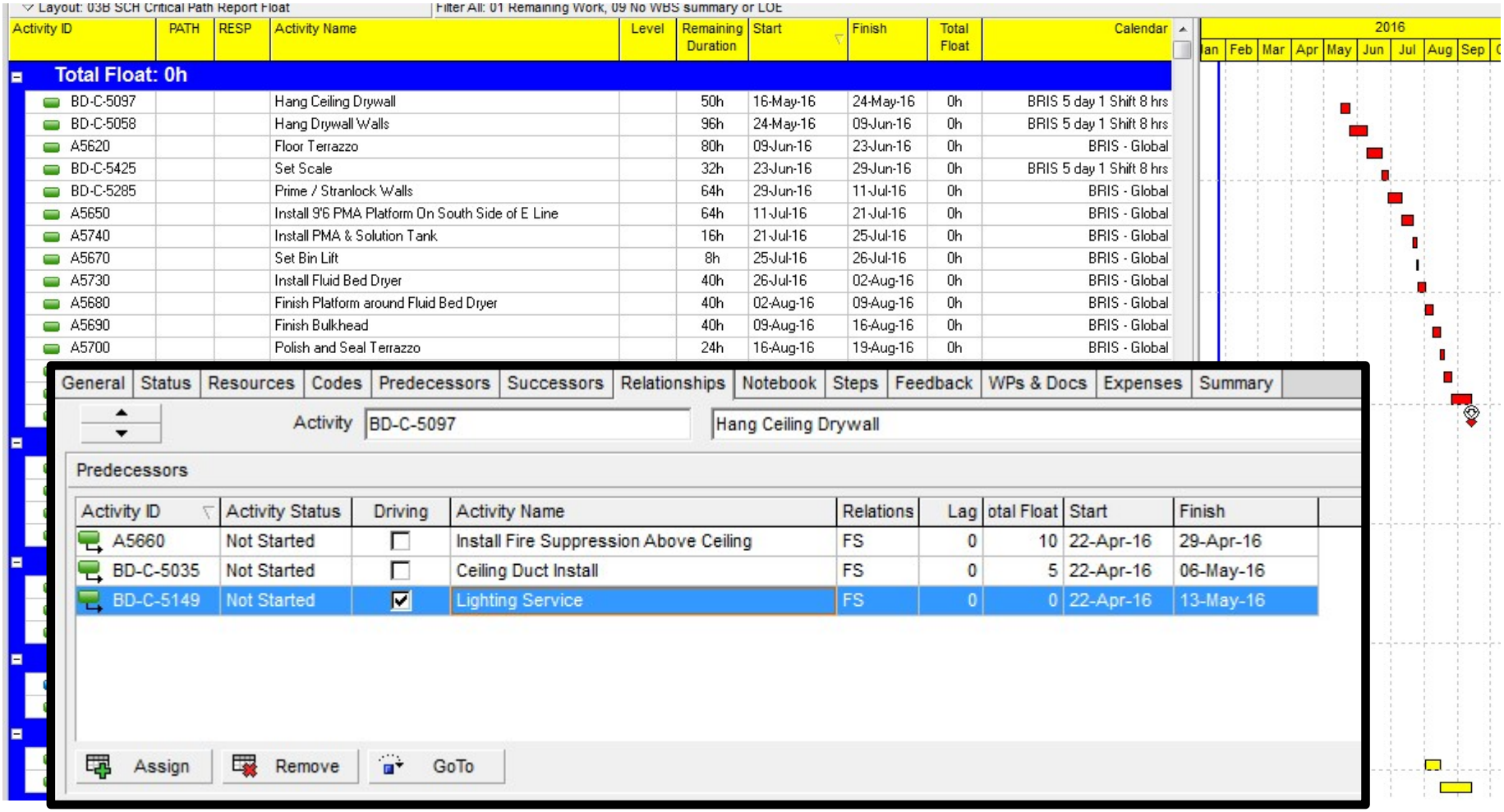
- **Weakness: Multiple Calendars**



Layout: 03B SCH Critical Path Report Float | Filter All: 01 Remaining Work, 09 No WBS summary or LOE

Activity ID	PATH	RESP	Activity Name	Level	Remaining Duration	Start	Finish	Total Float	Calendar
Total Float: 0h									
BD-C-5097			Hang Ceiling Drywall		50h	16-May-16	24-May-16	0h	5 day 1 Shift 8 hrs
BD-C-5058			Hang Drywall Walls		96h	24-May-16	09-Jun-16	0h	5 day 1 Shift 8 hrs
A5620			Floor Terrazzo		80h	09-Jun-16	23-Jun-16	0h	BRIS - Global
BD-C-5425			Set Scale		32h	23-Jun-16	29-Jun-16	0h	5 day 1 Shift 8 hrs
BD-C-5285			Prime / Stranlock Walls		64h	29-Jun-16	11-Jul-16	0h	BRIS - Global
A5650			Install 9'6 PMA Platform On South Side of E Line		64h	11-Jul-16	21-Jul-16	0h	BRIS - Global
A5740			Install PMA & Solution Tank		16h	21-Jul-16	25-Jul-16	0h	BRIS - Global
A5670			Set Bin Lift		8h	25-Jul-16	26-Jul-16	0h	BRIS - Global
A5730			Install Fluid Bed Dryer		40h	26-Jul-16	02-Aug-16	0h	BRIS - Global
A5680			Finish Platform around Fluid Bed Dryer		40h	02-Aug-16	09-Aug-16	0h	BRIS - Global
A5690			Finish Bulkhead		40h	09-Aug-16	16-Aug-16	0h	BRIS - Global
A5700			Polish and Seal Terrazzo		24h	16-Aug-16	19-Aug-16	0h	BRIS - Global
BD-C-5375			Install Doors and Specialties		39h	19-Aug-16	26-Aug-16	0h	5 day 1 Shift 8 hrs
BD-C-5139			Construction Punchlist		100h	26-Aug-16	13-Sep-16	0h	5 day 1 Shift 8 hrs
A5200			SAT/Commissioning Complete		0h		13-Sep-16*	0h	5 day 1 Shift 8 hrs
Total Float: 1h									
BD-C-5455			Install Underground Sanitary Sewer Piping		80h	17-Feb-16	01-Mar-16	1h	5 day 1 Shift 8 hrs
BD-C-5415			Backfill Column Line 11-14		80h	02-Mar-16	15-Mar-16	1h	5 day 1 Shift 8 hrs
BD-C-5445			Rebar and Pour Line 11-14		80h	16-Mar-16	29-Mar-16	1h	5 day 1 Shift 8 hrs
BD-C-5025			Ceiling Joist Framing		40h	18-Apr-16	22-Apr-16	1h	5 day 1 Shift 8 hrs
Total Float: 2h									
BD-C-5175			Install Mezzanine Foundations		48h	05-Feb-16	12-Feb-16	2h	5 day 1 Shift 8 hrs
A5460			Install Wall Framing		104h	29-Mar-16	15-Apr-16	2h	BRIS - Global
BD-C-5149			Lighting Service		120h	22-Apr-16	13-May-16	2h	BRIS - Global

Driving Predecessor

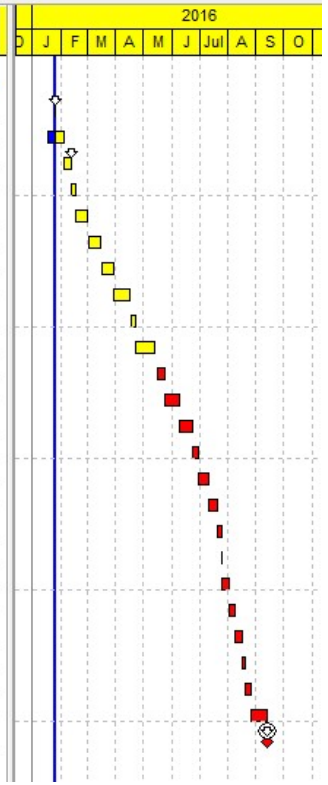


Critical Path by Longest Path

- **Filter on Longest Path (P6 global filter)**

Layout: 03L SCH Critical Path Longest | Filter All: Longest Path

Activity ID	PATH	RESP	Activity Name	Level	Remaining Duration	Start	Finish	Total Float	Calendar
Yes									
A5320			Submit / Owner Approve Rebar Submittals		0h	26-Jan-16	26-Jan-16	3h	BRIS 5 day 1 Shift 8 hrs
A5890			Procure Anchor Bolts		64h	18-Jan-16 A	04-Feb-16	2h	BRIS - Global
BD-C-5175			Install Mezzanine Foundations		48h	05-Feb-16	12-Feb-16	2h	BRIS 5 day 1 Shift 8 hrs
A5440			Demo Slabs E 3/4 - South		16h	12-Feb-16	16-Feb-16	2h	BRIS - Global
BD-C-5455			Install Underground Sanitary Sewer Piping		80h	17-Feb-16	01-Mar-16	1h	BRIS 5 day 1 Shift 8 hrs
BD-C-5415			Backfill Column Line 11-14		80h	02-Mar-16	15-Mar-16	1h	BRIS 5 day 1 Shift 8 hrs
BD-C-5445			Rebar and Pour Line 11-14		80h	16-Mar-16	29-Mar-16	1h	BRIS 5 day 1 Shift 8 hrs
A5460			Install Wall Framing		104h	29-Mar-16	15-Apr-16	2h	BRIS - Global
BD-C-5025			Ceiling Joist Framing		40h	18-Apr-16	22-Apr-16	1h	BRIS 5 day 1 Shift 8 hrs
BD-C-5149			Lighting Service		120h	22-Apr-16	13-May-16	2h	BRIS - Global
BD-C-5097			Hang Ceiling Drywall		50h	16-May-16	24-May-16	0h	BRIS 5 day 1 Shift 8 hrs
BD-C-5058			Hang Drywall Walls		96h	24-May-16	09-Jun-16	0h	BRIS 5 day 1 Shift 8 hrs
A5620			Floor Terrazzo		80h	09-Jun-16	23-Jun-16	0h	BRIS - Global
BD-C-5425			Set Scale		32h	23-Jun-16	29-Jun-16	0h	BRIS 5 day 1 Shift 8 hrs
BD-C-5285			Prime / Stranlock Walls		64h	29-Jun-16	11-Jul-16	0h	BRIS - Global
A5650			Install 9'6 PMA Platform On South Side of E Line		64h	11-Jul-16	21-Jul-16	0h	BRIS - Global
A5740			Install PMA & Solution Tank		16h	21-Jul-16	25-Jul-16	0h	BRIS - Global
A5670			Set Bin Lift		8h	25-Jul-16	26-Jul-16	0h	BRIS - Global
A5730			Install Fluid Bed Dryer		40h	26-Jul-16	02-Aug-16	0h	BRIS - Global
A5680			Finish Platform around Fluid Bed Dryer		40h	02-Aug-16	09-Aug-16	0h	BRIS - Global
A5690			Finish Bulkhead		40h	09-Aug-16	16-Aug-16	0h	BRIS - Global
A5700			Polish and Seal Terrazzo		24h	16-Aug-16	19-Aug-16	0h	BRIS - Global
BD-C-5375			Install Doors and Specialties		39h	19-Aug-16	26-Aug-16	0h	BRIS 5 day 1 Shift 8 hrs
BD-C-5139			Construction Punchlist		100h	26-Aug-16	13-Sep-16	0h	BRIS 5 day 1 Shift 8 hrs
A5200			SAT/Commissioning Complete		0h		13-Sep-16*	0h	BRIS 5 day 1 Shift 8 hrs

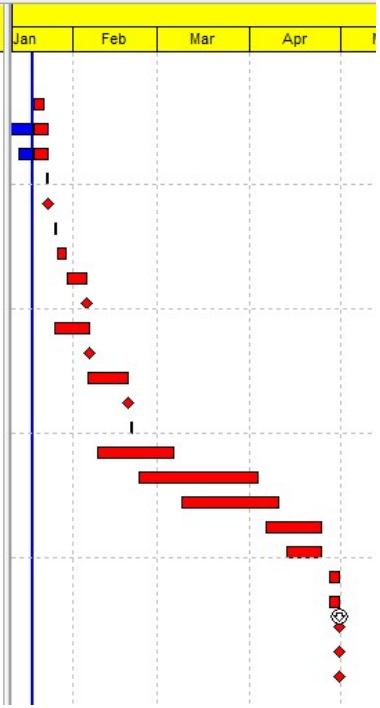


Critical Path by Longest Path

- **Does not always work**

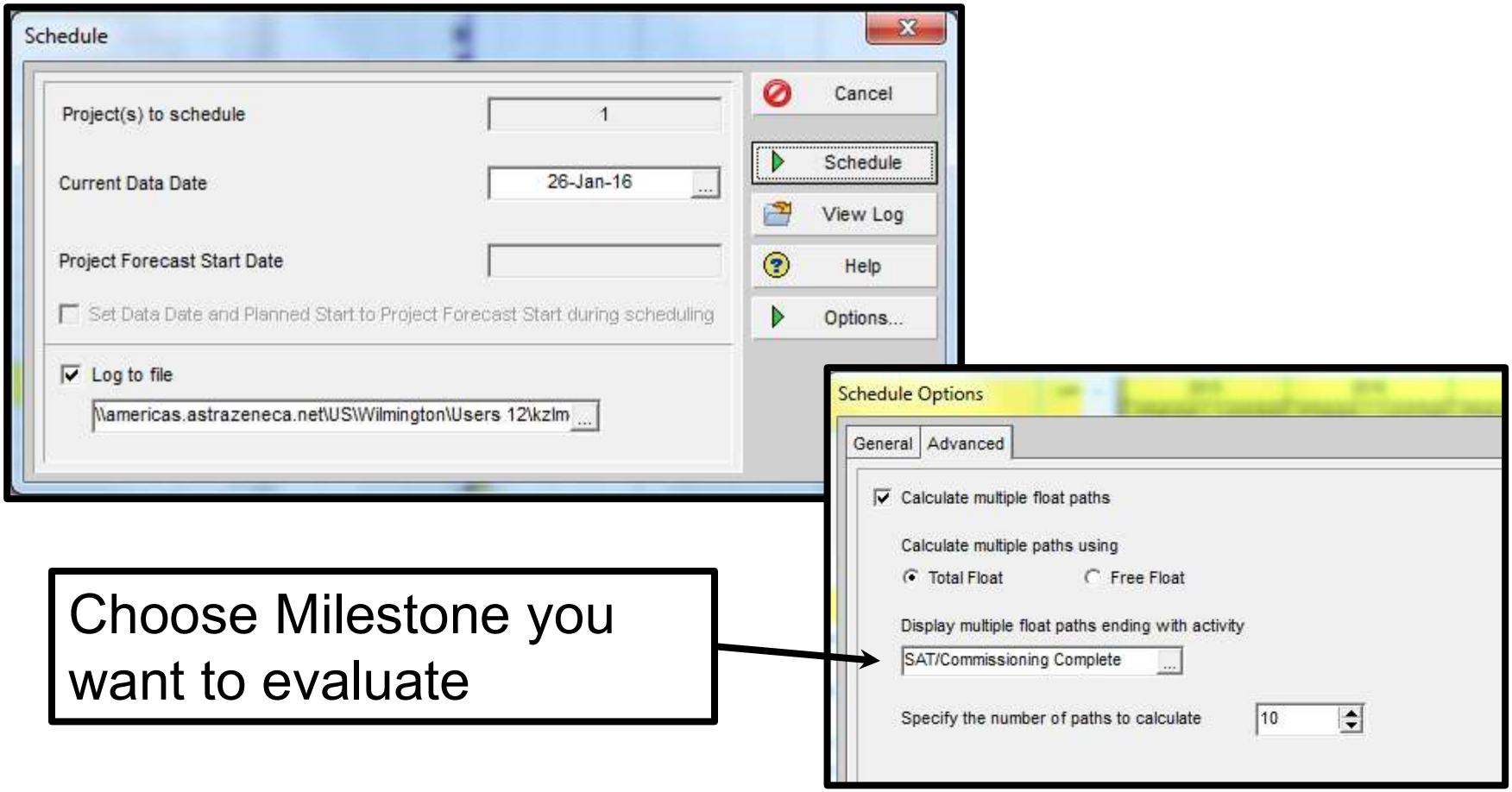
Layout: 03L SCH Critical Path Longest | Filter All: Longest Path

Activity ID	PATH	RESP	Activity Name	Level	Remaining Duration	Start	Finish	Total Float	Calendar
Yes									
N06-144	2	Hartman	LINE 1 Dividella SAT Functional Tests (2x1hr, 2x30mins)		4	19-Jan-15	22-Jan-15	0	5 Day w/ Hol
N06-119	1	Hartman	LINE 2 Dividella IQ OQ Functional Tests		5	07-Jan-15 A	23-Jan-15	0	5 Day w/ Hol
A2780	1	Hartman	LINE 2 Full Line OQ		5	14-Jan-15 A	23-Jan-15	0	5 Day w/ Hol
N05-156	2	Hartman	LINE 1 Dividella IQ OQ Calib / PM Verif		1	23-Jan-15	23-Jan-15	0	5 Day w/ Hol
A5490	1	Hartman	LINE 2 Full Line OQ COMPLETE (1/21/15)	L.2	0		23-Jan-15	0	5 Day w/ Hol
N06-145	2	Hartman	LINE 1 Dividella IQ OQ SOP Verif		1	26-Jan-15	26-Jan-15	0	5 Day w/ Hol
N06-146	2	Hartman	LINE 1 Dividella IQ OQ Functional Tests		3	27-Jan-15	29-Jan-15	0	5 Day w/ Hol
A2900	2	Hartman	LINE 1 Full Line OQ		5	30-Jan-15	05-Feb-15	0	5 Day w/ Hol
A5500	2	Hartman	LINE 1 Full Line OQ COMPLETE (2/11/15)	L.2	0		05-Feb-15	0	5 Day w/ Hol
A1390	1	Schank	LINE 2 Process Qualification PQ		10	26-Jan-15	06-Feb-15	0	5 Day w/ Hol
A2920	1	Schank	LINE 2 Process Qualification PQ COMPLETE (2/4/15)	L.2	0		06-Feb-15	0	5 Day w/ Hol
A2670	2	Schank	LINE 1 Process Qualification PQ		10	06-Feb-15	19-Feb-15	0	5 Day w/ Hol
A2930	2	Schank	LINE 1 Process Qualification PQ COMPLETE (2/25/15)	L.2	0		19-Feb-15	0	5 Day w/ Hol
N02-102	2	Kroll	LINE 1 Schedule Contingency (Buffer)		1	20-Feb-15	20-Feb-15	0	5 Day w/ Hol
N02-101	1	Kroll	LINE 2 Schedule Contingency (Buffer)		20	09-Feb-15	06-Mar-15	0	5 Day w/ Hol
A2750	2	Tran	LINE 1 Training Runs		30	23-Feb-15	03-Apr-15	0	5 Day w/ Hol
A1870	1	Tran	LINE 2 Training Runs		25	09-Mar-15	10-Apr-15	0	5 Day w/ Hol
N01-102	2	Tran	LINE 1 End to End Runs		15	06-Apr-15	24-Apr-15	0	5 Day w/ Hol
N01-100	1	Tran	LINE 2 End to End Runs		10	13-Apr-15	24-Apr-15	0	5 Day w/ Hol
N01-101	1	Tran	LINE 2 Demo Runs		4	27-Apr-15	30-Apr-15	0	5 Day w/ Hol
N01-103	2	Tran	LINE 1 Demo Runs		4	27-Apr-15	30-Apr-15	0	5 Day w/ Hol
A2590	1	Kroll	Ready for Production (Manufacturing Requirement 4/30/15)	L.1	0		30-Apr-15*	0	5 Day w/ Hol
A1410	1	Kroll	LINE 2 COMPLETE Ready for Production	L.2	0		30-Apr-15	0	5 Day w/ Hol
A2580	2	Kroll	LINE 1 COMPLETE Ready for Production	L.2	0		30-Apr-15	0	5 Day w/ Hol



P6 Multiple Path Tool

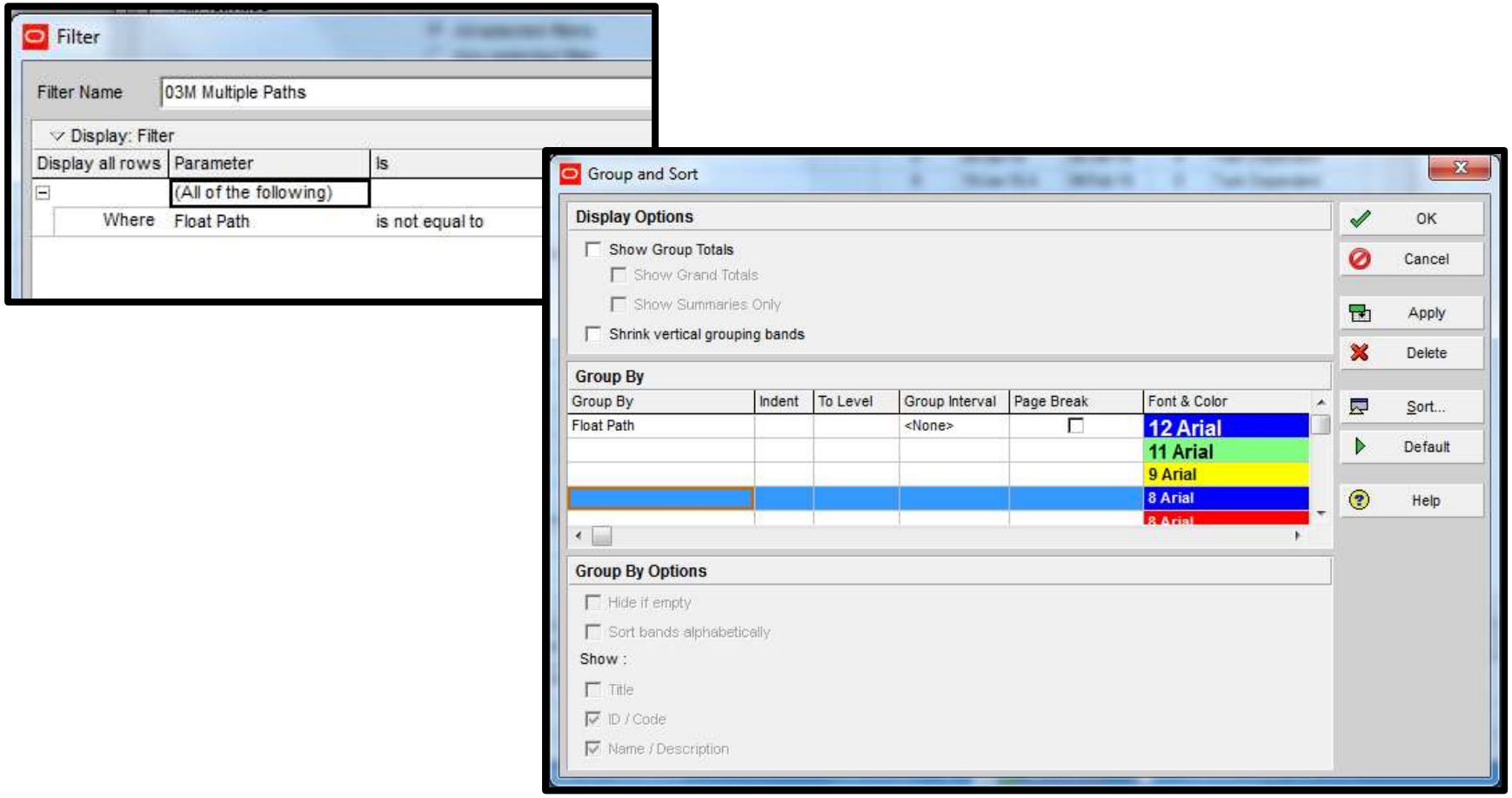
- **From the Schedule window; Options, Advance**



Choose Milestone you want to evaluate

P6 Multiple Path Tool

- **Populates field called Float Path**

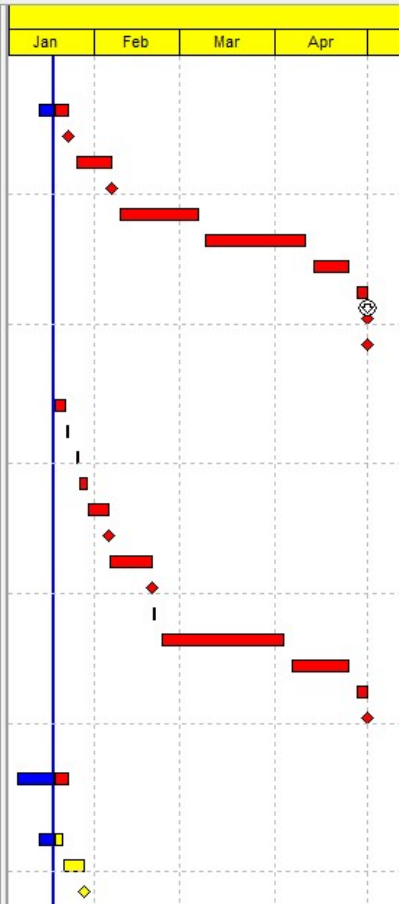


P6 Multiple Path Tool

- **Display of Multiple Path(s)**

Layout: 03M SCH Critical Path Mulitiple | Filter All: 03M Multiple Paths

Activity ID	PATH	RESP	Activity Name	Level	Remaining Duration	Start	Finish	Total Float
1								
A2780	1	Hartman	LINE 2 Full Line OQ		5	14-Jan-15 A	23-Jan-15	0
A5490	1	Hartman	LINE 2 Full Line OQ COMPLETE (1/21/15)	L.2	0		23-Jan-15	0
A1390	1	Schank	LINE 2 Process Qualification PQ		10	26-Jan-15	06-Feb-15	0
A2920	1	Schank	LINE 2 Process Qualification PQ COMPLETE (2/4/15)	L.2	0		06-Feb-15	0
N02-101	1	Kroll	LINE 2 Schedule Contingency (Buffer)		20	09-Feb-15	06-Mar-15	0
A1870	1	Tran	LINE 2 Training Runs		25	09-Mar-15	10-Apr-15	0
N01-100	1	Tran	LINE 2 End to End Runs		10	13-Apr-15	24-Apr-15	0
N01-101	1	Tran	LINE 2 Demo Runs		4	27-Apr-15	30-Apr-15	0
A2590	1	Kroll	Ready for Production (Manufacturing Requirement 4/30/15)	L.1	0		30-Apr-15*	0
A1410	1	Kroll	LINE 2 COMPLETE Ready for Production	L.2	0		30-Apr-15	0
2								
N06-144	2	Hartman	LINE 1 Dividella SAT Functional Tests (2x1hr, 2x30mins)		4	19-Jan-15	22-Jan-15	0
N05-156	2	Hartman	LINE 1 Dividella IQ OQ Calib / PM Verif		1	23-Jan-15	23-Jan-15	0
N06-145	2	Hartman	LINE 1 Dividella IQ OQ SOP Verif		1	26-Jan-15	26-Jan-15	0
N06-146	2	Hartman	LINE 1 Dividella IQ OQ Functional Tests		3	27-Jan-15	29-Jan-15	0
A2900	2	Hartman	LINE 1 Full Line OQ		5	30-Jan-15	05-Feb-15	0
A5500	2	Hartman	LINE 1 Full Line OQ COMPLETE (2/11/15)	L.2	0		05-Feb-15	0
A2670	2	Schank	LINE 1 Process Qualification PQ		10	06-Feb-15	19-Feb-15	0
A2930	2	Schank	LINE 1 Process Qualification PQ COMPLETE (2/25/15)	L.2	0		19-Feb-15	0
N02-102	2	Kroll	LINE 1 Schedule Contingency (Buffer)		1	20-Feb-15	20-Feb-15	0
A2750	2	Tran	LINE 1 Training Runs		30	23-Feb-15	03-Apr-15	0
N01-102	2	Tran	LINE 1 End to End Runs		15	06-Apr-15	24-Apr-15	0
N01-103	2	Tran	LINE 1 Demo Runs		4	27-Apr-15	30-Apr-15	0
A2580	2	Kroll	LINE 1 COMPLETE Ready for Production	L.2	0		30-Apr-15	0
3								
N06-119	1	Hartman	LINE 2 Dividella IQ OQ Functional Tests		5	07-Jan-15 A	23-Jan-15	0
4								
N06-129	3	Hartman	LINE 1 Plunger Rod Inserter Testing - IQ / OQ Functional Tests		3	14-Jan-15 A	21-Jan-15	1
N04-203	3	Hartman	LINE 1 Plunger Rod Inserter Testing - Post Execution Approval pe		5	22-Jan-15	28-Jan-15	1
N04-204	3	Hartman	LINE 1 Plunger Rod Inserter Testing - Post Execution APPROVEL		0		28-Jan-15	1



Reporting the Critical Path

- No Method Seems to Capture it just right
- Propose a hybrid approach
  - Use any method; Float, Longest, Multiple
  - Tag Activity with PATH Activity code
- Report
  - Filter by PATH code
  - Group by PATH code
  - Sort by Finish, Start

Reporting the Critical Path

- **Tag Activity with PATH Activity Code**
  - **Create an Activity Code called PATH**
  - **Populate code with values 1 thru 20**
    - 1 = Critical Path
    - 2 = Path 2, etc.
  - **Create Layout with PATH as a column**
- **Follow the Path**
  - **Start with "Completion Milestone", Tag Activity**
  - **Goto Driving Predecessor, Tag Activity**
  - **Use pop up box or right side floating box**

Reporting Secondary Critical Paths

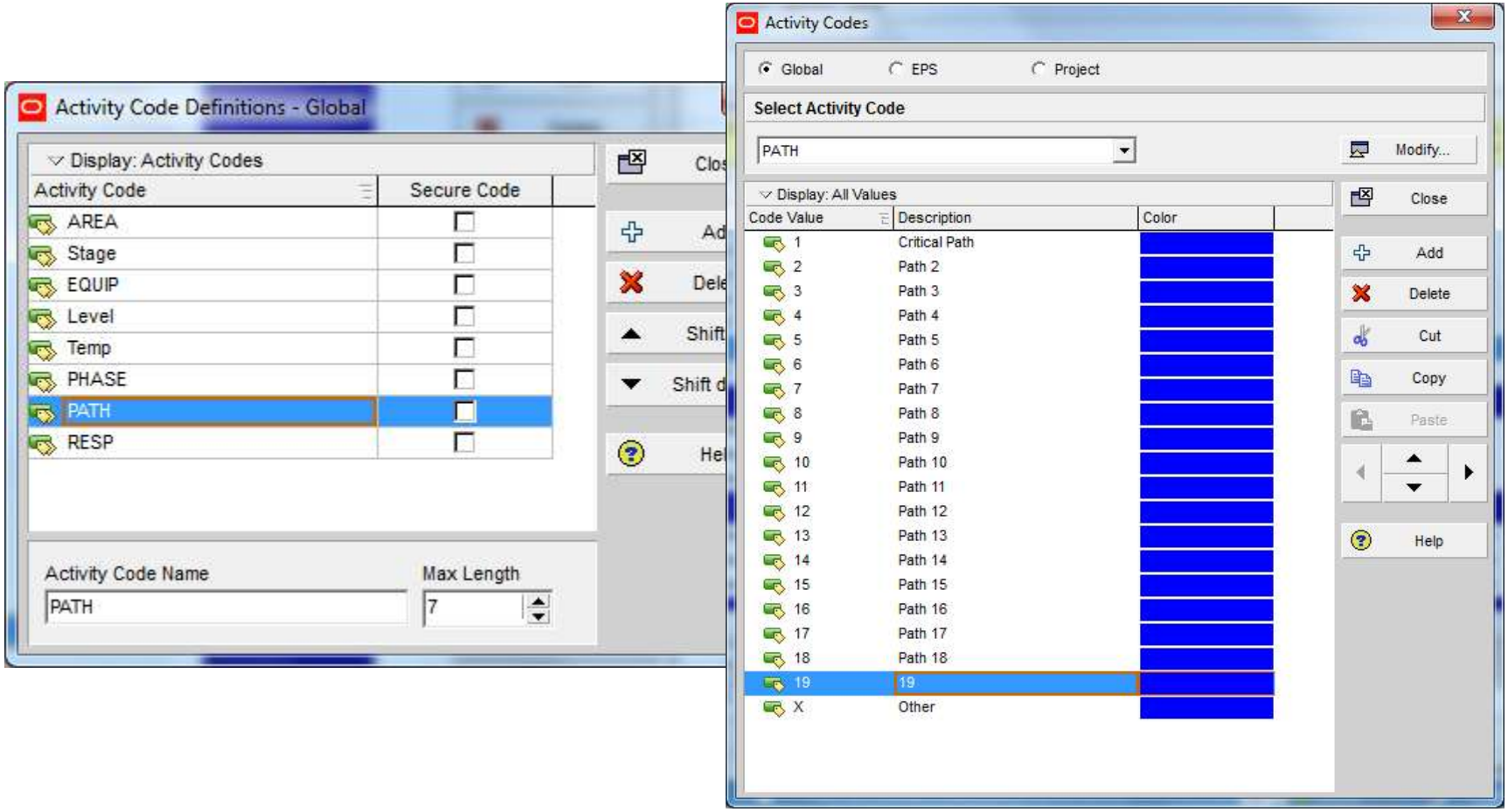
- This is where you earn your keep!!!
- Focus on the Here and Now
  - Suppress activities in future
  - Look ahead filters
- Eliminate Parallel Path for Clarity
  - Remember it's a tool for decisions
- Sometime highlight for discussion
  - Problem Area's

Reporting Critical Path(s)

- The skill Part
  - Tag and Goto Driving Predecessor Activity
  - Follow Branches
- Follow “Path” until
  - Reach a completed activity
  - Reach an in-progress activity
  - Reach a Start Constraint
- Review Report
  - Paths make senses?
  - Change Order (change tag)
  - Remove (delete tag)

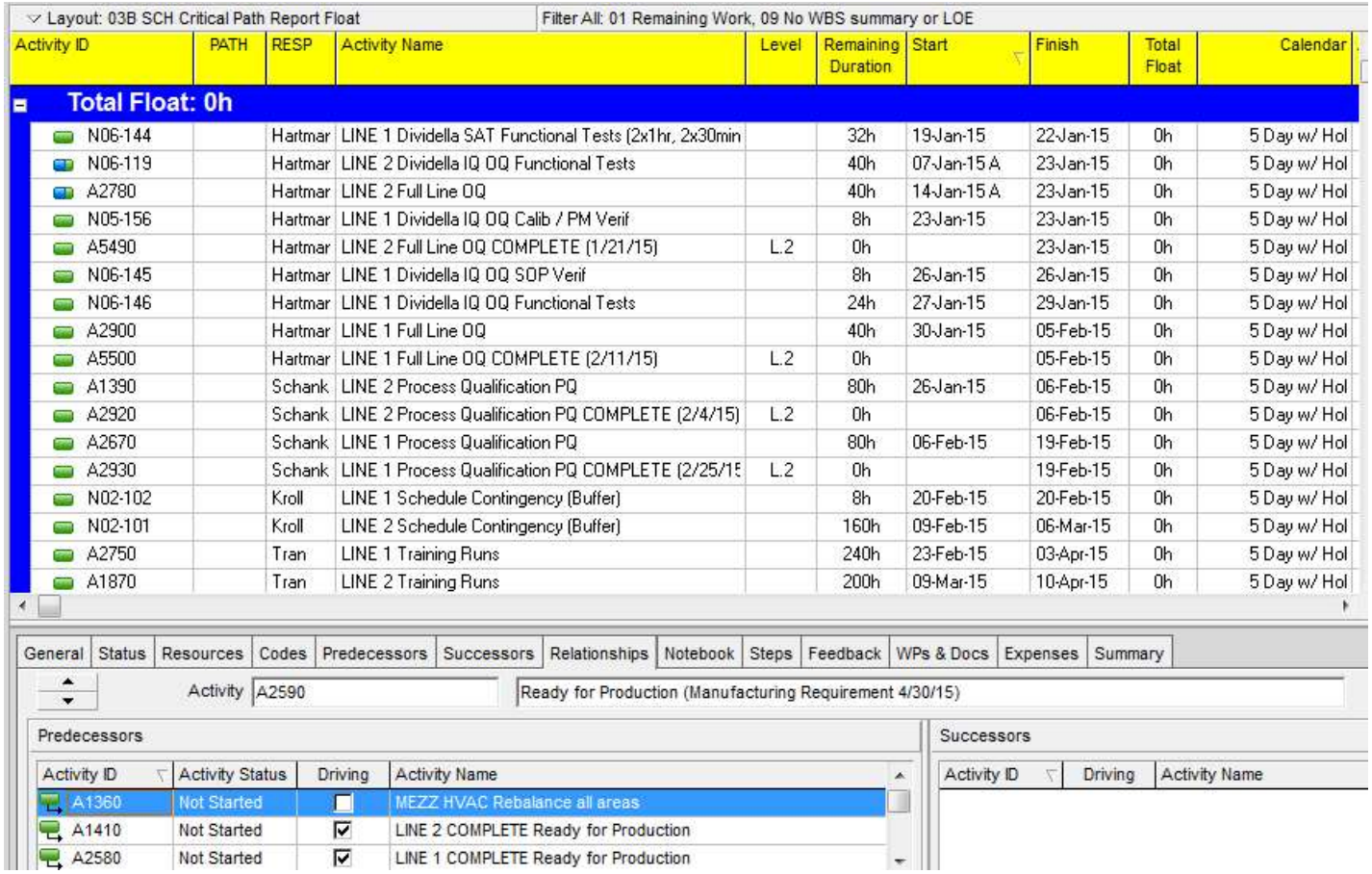
Presentation with Primavera P6

- **Define PATH activity code**



Presentation with Primavera P6

- **Layout Grouped by Float with PATH Column**



Layout: 03B SCH Critical Path Report Float | Filter All: 01 Remaining Work, 09 No WBS summary or LOE

Activity ID	PATH	RESP	Activity Name	Level	Remaining Duration	Start	Finish	Total Float	Calendar
Total Float: 0h									
N06-144		Hartmar	LINE 1 Dividella SAT Functional Tests (2x1hr, 2x30min		32h	19-Jan-15	22-Jan-15	0h	5 Day w/ Hol
N06-119		Hartmar	LINE 2 Dividella IQ OQ Functional Tests		40h	07-Jan-15 A	23-Jan-15	0h	5 Day w/ Hol
A2780		Hartmar	LINE 2 Full Line OQ		40h	14-Jan-15 A	23-Jan-15	0h	5 Day w/ Hol
N05-156		Hartmar	LINE 1 Dividella IQ OQ Calib / PM Verif		8h	23-Jan-15	23-Jan-15	0h	5 Day w/ Hol
A5490		Hartmar	LINE 2 Full Line OQ COMPLETE (1/21/15)	L.2	0h		23-Jan-15	0h	5 Day w/ Hol
N06-145		Hartmar	LINE 1 Dividella IQ OQ SOP Verif		8h	26-Jan-15	26-Jan-15	0h	5 Day w/ Hol
N06-146		Hartmar	LINE 1 Dividella IQ OQ Functional Tests		24h	27-Jan-15	29-Jan-15	0h	5 Day w/ Hol
A2900		Hartmar	LINE 1 Full Line OQ		40h	30-Jan-15	05-Feb-15	0h	5 Day w/ Hol
A5500		Hartmar	LINE 1 Full Line OQ COMPLETE (2/11/15)	L.2	0h		05-Feb-15	0h	5 Day w/ Hol
A1390		Schank	LINE 2 Process Qualification PQ		80h	26-Jan-15	06-Feb-15	0h	5 Day w/ Hol
A2920		Schank	LINE 2 Process Qualification PQ COMPLETE (2/4/15)	L.2	0h		06-Feb-15	0h	5 Day w/ Hol
A2670		Schank	LINE 1 Process Qualification PQ		80h	06-Feb-15	19-Feb-15	0h	5 Day w/ Hol
A2930		Schank	LINE 1 Process Qualification PQ COMPLETE (2/25/15	L.2	0h		19-Feb-15	0h	5 Day w/ Hol
N02-102		Kroll	LINE 1 Schedule Contingency (Buffer)		8h	20-Feb-15	20-Feb-15	0h	5 Day w/ Hol
N02-101		Kroll	LINE 2 Schedule Contingency (Buffer)		160h	09-Feb-15	06-Mar-15	0h	5 Day w/ Hol
A2750		Tran	LINE 1 Training Runs		240h	23-Feb-15	03-Apr-15	0h	5 Day w/ Hol
A1870		Tran	LINE 2 Training Runs		200h	09-Mar-15	10-Apr-15	0h	5 Day w/ Hol

General | Status | Resources | Codes | Predecessors | Successors | Relationships | Notebook | Steps | Feedback | WPs & Docs | Expenses | Summary

Activity A2590 — Ready for Production (Manufacturing Requirement 4/30/15)

Predecessors

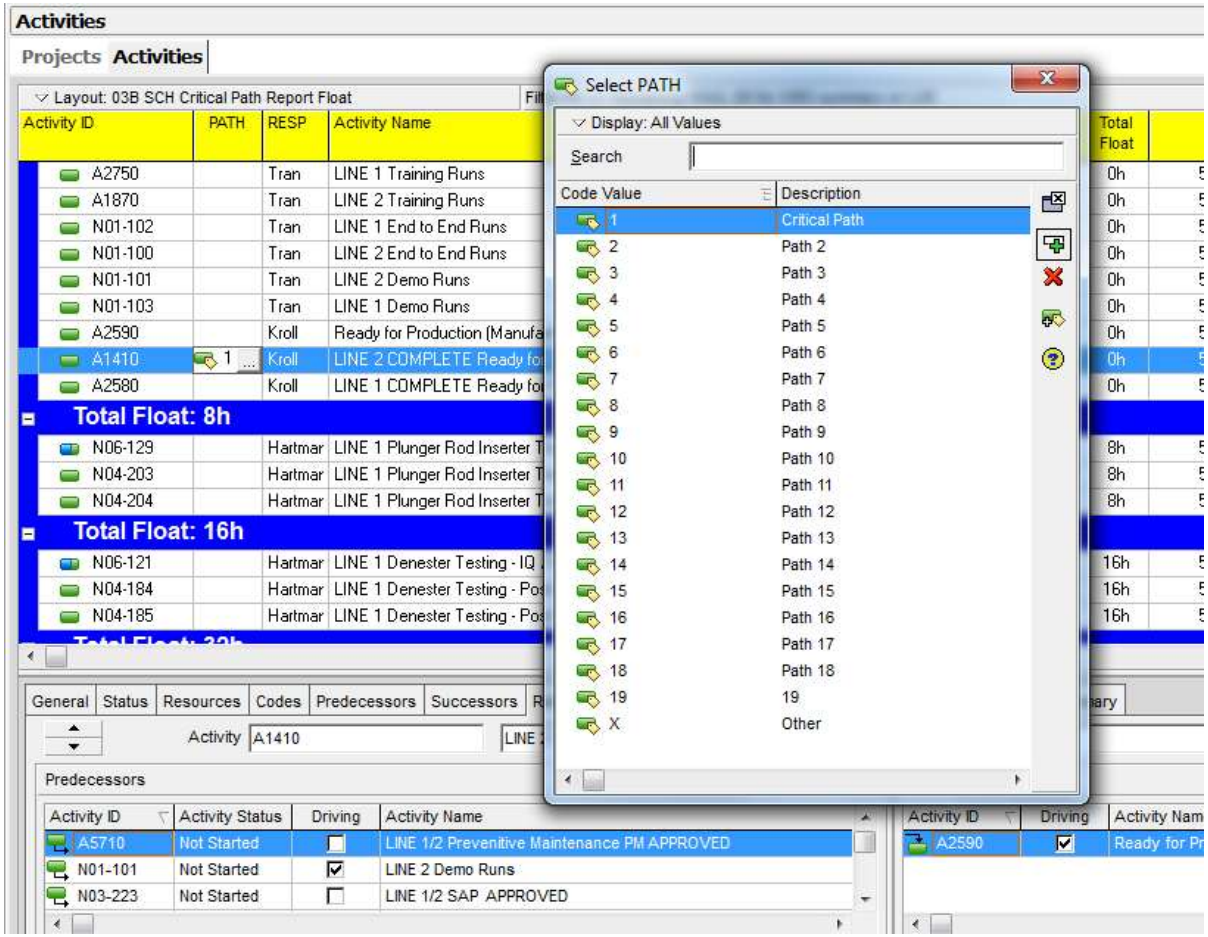
Activity ID	Activity Status	Driving	Activity Name
A1360	Not Started	☐	MEZZ HVAC Rebalance all areas
A1410	Not Started	☑	LINE 2 COMPLETE Ready for Production
A2580	Not Started	☑	LINE 1 COMPLETE Ready for Production

Successors

Activity ID	Driving	Activity Name

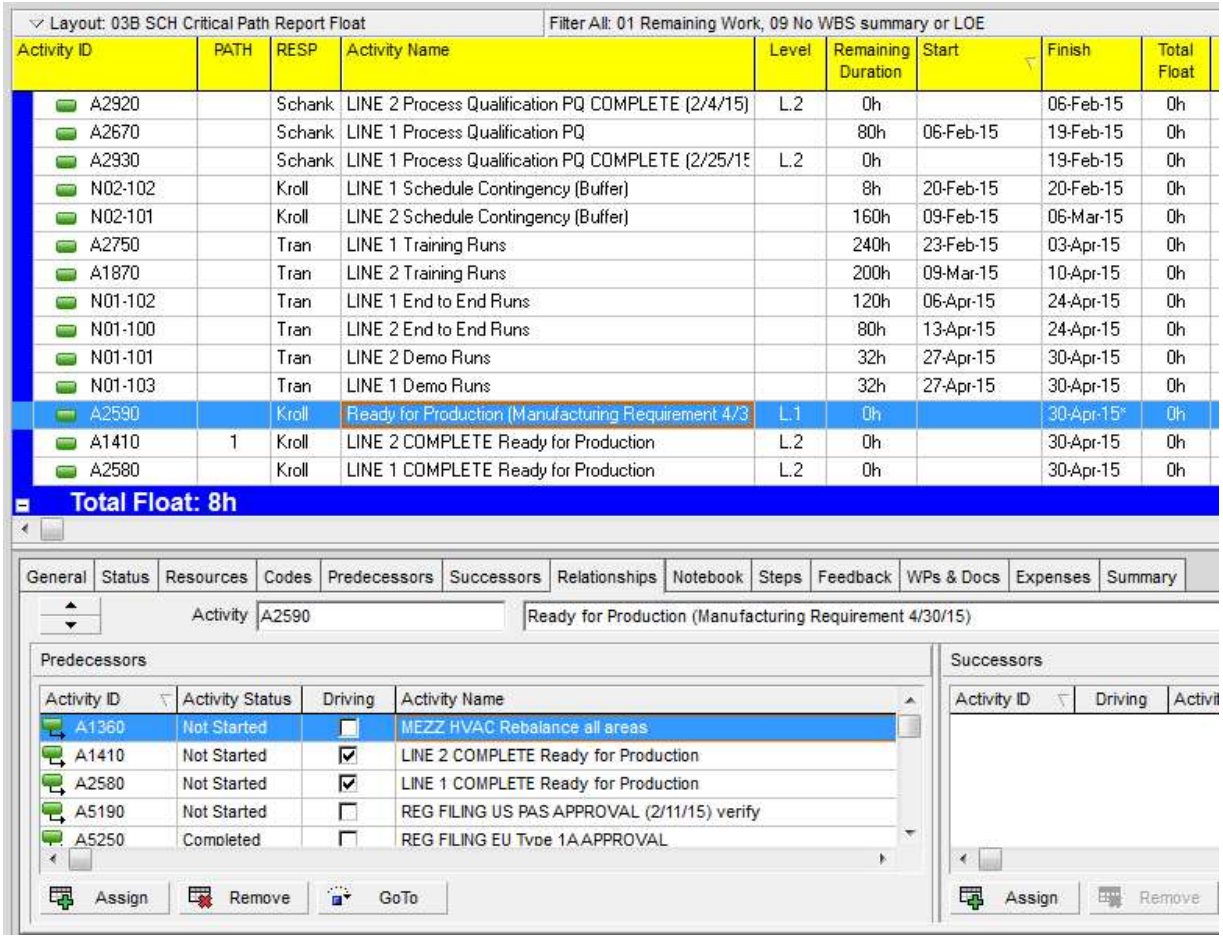
Presentation with Primavera P6

- **Tag Activity with PATH code**



Presentation with Primavera P6

- **Find and GoTo Driving Predecessor**

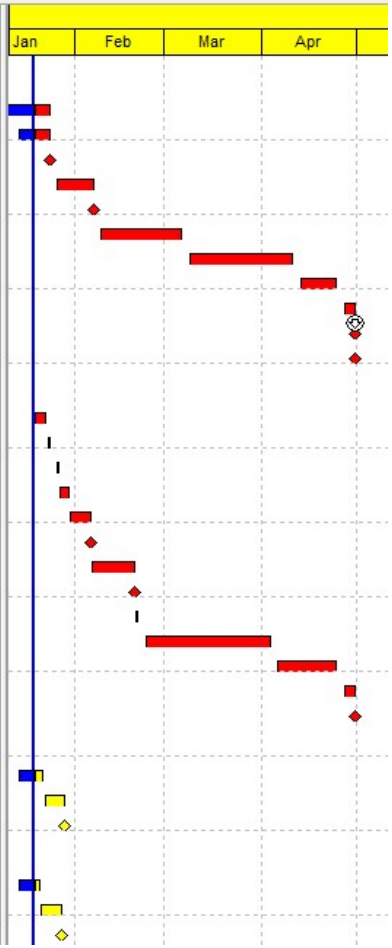


Presentation with Primavera P6

- **Open Layout Filtered and Grouped by PATH code**

Layout: 03D SCH Critical Path Report by Code *** | Filter All: 03C Critical Path Code

Activity ID	PATH	RESP	Activity Name	Level	Remaining Duration	Start	Finish	Total Float
Critical Path								
N06-119	1	Hartman	LINE 2 Dividella IQ OQ Functional Tests		40h	07-Jan-15 A	23-Jan-15	0h
A2780	1	Hartman	LINE 2 Full Line OQ		40h	14-Jan-15 A	23-Jan-15	0h
A5490	1	Hartman	LINE 2 Full Line OQ COMPLETE (1/21/15)	L.2	0h		23-Jan-15	0h
A1390	1	Schank	LINE 2 Process Qualification PQ		80h	26-Jan-15	06-Feb-15	0h
A2920	1	Schank	LINE 2 Process Qualification PQ COMPLETE (2/4/15)	L.2	0h		06-Feb-15	0h
N02-101	1	Kroll	LINE 2 Schedule Contingency (Buffer)		160h	09-Feb-15	06-Mar-15	0h
A1870	1	Tran	LINE 2 Training Runs		200h	09-Mar-15	10-Apr-15	0h
N01-100	1	Tran	LINE 2 End to End Runs		80h	13-Apr-15	24-Apr-15	0h
N01-101	1	Tran	LINE 2 Demo Runs		32h	27-Apr-15	30-Apr-15	0h
A2590	1	Kroll	Ready for Production (Manufacturing Requirement 4/30/15)	L.1	0h		30-Apr-15*	0h
A1410	1	Kroll	LINE 2 COMPLETE Ready for Production	L.2	0h		30-Apr-15	0h
Path 2								
N06-144	2	Hartman	LINE 1 Dividella SAT Functional Tests (2x1hr, 2x30mins)		32h	19-Jan-15	22-Jan-15	0h
N05-156	2	Hartman	LINE 1 Dividella IQ OQ Calib / PM Verif		8h	23-Jan-15	23-Jan-15	0h
N06-145	2	Hartman	LINE 1 Dividella IQ OQ SOP Verif		8h	26-Jan-15	26-Jan-15	0h
N06-146	2	Hartman	LINE 1 Dividella IQ OQ Functional Tests		24h	27-Jan-15	29-Jan-15	0h
A2900	2	Hartman	LINE 1 Full Line OQ		40h	30-Jan-15	05-Feb-15	0h
A5500	2	Hartman	LINE 1 Full Line OQ COMPLETE (2/11/15)	L.2	0h		05-Feb-15	0h
A2670	2	Schank	LINE 1 Process Qualification PQ		80h	06-Feb-15	19-Feb-15	0h
A2930	2	Schank	LINE 1 Process Qualification PQ COMPLETE (2/25/15)	L.2	0h		19-Feb-15	0h
N02-102	2	Kroll	LINE 1 Schedule Contingency (Buffer)		8h	20-Feb-15	20-Feb-15	0h
A2750	2	Tran	LINE 1 Training Runs		240h	23-Feb-15	03-Apr-15	0h
N01-102	2	Tran	LINE 1 End to End Runs		120h	06-Apr-15	24-Apr-15	0h
N01-103	2	Tran	LINE 1 Demo Runs		32h	27-Apr-15	30-Apr-15	0h
A2580	2	Kroll	LINE 1 COMPLETE Ready for Production	L.2	0h		30-Apr-15	0h
Path 3								
N06-129	3	Hartman	LINE 1 Plunger Rod Inserter Testing - IQ / OQ Functional Tests		24h	14-Jan-15 A	21-Jan-15	8h
N04-203	3	Hartman	LINE 1 Plunger Rod Inserter Testing - Post Execution Approval period		40h	22-Jan-15	28-Jan-15	8h
N04-204	3	Hartman	LINE 1 Plunger Rod Inserter Testing - Post Execution APPROVED (to		0h		28-Jan-15	8h
Path 4								
N06-121	4	Hartman	LINE 1 Denester Testing - IQ / OQ Functional Tests		16h	14-Jan-15 A	20-Jan-15	16h
N04-184	4	Hartman	LINE 1 Denester Testing - Post Execution Approval period		40h	21-Jan-15	27-Jan-15	16h
N04-185	4	Hartman	LINE 1 Denester Testing - Post Execution APPROVED (to full OQ)		0h		27-Jan-15	16h



Closing

- **Avoid Pit-Falls**
  - **Use Retain Logic**
  - **Clean up Open Ends**
  - **Clean up Out of Sequence**
  - **For parallel**
    - Do not use negative lags
    - Use SS and FF with positive lags
  - **Do not use FS with a lag**
    - Replace with activities
  - **Do not use On or Mandatory Constraints**

Jonathan Japka, PMP

■ Custom Training ■ P6 Support ■ Scheduling

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- **Services**
  - **Customized P6 Training**
    - Create training based upon your project
  - **Initial Setup / Configurations**
  - **Heath Checks**
    - Review installations analyzing for improvements
  - **Program Scheduling (Multi Projects)**
  - **Project Scheduling**

Jonathan Japka, PMP

■ Custom Training ■ P6 Support ■ Scheduling

For more information please contact:

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