



Risk Practice

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PROJECT MANAGEMENT SOLUTIONS THAT *SIMPLY WORK* SINCE 1989.

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Safe Harbor

- The statements made in this technical presentation are based on our current knowledge of the tools.
- Our statements should not be construed to be an official “Vendor perspective”, but are intended to be the sharing of technical and user knowledge gained as we explore new paths and technologies, usually in advance of our clients.
- You need to make your own judgments as to the application of our shared ideas in your own, unique environment.

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- Authorized Oracle Primavera, Asta Powerproject and PMWeb Software Sales
- Experienced Industry Implementation Specialists & Consultants
 - P6, Contract Management, Unifier, Asta Powerproject, and PMWeb
- Custom Integration, Analytics, Dashboards, Risk and Role-based User Access
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- Cloud Based, Global Managed Hosting Services
- P6 and Asta Cloud Team Deployments Reduce the Risk of Critical Data Loss
- **Project Status**, Java-free Risk and Collaboration Using P6 Web Services
- Contract Management Interface (CMI) – Extend Your PCM Deployment

Tool Matrix

Business Process			
Portfolio Management	P6, Unifier		Portfolios
Planning & Budgeting	Unifier	Powerproject	Planning
Estimating		BidCon	Estimating
CPM Scheduling	P6	Powerproject	Scheduling
Cost Management & Reporting	P6, Unifier	Powerproject	Cost Management
Document Management	Unifier		Doc. Management
Change Management	Unifier		Workflows
BIM/Engineering Forms	Unifier	Asta BIM	Engineering Forms
Risk Analysis	Risk Analysis	Asta Risk	Risk Register
Facility Management/Work Orders	Unifier		Facility Management
Claims Support & Analysis	P6	Powerproject	Scheduling Doc. Management

Agenda

Risk Analysis

- Risk Definitions, Reasons, Methodology
- Sample Demonstration
 - Risk Event Template
 - Sliders
 - P80
 - Schedule Contribution
 - Risk Register
- Pros/Cons Primavera Risk Analysis (PRA) vs Acumen Risk (AR)

Risk Assessments

Risk Analysis Definitions

- Risk: An uncertain event or condition that, if it occurs, has a positive (opportunity) or negative (threat) effect on a project's objectives. Understanding these risks helps to better evaluate and reduce risk exposure, increase confidence, identify areas of potential acceleration of schedule and help establish reasonable contingency
- Threat – situation or condition that is unfavorable to project
 - Negative circumstance
 - Risk with negative impact
- Opportunity – situation or condition that is favorable to project
 - Positive circumstance
 - Risk with positive impact

Risk Assessments

Risk Analysis Definitions (Con't)

- Uncertainty – lack of knowledge about an event that reduces confidence in conclusions drawn from the data.
 - Cost
 - Time
 - Work effort
 - Quality requirements



Risk Assessments

Risk Analysis Workshop – Why/When do it...

Why

- Identify/Quantify potential events causing delay/cost increase to Project
 - Incomplete design
 - Inadequate site investigation
 - Unrealistic schedule/budget
 - Permit requirements
 - Weather
 - Supplier's/contractor's ability to deliver
 - Public relations
 - Unforeseen conditions...
- Optimize Project Performance, identify Critical activities, create Transparency, predictability, minimize surprises-early warning



Risk Assessments

Risk Analysis Workshop – Why/When do it...

When

- Before entering into a Funding gate
- Before/during Engineering Phase
- Before starting Construction – evaluating competing bids for equipment for example
- As often as it feels necessary to capture/evaluate/mitigate/eliminate risk affecting ultimate project goal – Completing project
 - Some groups review Portfolio quarterly
 - Some review yearly (ex. LRP cycle)
 - Partner review initiated

Many times it is seen as a one time event but in these large scale projects spanning several years, risk assessments should be done frequently, if nothing else, to update the risk register and adjust for risk past and for new risks surfacing. Proactively performing Risk is best done throughout the life cycle

Risk Assessments

Risk Analysis Workshop - *Process*

- Review of CPM schedule for duration and logic integrity (Schedule Quality)
 - Use of Acumen Fuse for identifying issues
 - Schedule quality key to driving valuable Risk outcomes
- Identify Uncertainty Ranging of activities in schedule (adjust for wobble)
 - Maybe more certainty around Engineering durations but less certainty over Construction durations (with Acumen-could be reviewed at WBS)
 - Validate these ranges and inputs with Project team for buy-in
 - Careful not to be too optimistic, management directives
 - Compare against past performance if available
- Identification of Risk Events with project team (Risk Register)
 - Establish Risk Template ranges
 - Could involve risk mitigation during exercise (usually after having analysis and mitigating known critical risk)

Risk Assessments

Risk Analysis Workshop - *Process*

- Run the Risk Analysis
 - Uncertainty Only
 - Uncertainty plus Risk Events (Full Risk Exposure)
 - Identify top contributing activities and risk events
 - Propose/evaluate risk handling – Schedule and Cost Estimate **MUST** be updated to show new work from accepted risk handling
- Optimize schedule from above results (scenario planning)
 - Could mean rebaseline using P80 schedule results
 - Mitigate Risks
 - Exclude show-stoppers

Risk Assessment Tool


Demonstration

- Risk Event Template
- Acumen Summary by WBS showing Duration “Slider” and dates to WBS level #
- Running Risk Analysis – roll the dice
- P80 Report
- Schedule Contribution (Tornado chart)

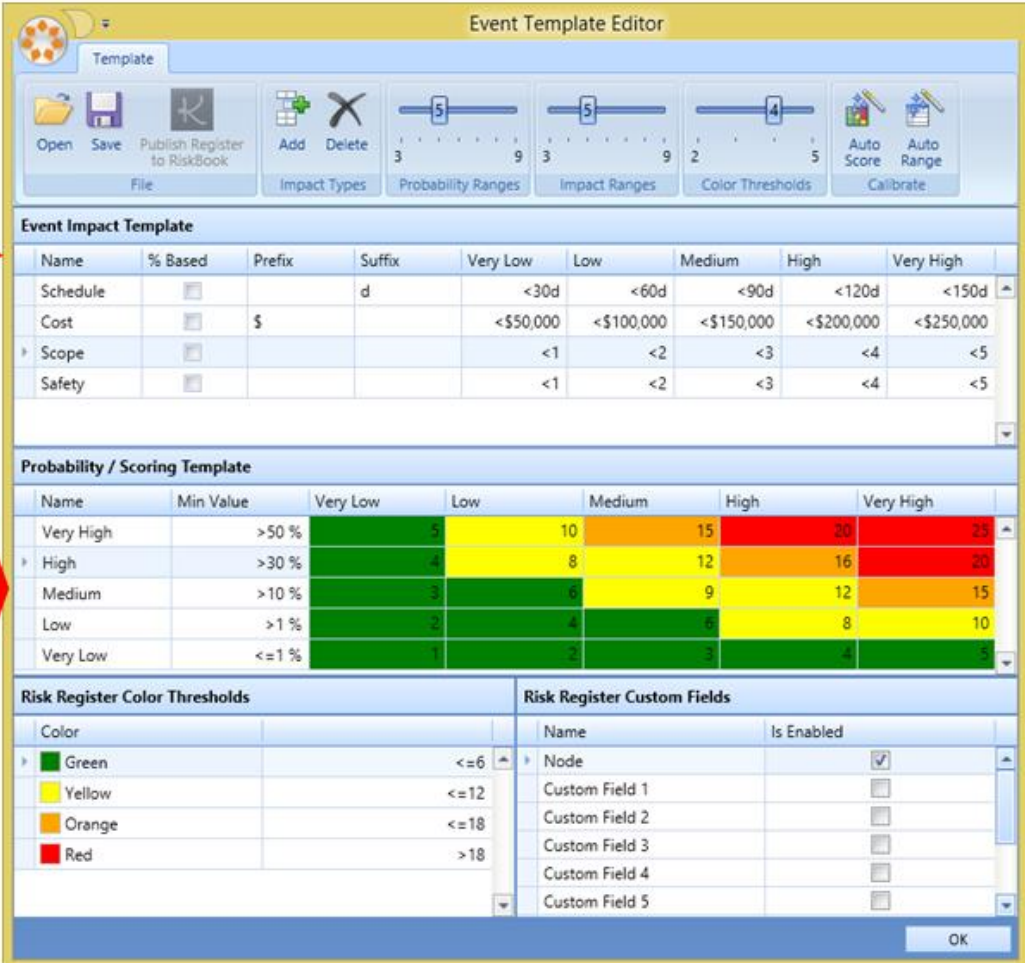
Risk Assessment Tool

Risk Event Template

A. Acumen Risk Event Template

The Acumen Risk template,  has been set to match the Risk Profile as provided in Excel on 2/14/15 (below).

1			
2	Likelihood Rating⁽¹⁾	Chance Of Occuring⁽¹⁾	Assumed Probability⁽²⁾
3	1	0 - 1%	0.50%
4	2	1 - 10%	5%
5	3	10 - 30%	20%
6	4	30 - 50%	40%
7	5	> 50%	75%
8			
9	Source:		
10	(1) Per risk register provided by CLNG 11/28/14 ("RiskRegisterSummary"), "Criteria" tab.		
11	(2) Assumed Probability is taken as the average of the Chance Of Occurring.		



Event Impact Template

Name	% Based	Prefix	Suffix	Very Low	Low	Medium	High	Very High
Schedule	<input type="checkbox"/>		d	<30d	<60d	<90d	<120d	<150d
Cost	<input type="checkbox"/>	\$		<\$50,000	<\$100,000	<\$150,000	<\$200,000	<\$250,000
Scope	<input type="checkbox"/>			<1	<2	<3	<4	<5
Safety	<input type="checkbox"/>			<1	<2	<3	<4	<5

Probability / Scoring Template

Name	Min Value	Very Low	Low	Medium	High	Very High
Very High	> 50 %	5	10	15	20	25
High	> 30 %	4	8	12	16	20
Medium	> 10 %	3	6	9	12	15
Low	> 1 %	2	4	6	8	10
Very Low	<= 1 %	1	2	3	4	5

Risk Register Color Thresholds

Color	Threshold
Green	<= 6
Yellow	<= 12
Orange	<= 18
Red	> 18

Risk Register Custom Fields

Name	Is Enabled
Node	<input checked="" type="checkbox"/>
Custom Field 1	<input type="checkbox"/>
Custom Field 2	<input type="checkbox"/>
Custom Field 3	<input type="checkbox"/>
Custom Field 4	<input type="checkbox"/>
Custom Field 5	<input type="checkbox"/>

Risk Assessment Tool

Summary WBS showing Duration Uncertainty “Sliders”

Sliders

Id	Description	Remaining...	Duration Uncertainty	%	CLT	Rem....	Start	Finish	Total Float
	Current Schedule	504d			<input type="checkbox"/>	100w	1/1/2010	2/4/2014	-366d
	Current Schedule	504d			<input type="checkbox"/>	100w	1/1/2010	2/4/2014	-366d
0090	Handover	0d		100 %	<input type="checkbox"/>	0w	12/26/2013	12/26/2013	0d
0100	Project Finish	0d		100 %	<input type="checkbox"/>	0w	2/4/2014	2/4/2014	0d
0110	Project Start	0d		100 %	<input type="checkbox"/>	0w	1/1/2010	1/1/2010	0d
Current Schedule.0010	Concept	0d			<input type="checkbox"/>	0w	1/1/2010	3/1/2012	-366d
Current Schedule.0020	Early Design	0d			<input type="checkbox"/>	0w	6/14/2010	9/28/2010	0d
Current Schedule.0030	FEED	48d			<input type="checkbox"/>	9w	11/12/2010	5/8/2012	-91d
Current Schedule.0040	Detailed Design	48d			<input type="checkbox"/>	9w	11/9/2010	5/7/2012	-366d
Current Schedule.0050	Procurement	155d			<input type="checkbox"/>	31w	2/1/2010	10/4/2012	-310d
Current Schedule.0060	Manufacturing	77d			<input type="checkbox"/>	15w	10/10/2012	1/24/2013	-49d
Current Schedule.0070	Construction	224d			<input type="checkbox"/>	44w	1/24/2013	12/5/2013	0d
Current Schedule.0080	Commissioning	74d			<input type="checkbox"/>	14w	9/4/2013	12/18/2013	0d

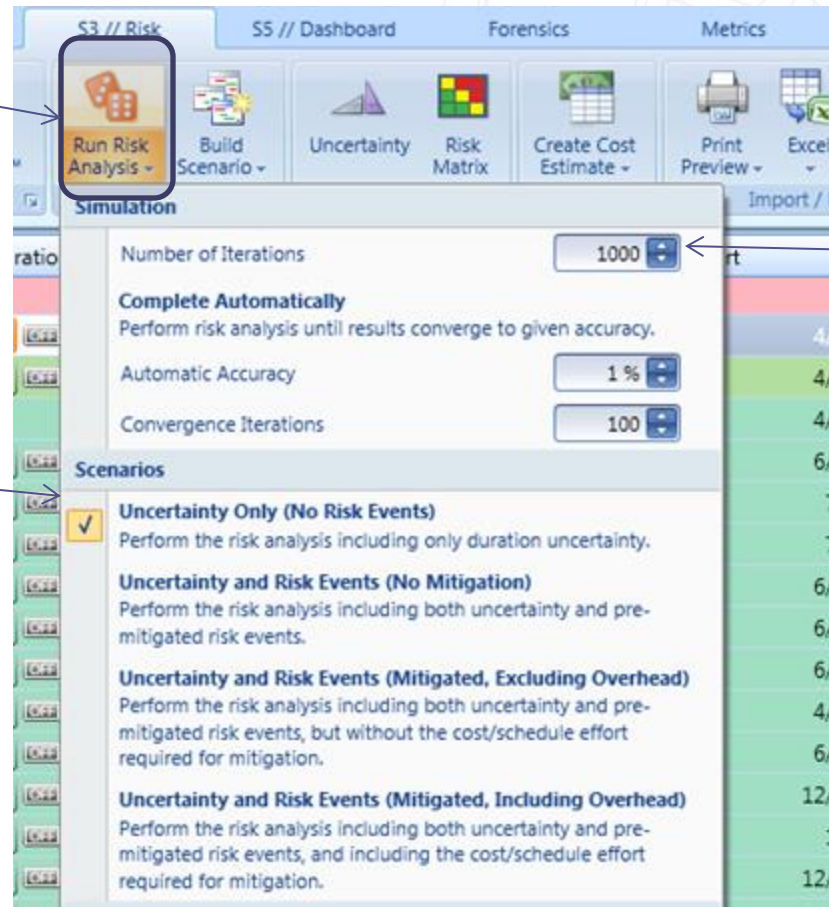
Name	Type	Min	Most Likely	Max
Very Conservative	Triangle	50%	100%	100%
Conservative	Triangle	75%	100%	105%
Realistic	Triangle	90%	100%	110%
Aggressive	Triangle	95%	100%	125%
Very Aggressive	Triangle	100%	100%	150%

Indicator of Risk being assigned to Activities or WBS

Risk Assessment Tool

Run Risk Analysis – Roll the dice

Click of lower box brings up pulldown



Iterations

Scenarios

Risk Assessment Tool

Run Risk Analysis – Roll the dice

Interaction



Repeatability



Activity
Correlation



Perform the risk analysis including both uncertainty and pre-mitigated risk events, and including the cost/schedule effort required for mitigation.

Interaction

- Automatic**
Automatically run all of the risk analysis iterations using multiple CPU cores. (Fastest)
- Interactive**
Automatically run risk analysis iterations and view the values changing during the execution. (Fast)
- Diagnose**
Manually run each risk analysis iteration and view the values changing during execution. (Slow)

Repeatability

- Use Fixed Seed
- Seed Value:

Activity Correlation

- Use correlation to link activities

Hierarchical Risk Models

- Use Correlation to Overcome the Central Limit Theorem.
- Correlation Coefficient:

Cost/Schedule Integration

- Account for cost of schedule risk impact

Risk Assessment Tool

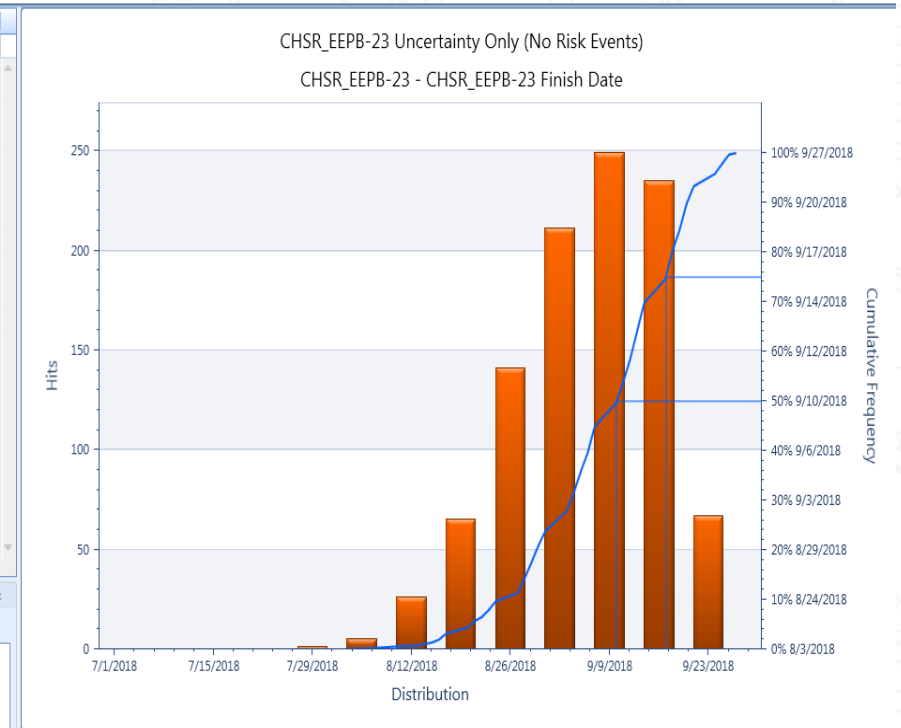
Run Risk Analysis – Initial output

Id	Description	Remaining...	Duration Uncertainty	Type	%	CLT	Cor...	Rem....	Start
CHSR_EEPB-23	CHSR_EEPB-23	651d						130w	4
CHSR_EEPB-23	CHSR - Palmdale t...	651d						130w	4
CHSR_EEPB-23.0	California High-Sp...	0d						0w	4
CHSR_EEPB-23.1	1 Project Manage...	650d						129w	6
CHSR_EEPB-23.2	2 Public/Agency Pa...	650d						129w	6
CHSR_EEPB-23.3	3 Project Definition	117d						23w	6
CHSR_EEPB-23.4	4 Preliminary Engin...	362d						72w	6
CHSR_EEPB-23.5	5 ED Analysis	566d						113w	6
CHSR_EEPB-23.6	6 Station Area Plan...	305d						60w	6
CHSR_EEPB-23.7	7 Draft and Final E...	422d						84w	4
CHSR_EEPB-23.8	8 Certification ED,...	421d						84w	6
CHSR_EEPB-23.10	4.11 Infrastructure...	360d						71w	12
CHSR_EEPB-23.11	11 Preliminary Engi...	129d						25w	12
CHSR_EEPB-23.12	4.12 Systems 30%	120d						23w	12
CHSR_EEPB-23.13	4.17 Capitol Cost E...	20d						3w	12
CHSR_EEPB-23.14	4.19 Design Submi...	40d						7w	12
CHSR_EEPB-23.A	Summary of Enviro...	649d						129w	4
CHSR_EEPB-23.B	ROLLUP: Cost-by-T...	650d						129w	4
CHSR_EEPB-23.H	Milestones	651d						130w	4

CHSR_EEPB-23 - CHSR_EEPB-23

General Status Relationships Duration Uncertainty Cost Uncertainty Cost Resource Assignments Risk Events Settings

Id	CHSR_EEPB-23	Description	CHSR_EEPB-23
Project	CHSR_EEPB-23	WBS	
Type	Project	Calendar	Standard
Platform	Oracle Primavera P6	Author	0203374
Original Project Name	CHSR_EEPB-23	Date Imported	1/25/2016 3:55:54 PM
Original File Path	C:\Users\d\townsend\Desktop\CHSR_EEPB December.xer	Imported	<input checked="" type="checkbox"/>

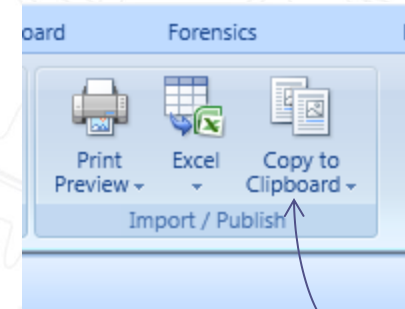
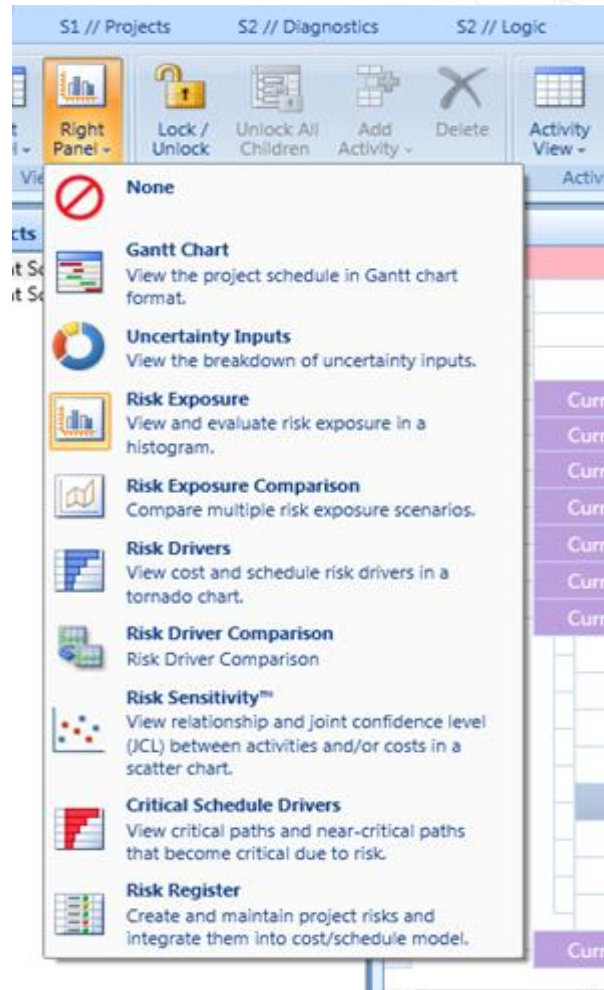


Metric	Value
Deterministic - 0 %	7/2/2018
Mean (P48)	9/8/2018
P0 - Best Case	8/3/2018
P50	9/10/2018
P75	9/17/2018
P100 - Worst Case	9/27/2018
Range	55 days
Risk Range Factor	6 %

Risk Assessment Tool

Risk Model Outputs – Left/Right Screen changes

- Various Views possible depending on Desired review.
- Any active screen can be copied to Clipboard for pasting into Word or Excel
- Version 8 - 3Q 2016 will include an Exec Report function to automatically include several of these graphics

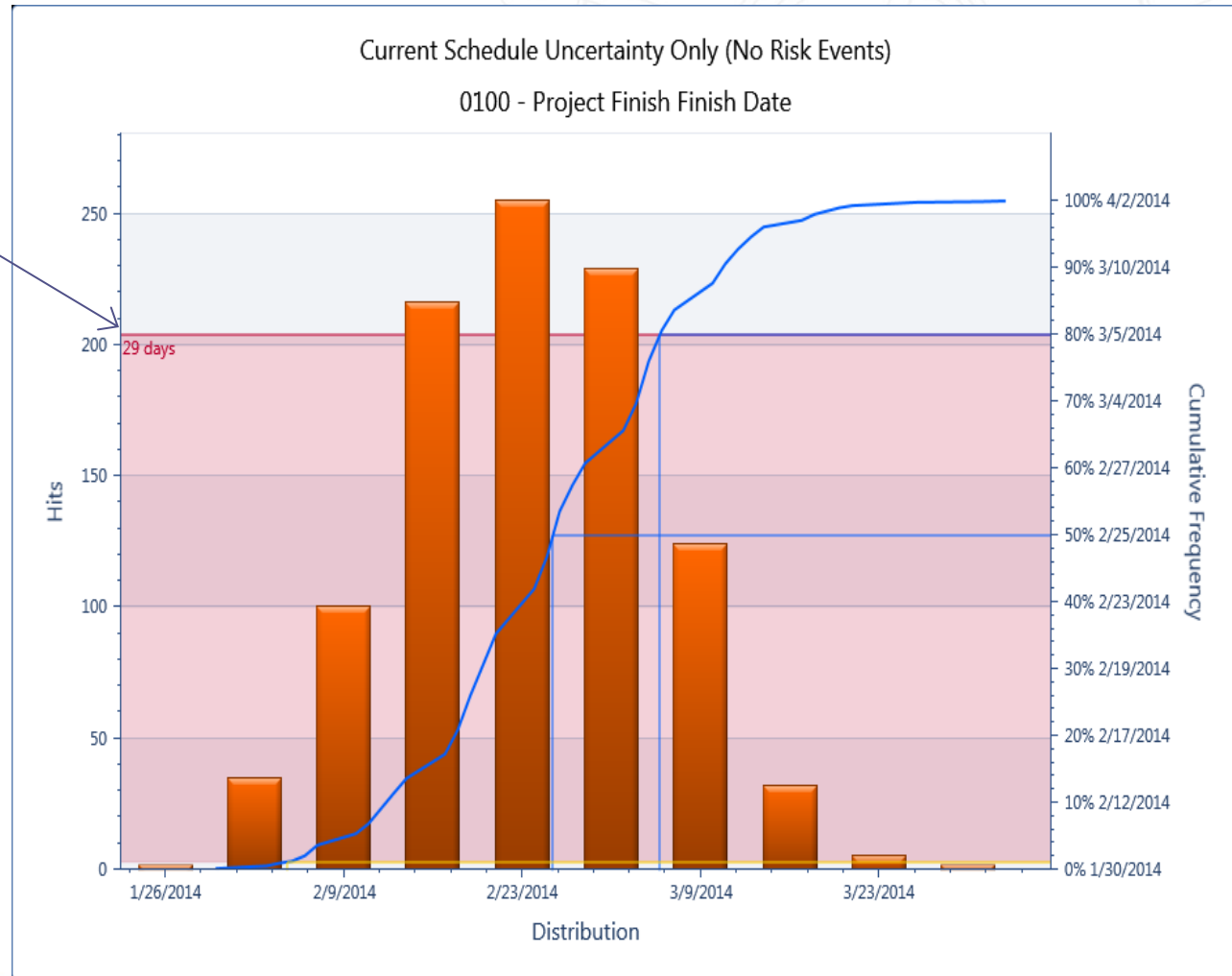


Copy to Clipboard

Risk Assessment Tool

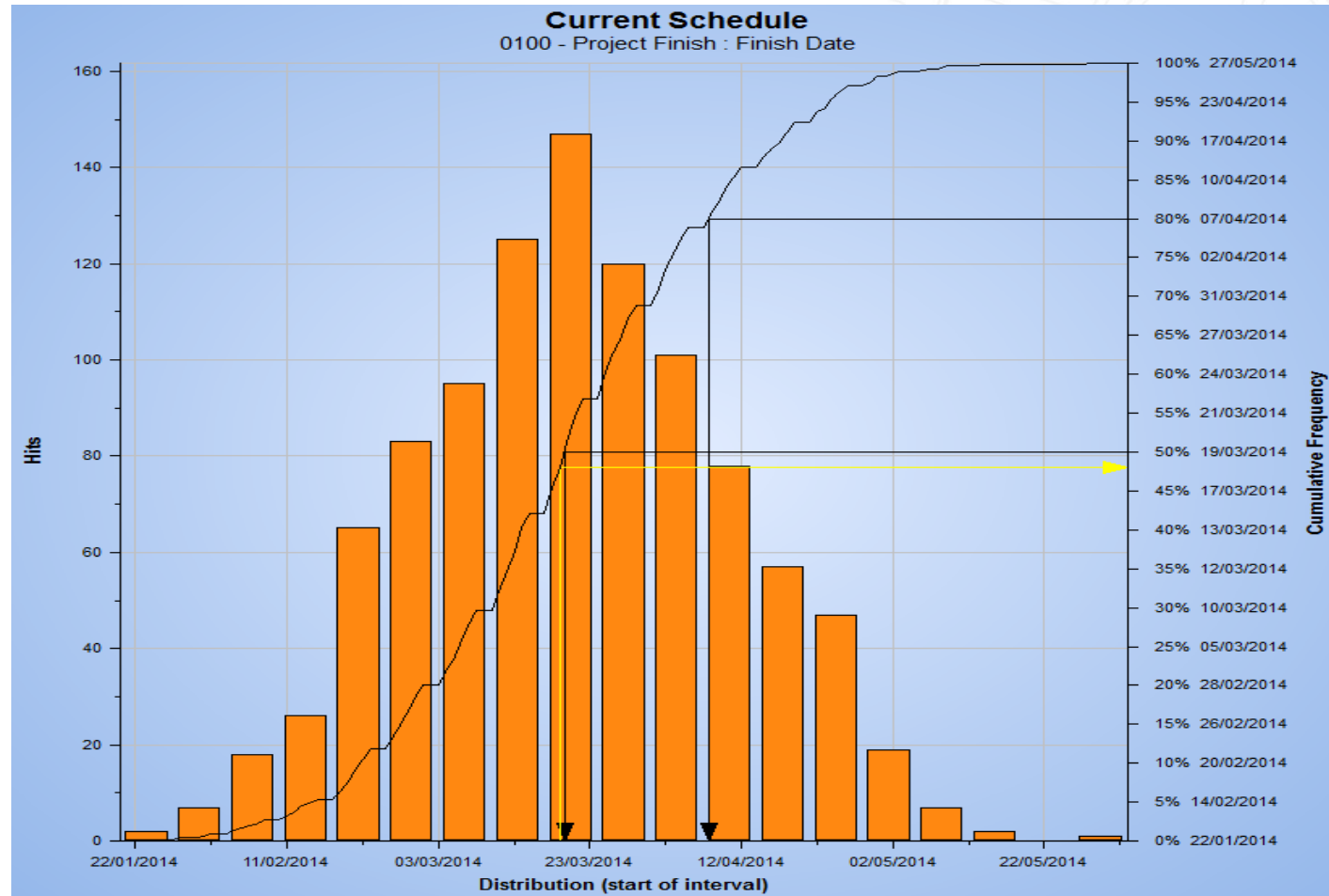
P80 Report (AR) – Can select any activity/milestone in Schedule

Measure of P80 contingency to the Deterministic



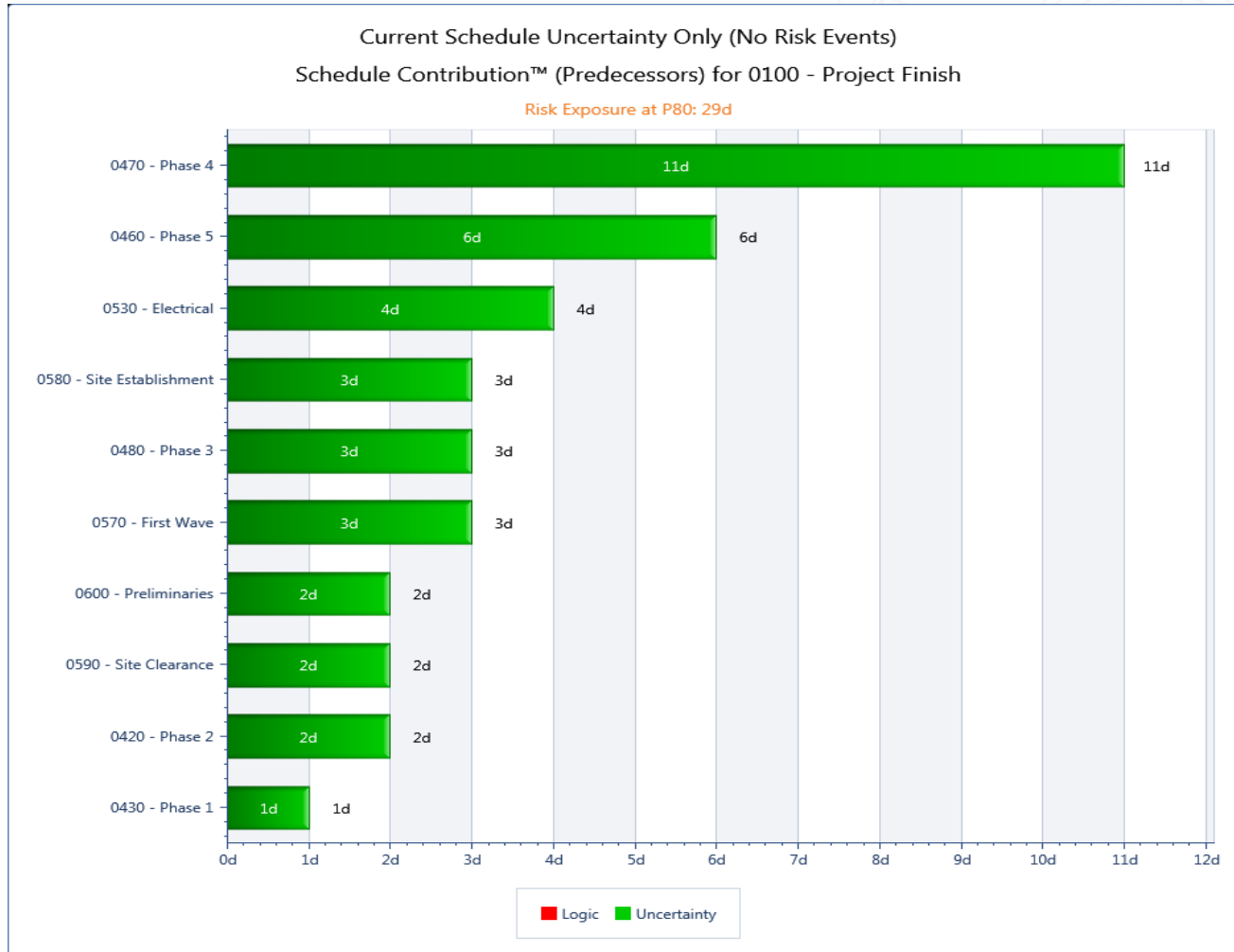
Risk Assessment Tool

P80 Report (PRA) – Can select any activity/milestone in Schedule



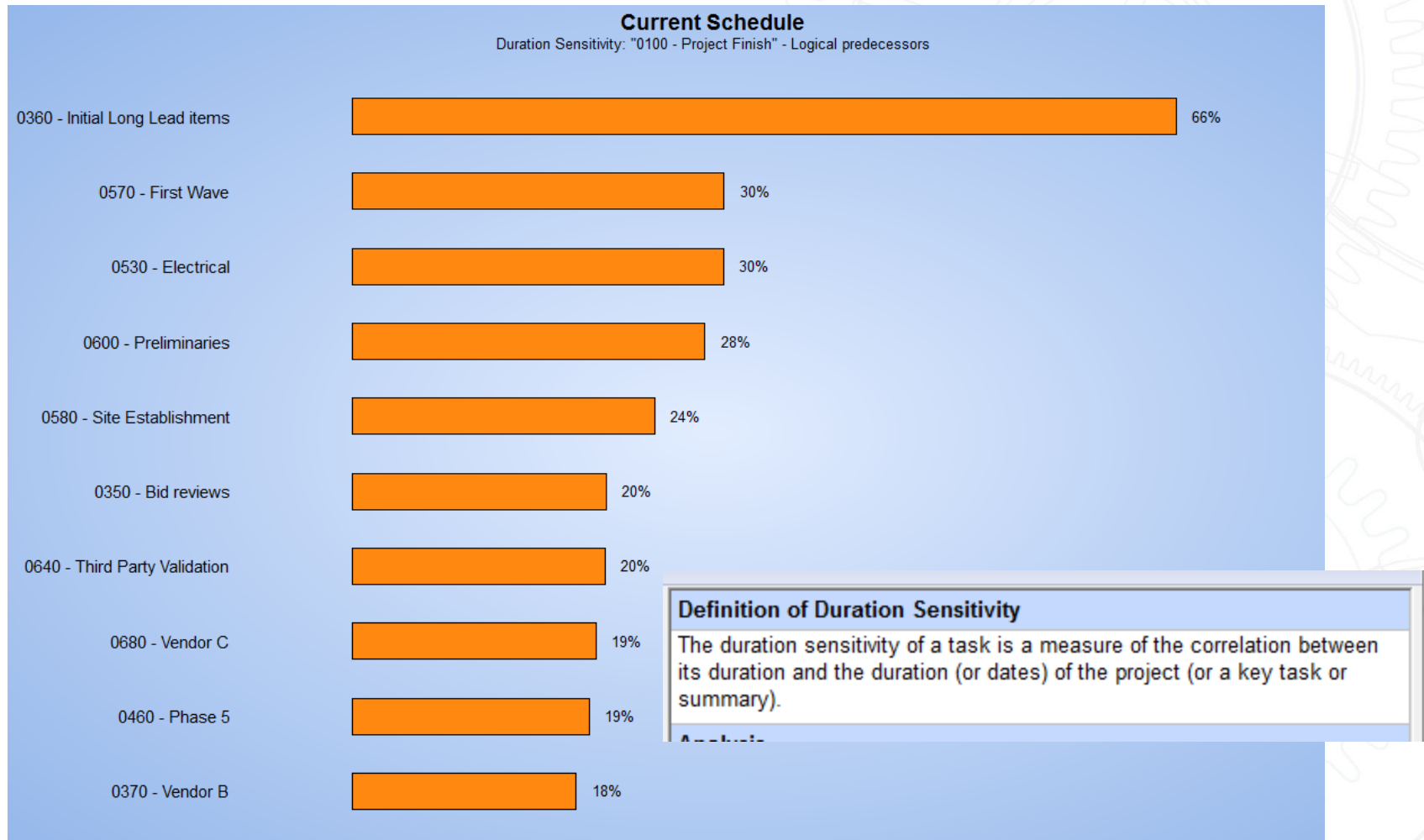
Risk Assessment Tool

Schedule Contribution - AR



Risk Assessment Tool

Schedule Contribution - PRA

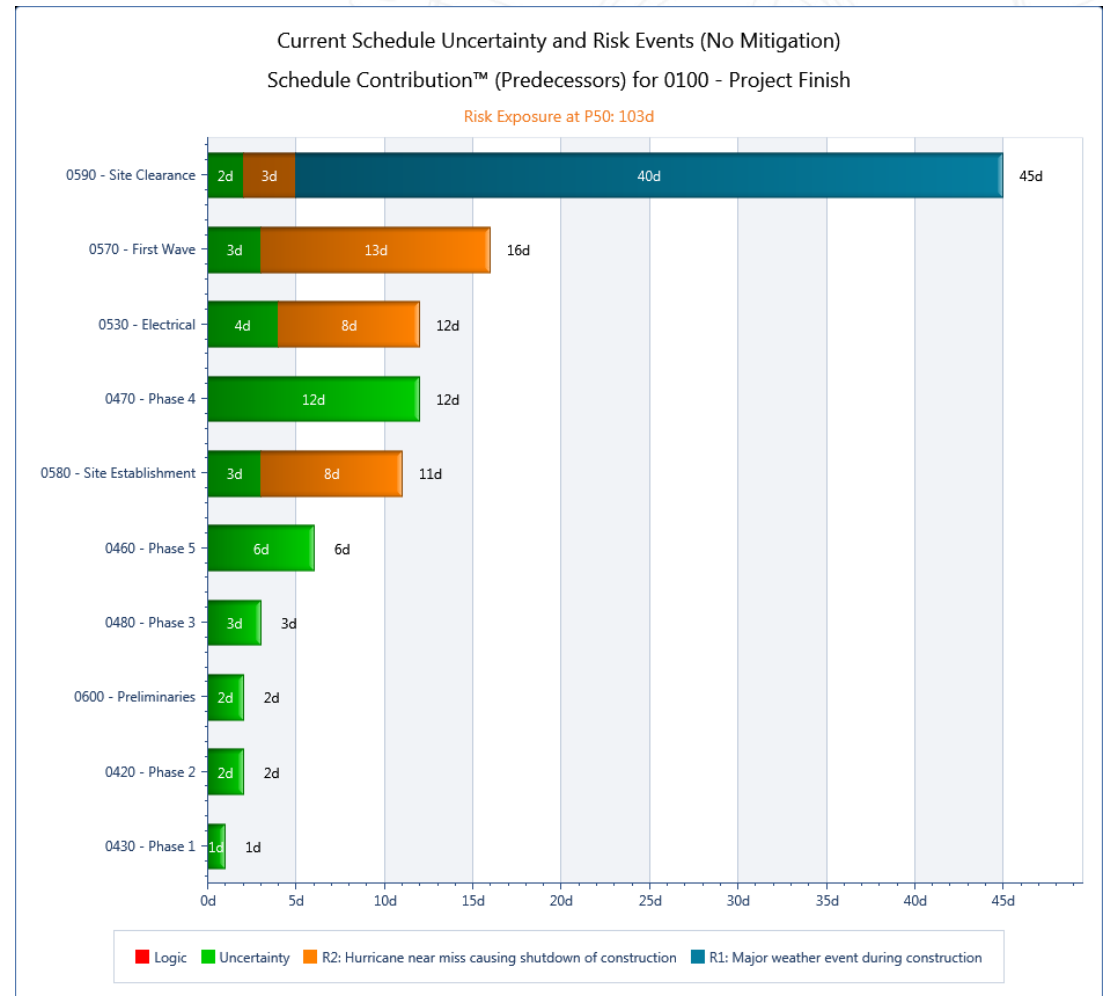


Risk Assessment Tool

Schedule Contribution - AR

Indicating all types of drivers for impacting Project Finish (and days associated with each)

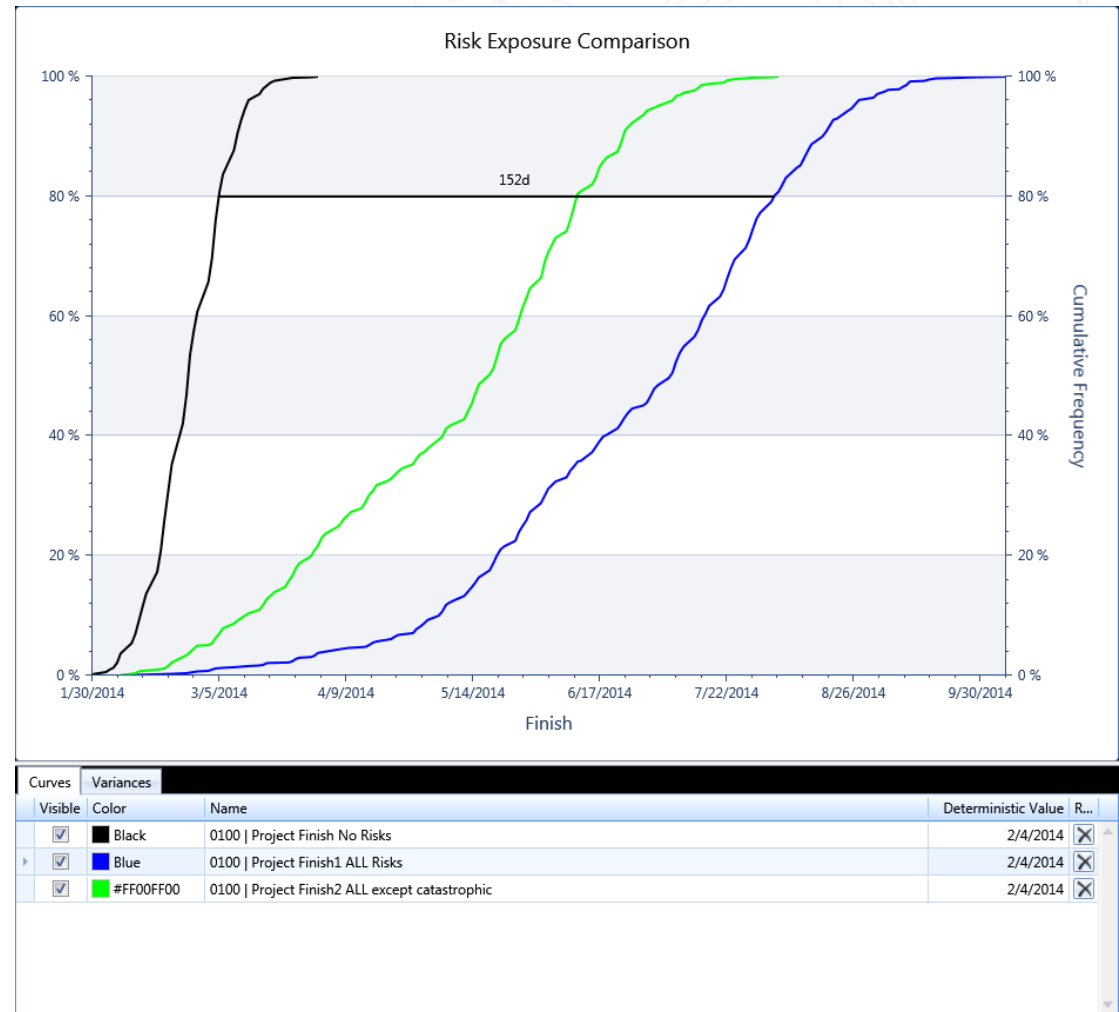
- Logic
- Uncertainty
- Hurricane near miss
- Major weather event



Risk Assessment Tool

Risk Exposure Comparison

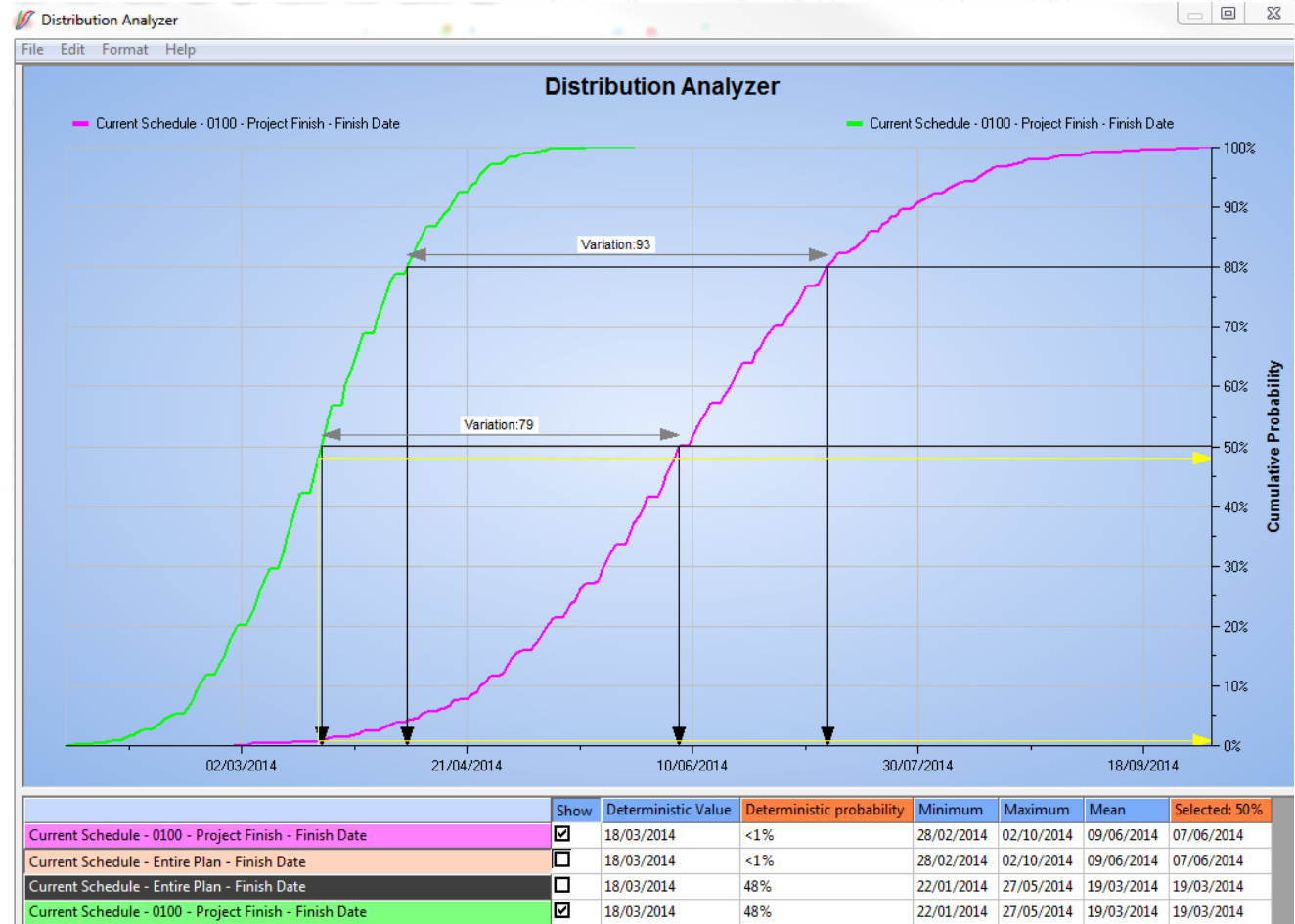
Measuring difference between applying NO risk vs ALL risks



Risk Assessment Tool

Risk Exposure Comparison (PRA)

Measuring difference between 2 runs with different risks applied



Risk Assessment Tool

Risk Register – Hurricane Example

Risk					Current			
Enabled	Absolu...	ID	Type	Name	Probability	Schedule	Cost	Score
<input type="checkbox"/>	<input type="checkbox"/>							
<input type="checkbox"/>	<input type="checkbox"/>	R1		Inadequate schedule or improper controls to maintain schedule by EPC contractor	Low	Medium	High	8
<input type="checkbox"/>	<input checked="" type="checkbox"/>	R2		Major weather event affects site during construction	High	Medium	High	16
<input type="checkbox"/>	<input checked="" type="checkbox"/>	R3		Major weather event affects region during construction	High	High	High	16
<input type="checkbox"/>	<input type="checkbox"/>	R4		Ongoing construction activities damage operating trains of existing facilities	Very Low	Low	High	4
<input type="checkbox"/>	<input type="checkbox"/>	R5		Delay of construction dock competition for receiving materials	Low	Low	Very Low	4
<input checked="" type="checkbox"/>	<input type="checkbox"/>	R6		Hurricane near miss causing shutdown of construction	High	Low	Medium	12
<input type="checkbox"/>	<input checked="" type="checkbox"/>	R7		Piping discipline Labor shortage Train 1	High	High	High	16
<input type="checkbox"/>	<input checked="" type="checkbox"/>	R8		Piping discipline Labor shortage Train 3	High	High	High	16

Id Name

Type Threat Opportunity Calendar Event Risk Window

On	Month	Probability	Min	Most Likely	Max
<input checked="" type="checkbox"/>	June	20 %	3 d	5 d	10 d
<input checked="" type="checkbox"/>	July	30 %	5 d	6 d	12 d
<input checked="" type="checkbox"/>	August	50 %	5 d	10 d	15 d
<input checked="" type="checkbox"/>	September	60 %	5 d	10 d	15 d
<input checked="" type="checkbox"/>	October	50 %	5 d	10 d	15 d
<input checked="" type="checkbox"/>	November	20 %	2 d	3 d	5 d
<input type="checkbox"/>	December	0 %	0 d	0 d	0 d

Risk Assessment Tool

Mitigation Analysis – New to latest Version (7.0)

- Ability to access if Mitigation will reduce Project Risk and if the improvement will be worth the Investment
 - Easy to run Scenario basis including and excluding certain Mitigation steps
 - Add as many steps as necessary to Mitigate a given Risk
 - Apply Duration, Cost and Probability

Risk Assessment Tool

Mitigation Analysis – New to latest Version



- Listing of Steps
 - Add as many Steps as required to Mitigate
 - Include/Exclude Steps running different scenarios

Risk Register

Drag a column header here to group by that column

Risk					Current				Mitigation				Mitigated			
Enabled	Absolu...	ID	Type	Name	Probability	Schedule	Cost	Score	Enabled	Description	Duration	Cost	Probability	Schedule	Cost	Score
<input type="checkbox"/>	<input type="checkbox"/>								<input type="checkbox"/>							
<input checked="" type="checkbox"/>	<input type="checkbox"/>	R1		Risk #1	High	Medium	Medium	12	<input checked="" type="checkbox"/>		15d	\$18,000	High	Very Low	Low	

Include/exclude to compare scenarios

Risk #1

Details / Mappings / Mitigation Steps

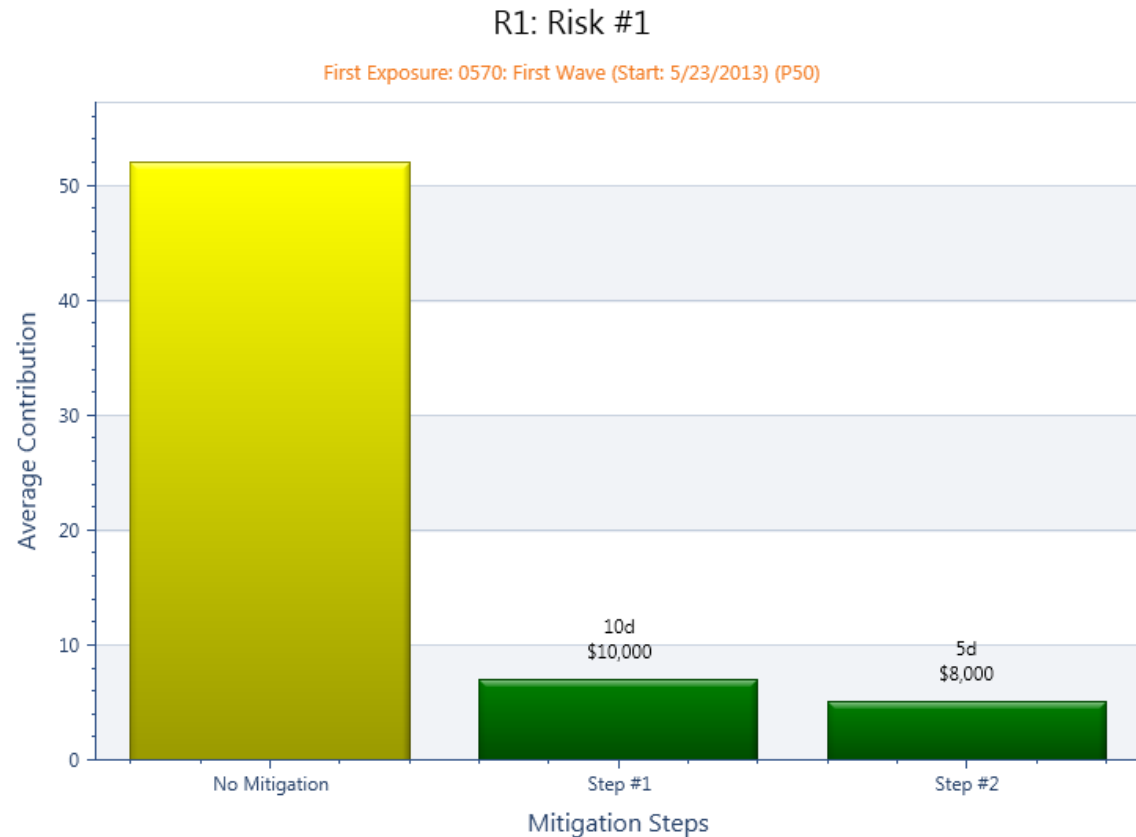
Enabled	Step	Description	Duration	Cost	Probability	Schedule	Cost	Score
<input checked="" type="checkbox"/>	1	step #1	10d	\$10,000	Medium	Low	Low	6
<input checked="" type="checkbox"/>	2	step #2	5d	\$8,000	High	Very Low	Low	8

Risk Assessment Tool

Mitigation Analysis – New to latest Version

Graphic of Steps impact- in this case improvement

Shows you need 15d mitigation, \$18,000 to save 47d



#	Description	Cum Duration	Cum Cost	Cum Reduction
1	step #1	10d	\$10,000	45d
2	step #2	15d	\$18,000	47d

Risk Assessment Tool

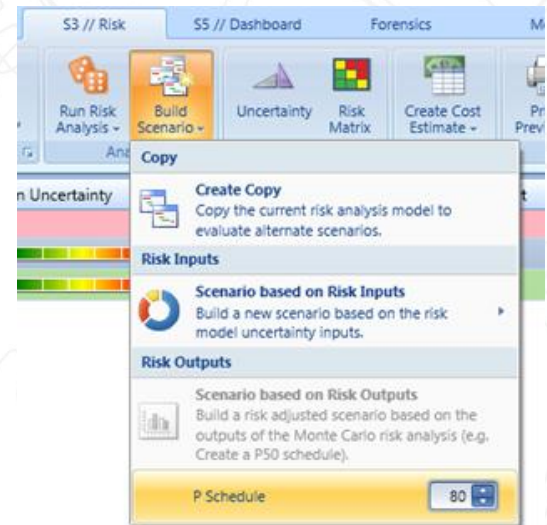
Scenario Planning – Forgotten Step Many Times

- How to Respond to Risk Results
 - Communicate Results to Necessary parties
 - Monitor and Control Risks Identified
 - Address Threats and Opportunities – Develop strategies for Response
 - Assimilate Risk Outcomes back into working Forecast file
 - Applying more realistic remaining durations
 - Imbedding Risk events into Schedule for visibility
 - Applying Contingency to key deliverables
 - Could be used just as a Snapshot for Quarterly/Annual Reviews

Risk Assessment Tool

Scenario Planning – Forgotten Step Many Times

- Build Scenario of Risk Inputs
 - Could be a baseline to compare to for future Risk work
- Build Scenario of Risk Outputs
 - Recreate Forecast schedule with Risks shown
 - P80 schedule



Important to apply learnings/outcomes from Risk exercise back into active Forecast schedule at a level Project Team agrees

Pro/Con PRA/AR

Pros PRA & AR

- Both written by same team – Dan Patterson headed up
- Both accept inputs from multiple planning programs
- Both have similar P## distribution curves on any activity in model
- Both respond best if a clean, healthy schedule is used – ***this is true to ALL risk assessment tools***
 - Minimal constraints, lags
 - Minimal SS/FF relationships
 - Minimal open ends
 - Both have the ability to convert positive lag into activities
- Both have ability to pick % on distribution curve
- Both work best on standalone workstations, slower response using virtual desktop – AR works fine with Citrix

Pro/Con PRA/AR

Pros

- AR - Kept up to date and in development today – built on 64 Bit platform; uses multiple cores and supports hyperthreading (makes for faster running of iterations)
- AR - Included with Fuse bundle, ability to screen schedule health and make corrections (Cleanse) in tool – Redundant logic, hard/soft constraints, remaining leads/lags (convert to tasks)
- AR - Duration uncertainty “sliders”, wobble
- AR - Export to xer file, multiple file types, can import mpp and export as xer file
- AR - Weather or calendar event building inside Risk Register
- AR - Ability to assign Risks to activity or WBS level – absolute or prorated across activities

Pro/Con PRA/AR

Pros (con't)

- AR - Export out the P-value schedule to continue scheduling forward
- AR - Integrated Risk Register (all types of risk events included in one spot)
- AR - Accepts inputs from Excel spreadsheet for Cost
- AR - Cleaner way to model cost Risk Analysis (run separate models and then join them together for time-dependent costs)
- AR -Clearer representation of driver analysis for a selected P-Value (logic, uncertainty, risk drivers)
- AR – Can enter and map risk events from the schedule activities
- AR – Easier for project teams to follow and optimizes their time needed for inputs

Pro/Con PRA/AR

Cons

- PRA – Not significantly changed since Oracle purchased – still in 32 Bit platform; capability taken away as macro programming no longer supported
- PRA – Export to xer file problematic (buggy)
- PRA – issues importing files with multiple calendars/workday definitions
- PRA – have to understand statistics to ‘get’ the driver analysis (across P-values)
- AR – not as many built-in modeling choices as PRA (duration distributions; probabilistic branching; probabilistic calendars; etc) – have to model differently
- PRA – duration uncertainty loaded manually per activity, except as a Quick Risk or template Quick Risk method
- PRA – schedule uncertainty poorly defined (% of correlation between durations and duration of project)

Risk Assessment

Risk Assessment Conclusion

- Why Risk
- When Risk
- Risk Expectations/Outputs
- Tool differences

Admitting there is Risk in the schedule is not a bad thing, refusing to believe any Risks identified will become issues and impact the schedule could lead to project failure. The workshop is intended to explore/brainstorm with the team the potential risks and help the team gain confidence and consensus on addressing those Risks in the correct method

Questions & Comments

- All questions are gathered into a master sheet, answered and distributed to all registrants as well as posted on our website.
- Answers are based on our own experiences using the various software products covered in this webinar.

Thank you for participating

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the
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