

U233 Project Risk Management

History and Process



Overview

- ▶ History
 - Current Baseline
- ▶ Process Overview
 - Identification
 - Simulation
 - Management
- ▶ Successes & Challenges



History

- ▶ Current Baseline Risks
 - 1 Week Risk Summit held week of August 4th, 2008
 - Broad representation from all levels of Isotek, DOE, PTC, and outside consultants
 - Focused on risk and opportunity identification
 - Included risk description, assumptions, and triggers
 - No quantification or analysis
 - No restrictions, constraints, or filtering
 - HQ provided facilitator
 - Prescribed format and capture methodology



History

- ▶ Current Baseline Risks
 - Risk Summit Results
 - Isotek tasked with:
 - Identifying additional contractor risks
 - Using information to prepare new baseline
 - Completing Risk Register with handling actions
 - PTC tasked with:
 - Working with DOE to identify additional government risks
 - Independent analysis of risk impacts (Cost)
- ▶ Results – Integrated (Contractor/Government) Risk Register



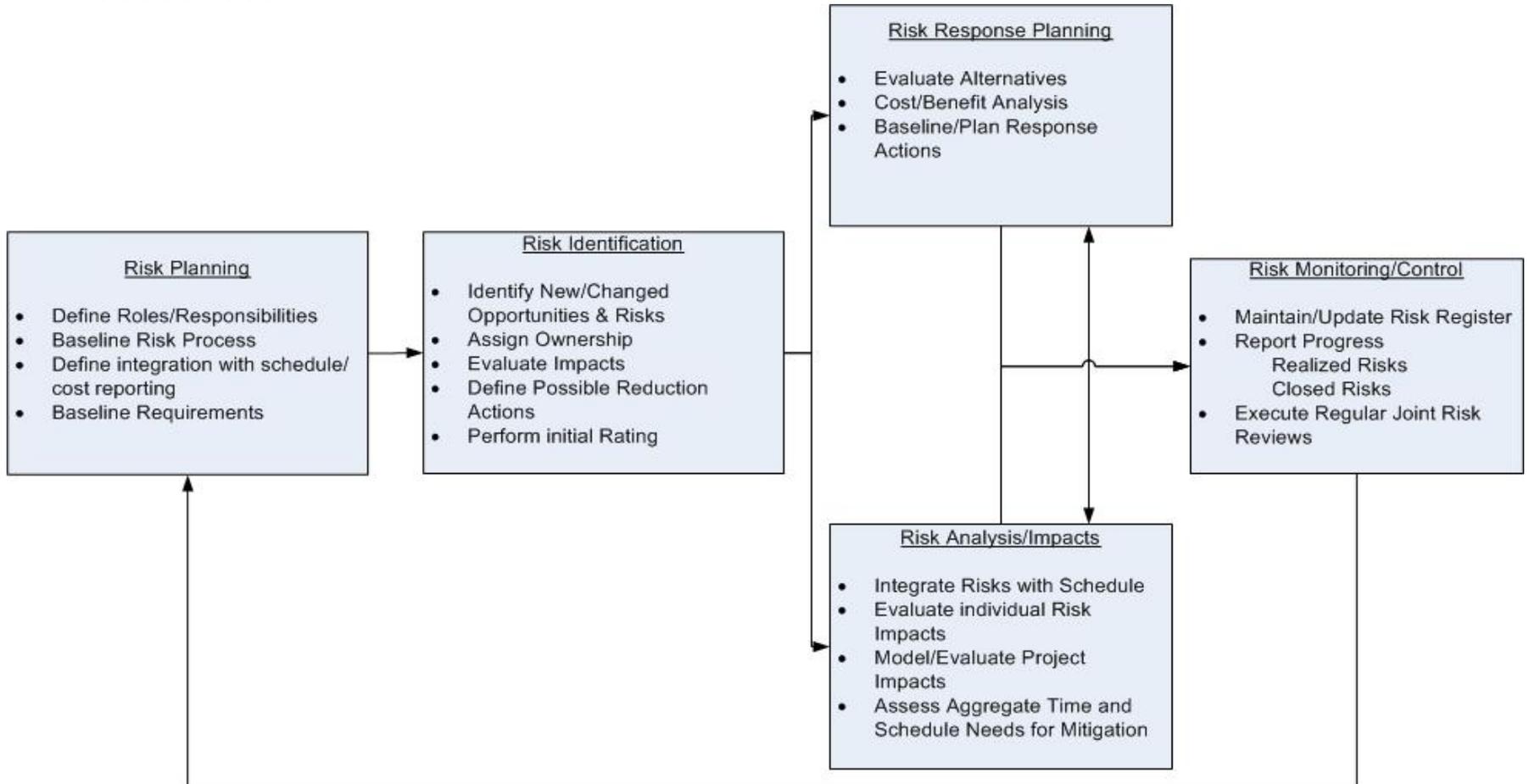
History

- ▶ Risk Register Items Quantified
 - Probability
 - Impact (Cost, Schedule)
- ▶ Monte Carlo Model developed from baseline and simulations executed to validate MR (details later)
- ▶ Additional Information
 - Risk Manager position created within Isotek
 - Regular part of management process



Process

Process Flow



Process – Risk Planning

- ▶ Risk Management Plan
 - Roles & Responsibilities clearly identified
 - Frequency of updates
 - Process description
- ▶ Process Improvements
 - Working towards integrating risks into Primavera
 - Use of activity notes, or
 - Risk listing
 - Still evaluating concept



Process – Risk Identification

▶ “Triggers” and Planned Sessions

- Triggers
 - Changes to the baseline or overall solution approach
 - Discovery of new information affecting solution
 - Typically found while accomplishing work, or discussions in related meetings
- Planned Sessions
 - Regularly held meetings to identify and review upcoming risks based on current work
 - Periodic full review of risk register with team
- Both DOE and contractor participation
- Results report produced after each meeting
- While risk identification is not the main focus of each risk meeting, it is always pursued.



Process – Risk Identification

- Risk are typically captured directly in the Risk Register.
- Partial input is accepted – details after meetings
- Forms developed off of Risk Register

	B	D	E	G	H	I	J	K	L	M	N	O
	Risk #	Risk Statement	Last Review	Risk Owner	Risk Status	Risk Assumptions	Trigger Metric	Prob	Conseq	Risk Impact Rating	Handling Strategy	Handling Steps
1												
77	T66	Human resource turnover with necessary security credentials impacts project schedule and cost.	8/13/2009	K. Engle	Open	* HR assumptions for turnover rates *	Backup support personnel mobilized for filling position	Low	Marginal	Low	Support personnel who meet	<ol style="list-style-type: none"> 1. Operations list detailing work skills, clearance requirements and training t 2. Soliciting contractor firms for persc availability and lead times requireme 3. Review staffing personnel with posi qualifications or availability for cross:
78	T67	Actual cost escalation is greater than OEMC guideline estimates.	8/5/2009	S. Barnes	Open	1. FY09 escalation is 2.1%.	Submittal of Baseline in November	Medium	Marginal	Low		
79	T68	Actual cost escalation beginning FY10 is greater than regional estimates.		S. Barnes	Closed - covered in T67	1. DOE-OR requests relief from OEMC regarding regional rates for certain areas (e.g. materials).		-Closed-	-Closed-	Closed		
80	T69	Unavailability of qualified nuclear operators delaying the start of operations.	8/13/2009	D. Moore	Open	<ol style="list-style-type: none"> 1. Demand remains high for qualified nuclear operations personnel. 2. Commercial nuclear industry has major expansion in 2012. 3. Shortage becomes more severe near startup and continues throughout operations. 	Turnover of staff	Medium	Significant	Moderate	Mitigate	<ol style="list-style-type: none"> 1. Staffing plan to include sufficient re for projected turnover
81	T70	Inexperienced nuclear operators results in an accident or error.	8/13/2009	D. Moore	Open	<ol style="list-style-type: none"> 1. Lack of personnel extend work hours for existing staff. 2. More of work force is inexperienced due to turnover. 3. Staff is position-qualified. 4. One accident/incident is assumed 	Accident or error occurs as a result of inexperience	High	Marginal	Moderate	Mitigate	<ol style="list-style-type: none"> 1. Develop rigorous OJT program. 2. Perform independent assessment or Training and Qualification program for processing



Process – Risk Analysis

- ▶ Identified Risks Used in Two Ways
 - Modeling – expected cost and schedule
 - Assess feasibility of meeting cost and schedule
 - Tie risk events to a timeframe/baseline
 - Typically done for BCP's or annually
 - Response/Management
 - Recurring attention
 - Tracking and recording of progress on eliminating or reducing risks
 - Consequence or likelihood of occurrence



Risk Analysis – Isotek Rating Scales

Qualitative	Criteria	Rating
Very Low	<ul style="list-style-type: none"> Is extremely unlikely to occur anytime in the life cycle of the project or its facilities. 	<p><1%</p> <p>1</p>
Low	<ul style="list-style-type: none"> Is unlikely to occur in the life cycle of the project or its facilities (i.e., there is not much chance the event will happen). 	<p>1% to 14%</p> <p>2</p>
Moderate	<ul style="list-style-type: none"> Will likely occur sometime during the life cycle of the project or its facilities (i.e., there is a moderate chance of the event happening). 	<p>15% to 49%</p> <p>3</p>
High	<ul style="list-style-type: none"> Will very likely occur sometime during the life cycle of the project or its facilities (i.e., there is a high chance the event will happen). 	<p>50% to 79 %</p> <p>4</p>
Very High	<ul style="list-style-type: none"> Will most likely occur sometime during the life cycle of the project or its facilities (i.e., everything points to the event happening). 	<p>>80%</p> <p>5</p>



Environmental Management



Risk Analysis – Isotek Rating Scales

Qualitative	Cost	Schedule	Rating
Negligible	<ul style="list-style-type: none"> Minimal or no consequence. No impact to Project cost. <\$600K 	<ul style="list-style-type: none"> Minimal or no consequence. No impact to Project schedule. < 2 Weeks 	1
Marginal	<ul style="list-style-type: none"> Small increase in meeting objectives. Marginally increases costs. >600K and < \$2M 	<ul style="list-style-type: none"> Small increase in meeting objectives. Marginally impacts schedule. <2 Months 	2
Significant	<ul style="list-style-type: none"> Significant degradation in meeting objectives significantly increases cost; fee is at risk. >\$2M and <\$6M 	<ul style="list-style-type: none"> Significant degradation in meeting objectives, significantly impacts schedule. >2 months and <6 months 	3
Critical	<ul style="list-style-type: none"> Goals and objectives are not achievable. Additional funding may be required; loss of fee and/or fines and penalties imposed. >\$6M and <\$15M 	<ul style="list-style-type: none"> Goals and objectives are not achievable. Additional time may need to be allocated. Missed incentivized and/or regulatory milestones. >6 months and <1 year 	4
Crisis	<ul style="list-style-type: none"> Project stopped. Funding withdrawal; cure notice, withdrawal of scope, or imminent contract cancellation. >\$15M 	<ul style="list-style-type: none"> Project stopped. Withdrawal of scope, cure notice, or imminent contract cancellation. >1 year 	5



Risk Analysis – Isotek Rating Scales

▶ Risk Rating Matrix – Sample Data

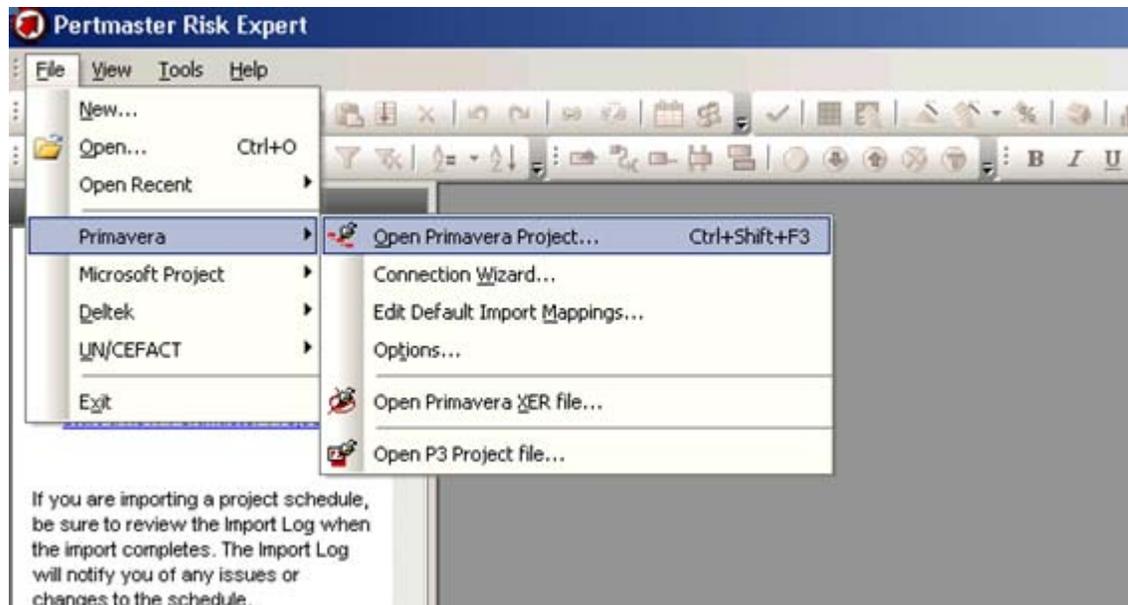
Ranking - Risk Matrix

		Impact					
		Negligible	Marginal	Significant	Critical	Crisis	
		1	2	3	4	5	
Probability	Very Low	1	Low	Low	Low	Low	Moderate
	Low	2	Low	Low	Low	Moderate	Moderate
	Moderate	3	Low	Low	Moderate	Moderate	High
	High	4	Low	Moderate	Moderate	High	High
	Very High	5	Low	Moderate	High	High	High



Risk Analysis – Modeling

- ▶ Develop Risk Model
 - Incorporate current baseline information



Process

▶ Assign general uncertainty distributions

The screenshot displays the Primavera Risk Expert software interface. The main window shows a Gantt chart for a project named "U233 Disposition Project - GC2 Re-Design BCP-105". The Gantt chart is divided into two months: June '09 and July '09. The tasks are listed in a table with columns for ID, Description, Rem Duration, Minimum Duration, Most Likely, Maximum Duration, Labor Remaining, and NonLabor Remaining. The tasks include "Source Term Dev. Draft Report", "Peer Review Report Source Term D...", "Source Term Dev. Final Report", "CAAS Placement Calculation", "CAAS Placement Calc. Computer M...", "CAAS Placement Calc. Draft Report", "Peer Review Report CAAS Placeme...", "CAAS Placement Calc. Final Rep...", "Computer Model Development", "Determine Maximum Fissionable Yield", "Neutronics Calculations", "CASS Placement Summary", "Draft Report Neutronics Calcs", "Peer Review Report Neutronics Cals", "Final Report Evacuation Zone C...", "Computer Model Development", "Neutronics Calculations", and "Identification of Detection Methods". The "TOTALS" row shows a Labor Remaining of \$186,618,203 and a NonLabor Remaining of \$85,470,137. The interface also includes a "Schedule Validation" panel on the left, a "Task Details" panel at the bottom, and a Windows taskbar at the very bottom.

ID	Description	Rem Duration	Jun '09	Jul '09	Minimum Duration	Most Likely	Maximum Duration	Labor Remaining	NonLabor Remaining	
OI	Source Term Dev. Draft Report	15			12	15	20			
OI	Peer Review Report Source Term D...	20			16	20	26			
OI	Source Term Dev. Final Report	0								
OI	CAAS Placement Calculation	30			24	30	39			
OI	CAAS Placement Calc. Computer M...	25			20	25	33			
OI	CAAS Placement Calc. Draft Report	20			16	20	26			
OI	Peer Review Report CAAS Placeme...	15			12	15	20			
OI	CAAS Placement Calc. Final Rep...	0								
OI	Computer Model Development	10			8	10	13			
OI	Determine Maximum Fissionable Yield	15			12	15	20			
OI	Neutronics Calculations	15			12	15	20			
OI	CASS Placement Summary	90						\$61,698		
OI	Draft Report Neutronics Calcs	15			12	15	20			
OI	Peer Review Report Neutronics Cals	15			12	15	20			
OI	Final Report Evacuation Zone C...	0								
OI	Computer Model Development	10			8	10	13			
OI	Neutronics Calculations	10			8	10	13			
OI	Identification of Detection Methods	20			16	20	26			
TOTALS								\$186,618,203	\$85,470,137	47



Risk Analysis – Modeling

▶ Add event risks from Risk Register

Pertmaster Risk Register

File Edit View Tools Reports Crystal Reports Help

Qualitative | Quantitative

Risk			Pre-Mitigation (Data Date = 27 Sep 08)				Post-mitigation				Details			
ID	T/O	Title	Probability	Schedule	Cost	Score	Probability	Schedule	Cost	Score	Owner	Status	Show in Quan...	Quantified
T536	T	air in-leakage rate into the dryer ...	VL (0.01%)	N (2)	N ...	1	M (15%)	N (2)	N ...	6	C. Swenson	Open	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
T537	T	Radon removal performance in C...	VL (0.01%)	N (2)	N ...	1	VL (0.01%)	M (13)	M ...	2	C. Swenson	Open	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
T538	T	UT-B Steam capacity is not suffici...	VL (0.01%)	N (2)	N ...	1	VL (0.01%)	M (13)	M ...	2	C. Swenson	Open	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
T539	T	10-160B shipping cask contains in...	VL (0.01%)	N (2)	N ...	1	VL (1%)	M (13)	M ...	2	D. Moore	Open	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
T540	T	Laboratory off-gas system can n...	VL (0.01%)	N (2)	N ...	1	VL (0.01%)	M (13)	M ...	2	N. Brandon	Open	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
T541	T	Road and fence line modifications...	VL (0.01%)	N (2)	N ...	1	VL (1%)	S (31)	S (...)	4	D. Moore	Open	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
T542	T	Soil properties are not consistent ...	VL (0.01%)	N (2)	N ...	1	VL (1%)	M (13)	M ...	2	C. Swenson	Open	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
T543	T	Major facility modifications are re...	VL (0.01%)	N (2)	N ...	1	L (5%)	S (31)	S (...)	9	C. Swenson	Open	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
T544	T	Roof opening is insufficient to allo...	VL (0.01%)	N (2)	N ...	1	H (50%)	S (31)	S (...)	18	C. Swenson	Open	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
T545	T	Core boring under the 3019-A fo...	VL (0.01%)	N (2)	N ...	1	M (15%)	N (2)	N ...	6	C. Swenson	Open	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
T546	T	Bridge crane in the penthouse ca...	VL (0.01%)	N (2)	N ...	1	VL (1%)	S (31)	S (...)	4	C. Swenson	Open	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
T547	T	South wall addition and roof open...	VL (0.01%)	N (2)	N ...	1	VL (1%)	M (13)	M ...	2	C. Swenson	Open	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
T548	T	If no off-site storage is available ...	H (50%)	S (73)	S (...)	18	H (50%)	S (73)	S (...)	18	M. Polley	Open	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Risk Details | User Defined | Mitigation | Waterfall Chart | Notes | Risk History

ID: _____ Title: _____ RBS: _____

Cause: _____ Description: _____ Effect: _____

Threat / Opportunity: _____ Manageability: _____

Owner: _____ Status: _____

Exposure (Entered): _____

Start Date: _____ End Date: _____

Pre-mitigated position:

Probability	Score
Schedule	
Cost	
Overall Impact	

Post-mitigated position:

Probability	Score
Schedule	
Cost	
Overall Impact	

Quantified Risk
 Show in Quantitative

No Risk Selected

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Process

- ▶ Quantify and tie event risks to activities

Pertmaster Risk Register

File Edit View Tools Reports Crystal Reports Help

Qualitative Quantitative

Pre-mitigated Post-mitigated

Risk View Task View

ID	T/O	Title	Quantified	Probability	Impacted Task ID(s)
T479	T	Availability of specialty piping delays project	<input checked="" type="checkbox"/>	5%	OP20202A1
T480	T	Availability of specialty valves delays project	<input checked="" type="checkbox"/>	5%	OP20202A1
T481	T	Change in product pipe routing causes change in design	<input checked="" type="checkbox"/>	5%	OP20202A1
T482	T	Damage to specialty equipment during transport and installation	<input checked="" type="checkbox"/>	0.01%	OP20202A1
T483	T	Leak or plug in product transfer line shuts down operations	<input checked="" type="checkbox"/>	5%	OPP30401
T484	T	Failure of heat tracing results in crystallization of product	<input checked="" type="checkbox"/>	5%	OPP30401
T485	T	Leak of LLLW during transfer	<input checked="" type="checkbox"/>	5%	OPP30401
T486	T	LLLW tank reaches capacity and shuts down operations	<input checked="" type="checkbox"/>	5%	OPP30401
T487	T	Leak in LLLW tank	<input checked="" type="checkbox"/>	5%	OPP30401
T488	T	Weather delays due to heavy rains/inclement weather	<input checked="" type="checkbox"/>	5%	OPP30401
T494	T	New Bldg - Crane accident (fall) impacts ventilation and/or buildi...	<input checked="" type="checkbox"/>	15%	WBS521, OP20202A1
T502	T	Current baseline does not include tenting the stack during demoli...	<input checked="" type="checkbox"/>	15%	CS20901E1
T504	T	Process upsets require additional nuclear safety and criticality su...	<input checked="" type="checkbox"/>	5%	OP26702C2
T505	T	Hot cell tooling does not work as designed requiring additional te...	<input checked="" type="checkbox"/>	15%	OP3040
T506	T	The CEUSP material contains more PU than indicated by the NFS ...	<input checked="" type="checkbox"/>	0.01%	OP3040101A5
T507	T	The CEUSP material and others, contains as-yet unidentified RC...	<input checked="" type="checkbox"/>	0.01%	OP3040101A5
T509	T	Dose to workers exceeds limits during analytical processes withn...	<input checked="" type="checkbox"/>	0.01%	OPP30401
T510	T	Dose to workers exceeds limits during sampling within hot cell an...	<input checked="" type="checkbox"/>	0.01%	OPP30401
T511	T	Weather delays, mechanical failures, or road closures causes su...	<input checked="" type="checkbox"/>	0.01%	OPP30401
T512	T	Procurement of new 10-160B casks are delayed causing delay in...	<input checked="" type="checkbox"/>	31.5%	OPW1020
T517	T	Radon decay tube becomes disconnected from the filter vent re...	<input checked="" type="checkbox"/>	0.01%	OPW7080
T518	T	Mechanical failure of cask transport trailer results in loss of use c...	<input checked="" type="checkbox"/>	0.01%	OPW7080
T520	T	Chemical process fails to demonstrate WAC compliance resulting ...	<input checked="" type="checkbox"/>	9%	OPP340501

Search

- U.07.02.02.02.02 - Housekeeping
 - OPP320217 - Housekeeping - Processing
 - OPP320222 - Housekeeping - Transition Period
- U.07.02.02.03 - Site Services
 - U.07.02.02.03.01 - Utilities
 - A1645 - 3019 Complex Utilities (Elect, Steam, Water & Air)
 - U.07.02.02.03.02 - Site Usage Fee
 - A1650 - Work Authorization/Site Usage Fee - Processing
 - A1655 - Work Authorization/Site Usage Fee - Transition Period
- U.07.03 - Laboratory Operations
 - OPP340501 - Laboratory Operations
- U.07.04 - U233 Processing & Disposition
 - OPP30401 - Processing Operations Summary
 - U.07.04.01 - CEUSP
 - OP3040101A5 - CEUSP - Processing Summary
 - OPP340201 - Batches 8 thru 42
 - OPP340201A - Batches 43 thru 84
 - OPP340201B - Batches 85 thru 126
 - OPP340201C - Batches 127 thru 168
 - OPP340201D - Batches 169 thru 210
 - OPP340201D5 - Inventory
 - OPP340201E - Batches 211 thru 252
 - OPP340201F - Batches 253 thru 294
 - OPP340201G - Batches 295 thru 336
 - OPP340201H - Batches 337 thru 378

Impacts for Risk T510			Schedule			Cost				Correlate	
Task ID	Description	Shape	Min	Likely	Max	Shape	Min	Likely	Max	Impact Ranges	Event existence
OPP30401	Processing Operatio...	Triangle	0	2	5	Triangle	\$0	\$300,000	\$600,000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

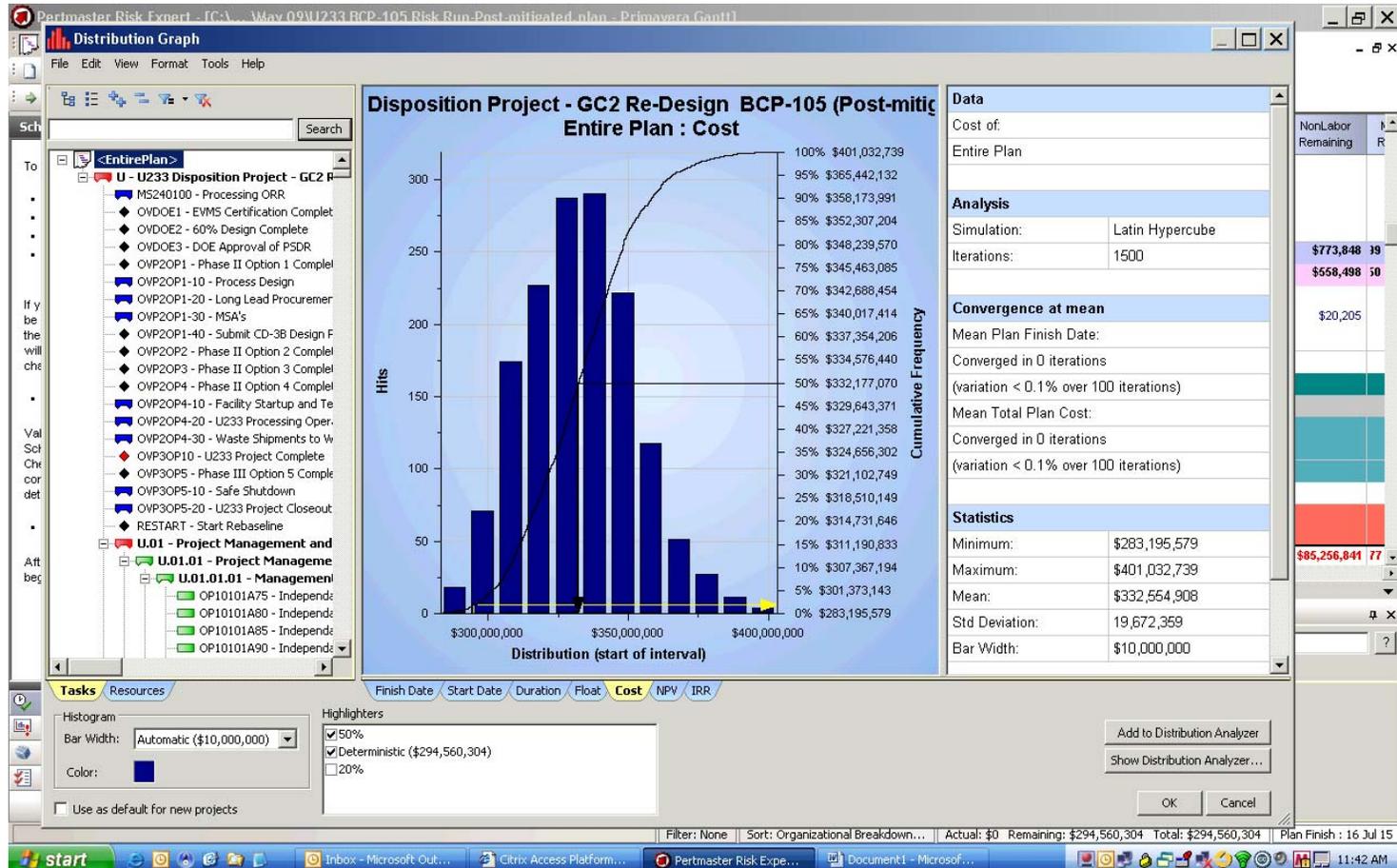
Pre-mitigated selected task: OPP30401 - Processing Operations Summary

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Risk Analysis – Modeling

► Validate data and run simulation



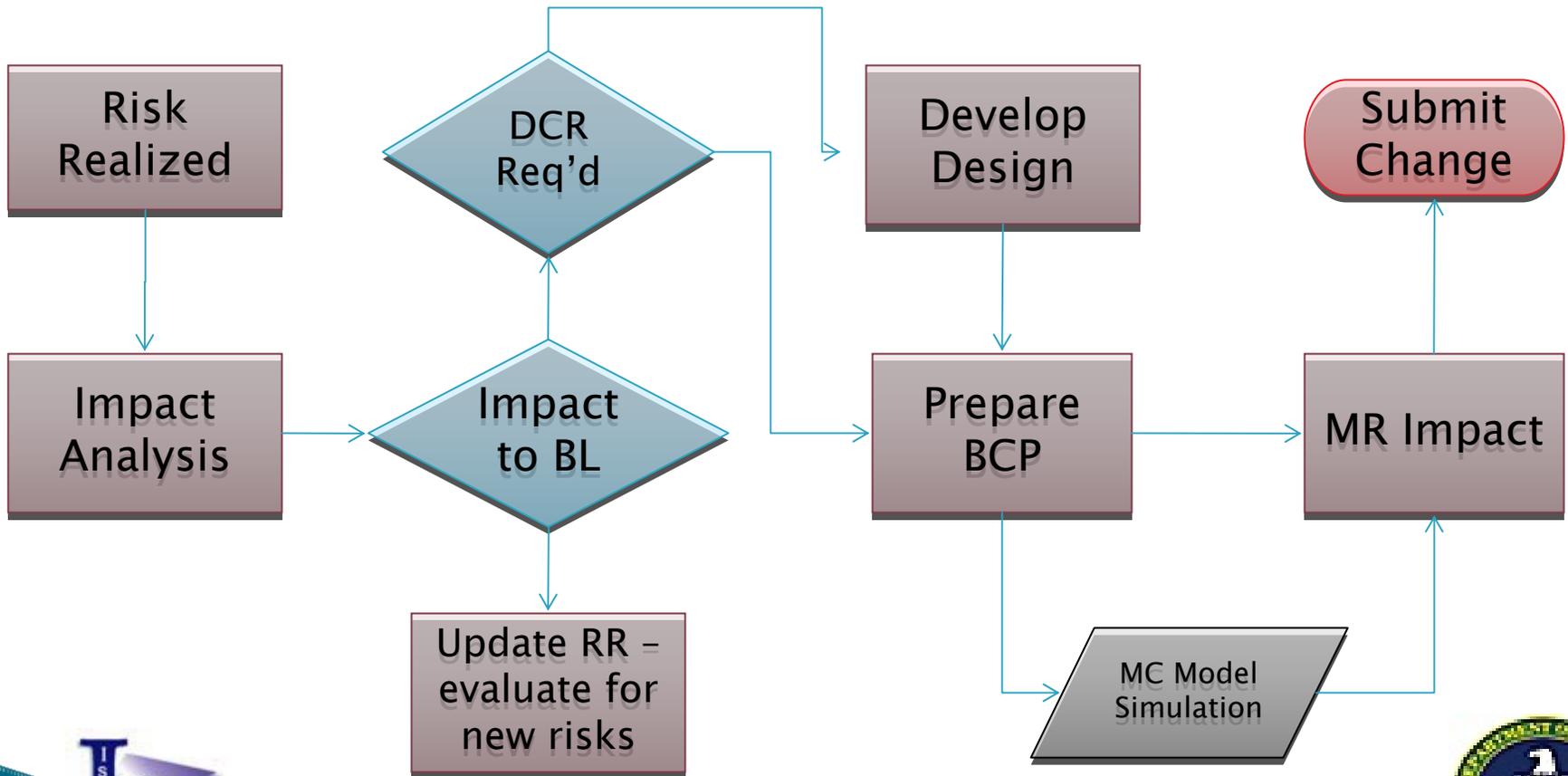
Risk Analysis – Management

- ▶ Regular Meetings (mentioned earlier)
 - DOE and Isotek participation
 - Joint identification and problem solving
 - Facilitated with Risk Register projected
 - Topics/focus based on current work or recent developments – varies from meeting to meeting
 - NOT intended to pound through the register every meeting.
- ▶ Keep working toward “institutionalizing” the risk process
 - Regular part of daily work
 - Reinforced/Full support demonstrated by Isotek and DOE management



Risk Analysis – Management

- ▶ Realized Risks and Closed risk process.



Federal Risk Management

- ▶ Applies to programmatic risks and risk events outside the control of the contractor.
- ▶ Processes parallel Isotek's
 - Integrated when possible for “full project view”
- ▶ Risk Planning
 - Federal Risk Management Plan



Federal Risk Identification and Analysis

▶ Risk Identification

- Risk Summit
- Quarterly Reviews and ongoing as risks emerge

▶ Risk Analysis

- Documented on Risk Assessment Form, summarized in Risk Register
- Risk Rating scales and Risk Matrix consistent with ORO-EM risk program
- Federal risk details into integrated project risk register and modeling



Federal Risk Analysis – DOE Risk Matrix

		CONSEQUENCE				
		Negligible (<0.2% TPC)	Marginal (0.2-1% TPC)	Significant (1-3% TPC)	Critical (3-10% TPC)	Crisis (>10% TPC)
PROBABILITY	Imminent (>90%)	Moderate	Moderate	High	High	High
	Very Likely (75-90%)	Low	Moderate	Moderate	High	High
	Likely (25-75%)	Low	Low	Moderate	Moderate	High
	Unlikely (10-25%)	Low	Low	Low	Moderate	High
	Very Unlikely (<10%)	Low	Low	Low	Low	Moderate



Federal Risk Management

- ▶ Quarterly review of federal risks
 - Revise analysis as needed
 - Close risks and identify emerging risks to add
- ▶ First realized risks have just recently occurred
 - Impacts submitted, working through processes for baseline and contract change control for use of Funded Contingency



Successes / Challenges

► Identification

◦ Successes

- Many risks identified
- Regular process
- Managers are “in-tune” with risk identification

◦ Challenges

- Risk vs. baseline requirement
- Drawing the line between real risk, and daily/expected behaviors
 - Risk exists everywhere in everything – too few vs. too many – see next chart....



Successes / Challenges

Risk identification “too many/too few”

A trip to the grocery store

- ▶ Unsafe driving could result in accident/delay
- ▶ Lack of preparation could result in 2nd trip
- ▶ Inaccurate estimate could result in failure to attain necessary supplies
- ▶ Unsafe driving could result in accident/delay
- ▶ Unsafe driving could result in ticket/delay
- ▶ Unsafe driving could result in pedestrian casualty causing delay
- ▶ Inattention in parking lot could result in pedestrian accident
- ▶ Inability to locate car keys could cause delay
- ▶ Lack of vehicle maintenance could prevent use of car resulting in delay
- ▶ Mechanical failure of vehicle could result in delay
- ▶ Lack of preparation could result in 2nd trip
- ▶ Inaccurate estimate could result in failure to attain necessary supplies
- ▶ Incomplete requirements (list) could result in additional trips
- ▶ No Wallet – start over.....

This?

Or This?

EM

Environmental Management

Slide 26

Successes / Challenges

▶ Modeling / Simulation

◦ Successes

- “Fairly” well integrated with baseline
- Risks are tied to specific activities in the schedule
- Results of risk runs (simulations) consistent

◦ Challenges

- Risks that shift the paradigm (criticality) – modeling those for cost/schedule impact questionable
- Accuracy of estimates – lot’s of information needed, very little available (both in assessing probability and consequence)
- Uncertainty vs. Risk – we don’t know what we don’t know....
 - Keep trying to reduce the unknowns – ongoing effort



Successes / Challenges

▶ Management

◦ Successes

- Risks are being closed regularly
- Culture is being instilled

◦ Challenges

- How much is enough – can go on and on...
- Integrating



Current Status

- ▶ 568 Risks/Opportunities Identified
- ▶ 346 Open
 - 1 High
 - 62 Moderate
 - 283 Low
- Note: there are project ending risks with low probability. These are not modeled, but are continually managed.

