SESSION GOALS

- Introduce you to MDT’s Risk Management process
- Prepare you for Risk Analysis Workshop
COST ESTIMATING BASICS

- Determine project needs/scope
- Identify project characteristics
  - Location
  - Type
  - Complexity
- Determine estimate basis
COST ESTIMATING BASICS

- Prepare base estimate
  - Don’t include risk
- Determine risk/contingency
- Review and approve estimate
- Communicate estimate
  - Scope
  - Assumptions
  - Basis
RISK MANAGEMENT

- Estimating
  - Plan
  - Identify
  - Analyze

- Management
  - Respond
  - Monitor and control
  - Communicate

- Documentation
  - Risk Management Plan
RISK-BASED ESTIMATING

- Determine project needs/scope
- Identify project characteristics
- Determine estimate basis
- Prepare base estimate
- Determine risk/contingency
RISK IDENTIFICATION AND ANALYSIS

- Plan
- Identify
- Analyze
**Plan**

- Determine appropriate level of project risk management
- Include time in schedule for risk management
- Include costs in preliminary engineering estimate
- Include appropriate costs in construction estimate
- Remember triangle: Schedule (Time)/Scope/Cost
- Develop risk management mindset
# Level of Project Risk Management

## H. Wynnlee Crisp Matrix

### Deciding the Appropriate Level of Project Risk Management

<table>
<thead>
<tr>
<th>How important is it to</th>
<th>VERY LOW</th>
<th>LOW</th>
<th>MEDIUM</th>
<th>HIGH</th>
<th>VERY HIGH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete on budget</td>
<td>1</td>
<td>10</td>
<td>25</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Complete on schedule</td>
<td>1</td>
<td>10</td>
<td>25</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Fulfill all the requirements of the scope</td>
<td>1</td>
<td>10</td>
<td>25</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Meet the quality expectation</td>
<td>1</td>
<td>10</td>
<td>25</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Have a fully functional finished product</td>
<td>1</td>
<td>10</td>
<td>25</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Have a satisfied Owner</td>
<td>1</td>
<td>10</td>
<td>25</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Know if a &quot;high&quot; risk is unreasonably high</td>
<td>1</td>
<td>10</td>
<td>25</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Understand the probability of completing on schedule</td>
<td>1</td>
<td>10</td>
<td>25</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Understand the probability of completing on budget</td>
<td>1</td>
<td>10</td>
<td>25</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Know which tasks impose the greatest risk on the overall project</td>
<td>1</td>
<td>10</td>
<td>25</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Communicate the probability of success/failure to others</td>
<td>1</td>
<td>10</td>
<td>25</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Demonstrate that a tight schedule is actually inadequate</td>
<td>1</td>
<td>10</td>
<td>25</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Demonstrate that a tight budget is actually inadequate</td>
<td>1</td>
<td>10</td>
<td>25</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Avoid damaging your reputation</td>
<td>1</td>
<td>10</td>
<td>25</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Avoid damaging your organization's reputation</td>
<td>1</td>
<td>10</td>
<td>25</td>
<td>50</td>
<td>100</td>
</tr>
</tbody>
</table>

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IDENTIFY

- Focus on those risks that could significantly affect project objectives
- Opportunities and threats
- Brainstorm and condense
- Use risk element chart
- Get input from local experts
ANALYZE INDIVIDUAL RISKS

- Qualitative or quantitative
- Probability of occurrence
- Cost impacts
- Schedule impacts
- Opportunities (decrease cost or time)
- Threats (increase cost or time)
- Overall significance
RISK MANAGEMENT

- Respond
- Monitor and Control
- Communicate
RESPOND

- Develop strategies
- Avoid or Exploit (adjust scope, schedule, or budget)
- Mitigate or Enhance (adjust PE and/or tasks)
- Accept (adjust contingency or costs/schedule)
- Assign tasks to responsible party with deadlines
RISK RESPONSE

Transfer (share)

Avoid (exploit)

Accept

Mitigate (enhance)

Probability

Impact
MONITOR AND CONTROL

- Follow through on strategies
- Retire risks that have been taken care of
- Determine if additional risks have surfaced
- Revise risk management plan as needed
COMMUNICATE

- Add risk impact to cost and schedule estimates
- Keep all stakeholders informed of status
- Reconvene risk management team as necessary
- Communicate positive and negative changes
Contingency Ranges based on project design stage and complexity
DOCUMENTATION

- Risk Management Plan
- Project reports
  - Scope
  - Assumptions
  - Basis
APPLICATION TO PROJECT
RARUS/SILVERBOW CR. STRUCTURES

- Project scope
- Location
- Estimate basis
- Current, unadjusted CN estimate
- Current, unadjusted project schedule
# Risk Management Plan

## Risk Management Plan Table

<table>
<thead>
<tr>
<th>Project No. and Name</th>
<th>STP 1219-1095</th>
<th>NE of Monticello, NY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated Date</td>
<td>06/15/2015</td>
<td></td>
</tr>
</tbody>
</table>

### Risk Management Support Details

<table>
<thead>
<tr>
<th>Risk Management Support Details</th>
<th>Planned</th>
<th>Actual</th>
<th>HHFLV</th>
<th>MN</th>
<th>WOT</th>
<th>HHFLV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Proactive Risk Management

- Developing an action response strategy
- Assess risk potential
- Implement contingency measures and record effectiveness of risk response action

### Risk Breakdown Structure

<table>
<thead>
<tr>
<th>Risk Breakdown Structure</th>
<th>Planned</th>
<th>Actual</th>
<th>HHFLV</th>
<th>MN</th>
<th>WOT</th>
<th>HHFLV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

### Estimated Monetary Impact of Significant Project Risks

- Estimated Monetary Impact: $0.0
- Estimated Significance: Significant

## Risk Identification

- **Risk Source:** Threat
- **Risk Trigger:** Failure to comply with requirements
- **Description of Risk Event (Cause-Risk-Impact):** Non-compliance leading to potential penalties

## Quantitative Analysis

<table>
<thead>
<tr>
<th>Risk</th>
<th>Probability</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>MN</td>
<td>10%</td>
<td>H</td>
</tr>
<tr>
<td>WOT</td>
<td>5%</td>
<td>H</td>
</tr>
<tr>
<td>HHFLV</td>
<td>2%</td>
<td>H</td>
</tr>
</tbody>
</table>

## Qualitative Display of Most Likely Impact

<table>
<thead>
<tr>
<th>Probability</th>
<th>Most Likely</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>70%</td>
</tr>
<tr>
<td>Medium-High</td>
<td>20%</td>
</tr>
<tr>
<td>Medium-Low</td>
<td>10%</td>
</tr>
<tr>
<td>High-Medium</td>
<td>5%</td>
</tr>
<tr>
<td>Low-Medium</td>
<td>0%</td>
</tr>
</tbody>
</table>

## Response

- **Response Action:**
  - Include the mitigation plan in the project's Interim Status report
  - Include the mitigation plan in the project's Final Status report

## Monitoring and Evaluation

- **Risk Revi
  - Conduct regular reviews and updates on risk mitigation plans
  - As of Nov. 15, the project has included additional reviews (WOT) and agency risk assessments.
DETERMINE RISK/CONTINGENCY

- Evaluate overall impact of risks
- Confirm complexity
- Establish project completeness
- Assign contingency
  
  OR

- Run Monte Carlo simulation
PREPARATION FOR WORKSHOP

- Familiarize with Risk Management Guidelines
- Step through Risk Management Plan Worksheets
- Review/Revise Base Estimate
  - Remove risk factors
  - Document assumptions
  - Check basis of item prices
- Review/Revise Schedule
  - Which activities are standard values
  - Which activities include risk