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
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

Risk Planning
- Define Roles/Responsibilities
- Baseline Risk Process
- Define integration with schedule/cost reporting
- Baseline Requirements

Risk Identification
- Identify New/Changed Opportunities & Risks
- Assign Ownership
- Evaluate Impacts
- Define Possible Reduction Actions
- Perform initial Rating

Risk Analysis/Impacts
- Integrate Risks with Schedule
- Evaluate Individual Risk Impacts
- Model/Evaluate Project Impacts
- Assess Aggregate Time and Schedule Needs for Mitigation

Risk Response Planning
- Evaluate Alternatives
- Cost/Benefit Analysis
- Baseline/Plan Response Actions

Risk Monitoring/Control
- Maintain/Update Risk Register
- Report Progress
- Realized Risks
- Closed Risks
- Execute Regular Joint Risk Reviews

EM
Environmental Management
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
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

<table>
<thead>
<tr>
<th>Qualitative</th>
<th>Criteria</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Low</td>
<td>Is extremely unlikely to occur anytime in the life cycle of the project or its facilities.</td>
<td>&lt;1%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Low</td>
<td>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).</td>
<td>1% to 14%</td>
</tr>
<tr>
<td>Moderate</td>
<td>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).</td>
<td>15% to 49%</td>
</tr>
<tr>
<td>High</td>
<td>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).</td>
<td>50% to 79%</td>
</tr>
<tr>
<td>Very High</td>
<td>Will most likely occur sometime during the life cycle of the project or its facilities (i.e., everything points to the event happening).</td>
<td>&gt;80%</td>
</tr>
</tbody>
</table>
## Risk Analysis – Isotek Rating Scales

<table>
<thead>
<tr>
<th>Qualitative</th>
<th>Cost</th>
<th>Schedule</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible</td>
<td>Minimal or no consequence. No impact to Project cost.</td>
<td>Minimal or no consequence. No impact to Project schedule.</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>&lt;$600K</td>
<td>&lt;2 Weeks</td>
<td></td>
</tr>
<tr>
<td>Marginal</td>
<td>Small increase in meeting objectives. Marginally increases costs.</td>
<td>Small increase in meeting objectives. Marginally impacts schedule.</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>&gt;$600K and &lt;$2M</td>
<td>&lt;2 Months</td>
<td></td>
</tr>
<tr>
<td>Significant</td>
<td>Significant degradation in meeting objectives significantly increases cost; fee is at risk.</td>
<td>Significant degradation in meeting objectives, significantly impacts schedule.</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>&gt;$2M and &lt;$6M</td>
<td>&gt;2 months and &lt;6 months</td>
<td></td>
</tr>
<tr>
<td>Critical</td>
<td>Goals and objectives are not achievable. Additional funding may be required; loss of fee and/or fines and penalties imposed.</td>
<td>Goals and objectives are not achievable. Additional time may need to be allocated. Missed incentivized and/or regulatory milestones.</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>&gt;$6M and &lt;$15M</td>
<td>&gt;6 months and &lt;1 year</td>
<td></td>
</tr>
<tr>
<td>Crisis</td>
<td>Project stopped. Funding withdrawal; cure notice, withdrawal of scope, or imminent contract cancellation.</td>
<td>Project stopped. Withdrawal of scope, cure notice, or imminent contract cancellation.</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>&gt;$15M</td>
<td>&gt;1 year</td>
<td></td>
</tr>
</tbody>
</table>
Risk Analysis – Isotek Rating Scales

- Risk Rating Matrix – Sample Data

![Risk Rating Matrix](image-url)
Risk Analysis – Modeling

- Develop Risk Model
  - Incorporate current baseline information
Process

- Assign general uncertainty distributions
Add event risks from Risk Register
Process

- Quantify and tie event risks to activities
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.

1. Risk Realized
2. Impact Analysis
3. DCR Req’d
4. Impact to BL
5. Update RR – evaluate for new risks
6. Develop Design
7. Prepare BCP
8. MR Impact
9. Submit Change
10. MC Model Simulation
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

<table>
<thead>
<tr>
<th>CONSEQUENCE</th>
<th>Negligible (&lt;0.2% TPC)</th>
<th>Marginal (0.2-1% TPC)</th>
<th>Significant (1-3% TPC)</th>
<th>Critical (3-10% TPC)</th>
<th>Crisis (&gt;10% TPC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imminent (&gt;90%)</td>
<td>Moderate</td>
<td>Moderate</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Very Likely (75-90%)</td>
<td>Low</td>
<td>Moderate</td>
<td>Moderate</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Likely (25-75%)</td>
<td>Low</td>
<td>Low</td>
<td>Moderate</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>Unlikely (10-25%)</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>Very Unlikely (&lt;10%)</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

**Environmental Management**
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 2\textsuperscript{nd} 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 2\textsuperscript{nd} trip
- Inaccurate estimate could result in failure to attain necessary supplies
- Incomplete requirements (list) could result in additional trips
- No Wallet – start over.....
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.