Capital Project Execution Risk and Mitigating Strategies
As of Friday, July 15, 2005

EUROPEAN BUSINESS NEWS

Shell's Costs Soar For Russia Project

Price Tag of Sakhalin II May Double to $20 Billion; Half-Year Delay Expected

By BHUSHAN BAHREE and BENOÎT FAUCON
Staff Reporters of THE WALL STREET JOURNAL
July 15, 2005; Page B2

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“Yesterday, Shell said it had previously changed its management team at Sakhalin II, which this week advised the company’s leaders that earlier cost estimates – leading to approval of the project in 2003 – vastly understated the spending needed to complete the project.”

“…project costs are rising sharply amid a growing backlog of orders at construction and service companies and because of spiraling costs of commodities such as steel.”

“…some of the cost increases were specific to the Sakhalin project, arising from a clutch of issues, including environmental concerns and difficulties in laying pipelines.”
N.V. Koninklijke Nederlandsche Petroleum Maatschappij
(Exact name of registrant as specified in its charter)

Royal Dutch Petroleum Company
(Translation of registrant's name into English)

The Netherlands
(Jurisdiction of incorporation or organisation)
30, Carel van Bylandtlaan, 2596 HR The Hague
The Netherlands
Tel No: (011 31 70) 377 9111
(Address of principal executive officers)

The "Shell" Transport and Trading Company,
Public Limited Company
(Exact name of registrant as specified in its charter)

England
(Jurisdiction of incorporation or organisation)
Shell Centre, London SE1 7NA, England
Tel No: (011 44 20) 7934 1234
(Address of principal executive officers)

This Report on Form 6-K is incorporated by reference into the Registration Statement on Form F-4 of Royal Dutch Shell plc filed with the Securities and Exchange Commission on May 18, 2005 and the related U.S. prospectus dated May 19, 2005 filed with the Securities and Exchange Commission on such date by Royal Dutch Shell plc in connection with the exchange offer by Royal Dutch Shell plc for the outstanding ordinary shares of Royal Dutch Petroleum Company.
Sarbanes Oxley disclosure?

“The …revised estimates means a project development cost of some $5 to $6 per barrel of oil equivalent and includes the LNG plant.”

“The project is midway through construction….”

“The cost and schedule estimates are still under review by SEIC and SEIC shareholders, who are focused on aggressively pursuing mitigation actions.”
Industry History

• IPA: 50% chance of “mega-wrecks”
  – Insufficient Front End Loading
  – Highly schedule – driven
  – Wholly inappropriate contract strategy
  – All caught up in company politics
  – Ignored what the company knew were Best Practices

• Infrastructure – similar experience:
  – Typically underestimated
  – “Delusion” often necessary for projects to proceed
The Financial World’s View of “Cost”

The deterministic estimate becomes the expected project “cost” at sanction
What has to be managed

The reality of project cost
A risk ranged target until the last bill is accounted for
“Cost estimates tend to be optimistic primarily because it is difficult to estimate aspects that are not apparent when using the “bottom-up” cost and schedule estimating approach usually practiced in the engineering and construction industry. In the absence of specific information, such estimating methods usually fix at zero costs and time requirements for things that are not readily apparent. Contingency allowances are not designed to adjust for the major sources of bias and therefore rarely do.”
Ed Merrow in his statement about estimates excluding any true uncertainties mentions that schedules have the same issues. History would indicate the problem is likely 2X in scheduling.

Schedules in general are based on the assumption that everything goes according to plan.
Background or Strategic Risks

Any risks to the expected project outcome not otherwise considered

Increasing Levels of Uncertainty

Skewed or Discontinuous

A Range of Futures

A Clear Enough Future


Tactical Risks

- Risks defined from the deterministic estimate and schedule

Richard Westney Keith Dodson

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Defining Project Risks

**Tactical Risks** are the uncertainties identified by a detailed evaluation of the current project estimate values and schedule durations.

**Background or Strategic Risks** are any other uncertainties that might affect project costs that may not be addressed or fully considered in the current project estimate or schedule. Some of these risks may have been ignored, limited by assumptions, or excluded in the current estimate. These risks are categorized as outside the project team and the estimator’s “vision”
Leadership Roles for Risk Management

Background or Strategic Risks

The Potential Risk Exposure Gap

Management Lacks Awareness

Project Team Lacks Authority

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Leadership Roles for Risk Management

Bridging the Risk Gap

Management Awareness

Clear Definition of Risks and Accountability

Project Team Authority
Leadership Roles for Risk Management

- **Authority / Accountability**
  - Management
    - e.g.:
      - Management intervention in PMT tactics leads to internally driven risks
    - e.g.:
      - Political risks
      - Global economic trends
      - Company Performance
  - PMT
    - e.g.:
      - Scope
      - Team performance
      - Pricing
      - Logistics
    - e.g.:
      - Unmitigated strategic risks become tactical problems for PMT

**Tactical**

**Strategic**

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Managing Project Risk

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Effective Risk Management is Continuous
Leadership for Effective Risk Management

- Identify
- Appraise
- Select
- Optimize / Define
- Execute
- Operate

Management

Strategic Risks

Risk
Project Management
Mitigation
Tactical Risks

Operating Facility

Project Team

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Defining Project Risks

Tactical Project Risks

Examples:

- Contracting
- Quantification
- Compliance with local government laws / requirements
- Materials identification and management
- Logistics risks
- Procurement (pricing) risks
- Engineering Productivity and schedule adherence
- Construction Productivity and schedule adherence
Defining Project Risks

Global Strategic Risk Examples

- Geo / Political Risks
- Partner / Stakeholders
- Market Risks for project components
- Resources
- Broad economic issues affecting project viability
Defining Project Risks

Enterprise Strategic Risk Examples

✓ Quality of Project Delivery System - (Governance, People and Systems)
✓ General business deal provisions that limit choice or action
✓ Assumptions given project team
✓ Organizational alignment on project requirements
✓ Over zealous expectations
Decision Making and Risk Assessment Traps

- Bias
- Anchoring
- Listening
- Group Think
Decision Making and Risk Assessment Traps

Bias

• Proximity Bias
• Expectation Bias
• Exclusion Bias
• Optimism Bias
• Pessimism Bias
Decision Making and Risk Assessment Traps

Anchoring

- The last project
- The estimate and schedule
- Experience
  - Size and Types of Projects
  - Location
Decision Making and Risk Assessment Traps

Listening

• The Market
• The Economy
• Public Opinion
• Changes in Government / Regulation
• Stakeholder interest
Group Think

A phenomenon wherein people seek unanimous agreement in spite of contrary facts pointing to another conclusion.

- The dominate personality
- Expectation
- Desire to “get along”
Tactical Risk
(Risks *around* the Estimate)

Most Likely = Base Estimate

Best Case                                  Worst Case

Commercial “Monte Carlo” Risk Programs are applicable here
Strategic Risk
(Risks outside the Estimate)

Examples

Highly Skewed

Most Likely Outcome is Unknown

Discontinuous

On / Off Risk

Best Case          Worst Case
(May be negative)

Different risk assessment techniques required here

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“Improving Project Predictability with Effective Risk Management”

- Holistic process and new tools for the identification and assessment of project risks
- Leadership practices for successful risk mitigation
Typical Risk Discovery Check List

Framing Inquiries

• Assumptions in the deterministic estimate
• Additional facilities that might be required to make the project “work”
• Potential optimization and preference changes
• Impact of inadequate company resources and processes
• Impact of organizational alignment issues
• Abnormal market risks that have not been considered
• Contracting Strategy and Credit risk of Contractors
• Potential for schedule acceleration impacts
• Impacts of the business deal and partners
• Political Risks
• Taxes and Duties not considered
• Abnormal weather
Background or Strategic Risk

• **Provides for:**
  – Any risks outside the determined estimate or schedule that can affect the ultimate cost

• **Management and accountability:**
  – At a level above the Project Team. The process provides an individual identification such that each risk can be managed. When a risk is funded and released to the project team, accountability shifts to the project team.

• **Characterized by:**
  – Project Scenario Type Analysis to identify risks not identified
  – A developed list of Best and Worst outcomes for identified risks including the financial impact of schedule risks
  – Valuation of identified risks for project
    • Weighted range funding selection
    • Probability distribution from Risk Resolution model

• **Financial Exposure:**
  – Funding or Reserve is a management decision
  – If funded, managed with respect to specific risks (not a “pot of $”)
Tactical Risk Assessment

• Independent evaluation of project estimate and schedule for understanding
• Interview knowledge holders for owner and contractor – Normally these are the discipline leaders, but occasionally are those individuals responsible for specific knowledge used for estimating decisions
• Interview Project Team relative to risk based on collected data
• Conduct a session with project team and team selected others to assess the range of the risks around the elements of the work break down structure of the estimate and / or schedule
• Simulate a probabilistic outcome of the range distributions using @Risk or Crystal Ball
Typical Tactical Risk Categories

• **Definition Risks, e.g.:**
  – Site Information (Utilities, geotech, transportation, etc)
  – Technology
  – Degree of design / quantification
  – Degree of specification

• **Performance Risks e.g.:**
  – Productivity
  – Planning / logistics
  – Procurement
  – Pricing
Tactical Risk Assessment

Production Plant - P50 Distribution

- P10 = $527.5 MM
- P50 = $608.8 MM
- P90 = $708.9 MM
- Budget = P36 = $584.5 MM
Using the current schedule information, develop a special purpose risk model in Microsoft Project. The model will be developed inclusive of all project schedule activities that have the potential for becoming critical and the direct logic of the schedule.

The developed model will ideally be in the range of 100 to 150 activities.

Range around the Finish Dates in the developed schedule.
Schedule Risk Model

Production Plant

<table>
<thead>
<tr>
<th>ID</th>
<th>Name</th>
<th>Duration</th>
<th>Start</th>
<th>Finish</th>
<th>Risk F 50</th>
<th>Start 2006</th>
<th>Finish 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>Issue Instrument Loop Drawings</td>
<td>26 days</td>
<td>4/22/07</td>
<td>5/17/07</td>
<td>6/22/07</td>
<td>JASON JFMAMJMAMJASON JFMAMJMAMJASON JFMAMJMAMJASON JFMAMJMAM</td>
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</tr>
<tr>
<td>19</td>
<td>Construction</td>
<td>566 days</td>
<td>11/21/06</td>
<td>6/8/08</td>
<td>6/10/08</td>
<td>JASON JFMAMJMAMJASON JFMAMJMAMJASON JFMAMJMAMJASON JFMAMJMAM</td>
<td>0%</td>
</tr>
<tr>
<td>20</td>
<td>Install Piling</td>
<td>122 days</td>
<td>11/21/06</td>
<td>3/22/07</td>
<td>3/24/07</td>
<td>JASON JFMAMJMAMJASON JFMAMJMAMJASON JFMAMJMAMJASON JFMAMJMAM</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Install Pile Caps/Sockets/Floors</td>
<td>121 days</td>
<td>1/14/07</td>
<td>5/14/07</td>
<td>5/14/07</td>
<td>JASON JFMAMJMAMJASON JFMAMJMAMJASON JFMAMJMAMJASON JFMAMJMAM</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Install Equip., Structure &amp; Bldg Foundations</td>
<td>152 days</td>
<td>2/13/07</td>
<td>3/12/07</td>
<td>3/10/07</td>
<td>JASON JFMAMJMAMJASON JFMAMJMAMJASON JFMAMJMAMJASON JFMAMJMAM</td>
<td>0%</td>
</tr>
<tr>
<td>23</td>
<td>Install Precast Structures (Air Heater &amp; Pipe Rack)</td>
<td>198 days</td>
<td>3/23/07</td>
<td>10/0/07</td>
<td>10/8/07</td>
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<tr>
<td>24</td>
<td>Install Equipment</td>
<td>100 days</td>
<td>5/14/07</td>
<td>11/16/07</td>
<td>12/3/07</td>
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<tr>
<td>25</td>
<td>Install U/G Pipe</td>
<td>96 days</td>
<td>3/23/07</td>
<td>9/26/07</td>
<td>6/0/07</td>
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<td></td>
</tr>
<tr>
<td>26</td>
<td>Install A/G Pipe</td>
<td>230 days</td>
<td>5/20/07</td>
<td>1/12/08</td>
<td>1/10/08</td>
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<tr>
<td>27</td>
<td>Hydro Test Pipe</td>
<td>140 days</td>
<td>9/16/07</td>
<td>2/1/08</td>
<td>2/5/09</td>
<td>JASON JFMAMJMAMJASON JFMAMJMAMJASON JFMAMJMAMJASON JFMAMJMAM</td>
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<tr>
<td>28</td>
<td>Install A/G Electrical</td>
<td>272 days</td>
<td>7/12/07</td>
<td>4/8/08</td>
<td>4/10/08</td>
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<tr>
<td>29</td>
<td>Install Instrumentation</td>
<td>224 days</td>
<td>9/23/07</td>
<td>5/3/08</td>
<td>5/6/08</td>
<td>JASON JFMAMJMAMJASON JFMAMJMAMJASON JFMAMJMAMJASON JFMAMJMAM</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Painting Equipment &amp; Piping</td>
<td>140 days</td>
<td>11/24/07</td>
<td>4/11/08</td>
<td>4/15/08</td>
<td>JASON JFMAMJMAMJASON JFMAMJMAMJASON JFMAMJMAMJASON JFMAMJMAM</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Insulate Equipment &amp; Piping</td>
<td>188 days</td>
<td>12/24/07</td>
<td>6/4/08</td>
<td>6/1/08</td>
<td>JASON JFMAMJMAMJASON JFMAMJMAMJASON JFMAMJMAMJASON JFMAMJMAM</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Commissioning &amp; Start-Up</td>
<td>141 days</td>
<td>8/4/08</td>
<td>2/21/08</td>
<td>2/24/08</td>
<td>JASON JFMAMJMAMJASON JFMAMJMAMJASON JFMAMJMAMJASON JFMAMJMAM</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>Mechanical Completion</td>
<td>0 days</td>
<td>5/3/08</td>
<td>5/3/08</td>
<td>5/6/08</td>
<td>JASON JFMAMJMAMJASON JFMAMJMAMJASON JFMAMJMAMJASON JFMAMJMAM</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Final Completion</td>
<td>0 days</td>
<td>8/1/08</td>
<td>8/1/08</td>
<td>8/3/08</td>
<td>JASON JFMAMJMAMJASON JFMAMJMAMJASON JFMAMJMAMJASON JFMAMJMAM</td>
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</tr>
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Schedule Risk Model

Production Plant P50 Risk Distribution Chart

- P90 = 16-Sep-06 Finish
- P50 = 25-Aug-06 Finish
- P10 = 10-Aug-06 Finish
- P3 = 3-Aug-06 Planned Finish

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Strategic Risks

An example of calculating Strategic Risk will be demonstrated using the

Strategic Risk Scenario Valuation Process
Background or Strategic Risks

- Strategic risks are skewed or discontinuous and do not fit the risk models available in the commercial Monte Carlo risk programs.
- The extremes of risks in the estimate or schedule that are not considered in the Tactical Risk Assessment are Strategic Risks.
- The P50 Contingency provided for the Tactical Risks is considered project cost in the Strategic Risk Assessment.
- The estimate or schedule may be used to calculate risk values, but the valuation of strategic risks are not “anchored” to estimate values.
- The estimate and schedule are not necessarily assumed to be the “likely” case.
Strategic Risk Evaluation Process

Steps (Interview / Workshop)

1. Frame risk scenarios and identify project Strategic / Background Risks
2. Gather Information and Intelligence
3. Categorize risks and range values on each risk selected
   – Base Best and Worst Values
4. Model Project Risk
   – Probability of occurrence assessment
   – Monte Carlo Type Simulation
Strategic Risk Categories

• **Scope** (What might be required to make the plant to work that is not provided for or undervalued)

• **Company Performance Factors** (Correct People, Governance, and Process)

• **Execution** (The potential market issues that “might” affect the project)

• **Schedule** (Potential acceleration costs)

• **Guarantees/Penalties** (Conditions of the “Business Deal”)

• **Other** (Political, Taxation, Duties, Weather, etc.)
A Risk Worksheet is prepared for each category of risk. The work sheet is used in conjunction with scenario type planning to identify and frame the Strategic Risks to the project.
<table>
<thead>
<tr>
<th>Risk Identification:</th>
</tr>
</thead>
<tbody>
<tr>
<td>XYZ Fabricators has an extremely high work load and new management --</td>
</tr>
<tr>
<td>It is very likely there will be claims due to their under pricing the order and the</td>
</tr>
<tr>
<td>accelerated FEL scope issues</td>
</tr>
<tr>
<td>Labor activity in the area of the project is expected to very heavy and recruiting to</td>
</tr>
<tr>
<td>the area is expected to be difficult. To keep and attract people wages will go up</td>
</tr>
<tr>
<td>dramatically</td>
</tr>
<tr>
<td>Construction Productivity</td>
</tr>
<tr>
<td>Construction Labor Escalation</td>
</tr>
<tr>
<td>The non-module bulks are to be furnished by the installation contractors and award</td>
</tr>
<tr>
<td>of contracts will not occur until 2009</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Risks Forward to Risk Assessment:</th>
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<tbody>
<tr>
<td>1. XYZ Contract Increase 0 2,500</td>
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<tr>
<td>2. Construction Productivity 0 5,000</td>
</tr>
<tr>
<td>3. Construction Escalation 0 7,500</td>
</tr>
<tr>
<td>4. Non-module materials escalation 0 1,000</td>
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</tbody>
</table>

| Comments: |
### Strategic Risk Assessment

#### Project: Production Plant

<table>
<thead>
<tr>
<th>Risk Description</th>
<th>Best Case Millions US$</th>
<th>Worst Case Millions US$</th>
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</thead>
<tbody>
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<td><strong>Scope</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Company Performance Factors</td>
<td>1000</td>
<td>5000</td>
</tr>
<tr>
<td><strong>Execution</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. XYZ contract increase</td>
<td>0</td>
<td>2500</td>
</tr>
<tr>
<td>2. Construction Productivity</td>
<td>0</td>
<td>5000</td>
</tr>
<tr>
<td>3. Construction labor escalation</td>
<td>0</td>
<td>7500</td>
</tr>
<tr>
<td>4. Non-module materials escalation</td>
<td>0</td>
<td>1000</td>
</tr>
<tr>
<td><strong>Schedule</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guarantees</td>
<td>0</td>
<td>1000</td>
</tr>
<tr>
<td><strong>Other</strong></td>
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<td></td>
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</tbody>
</table>

**Project Risk Range**  $1,000  $22,000

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Strategic Risk Assessment

Add Probability of Occurrence for Best and Worst Cases

<table>
<thead>
<tr>
<th>Risk Description</th>
<th>Best Case</th>
<th>Worst Case</th>
<th>Risk Factor Best Case %</th>
<th>Risk Factor Worst Case %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope</td>
<td></td>
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<td>Company Performance Factors</td>
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<td>0</td>
<td>2500</td>
<td>0%</td>
<td>50%</td>
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<tr>
<td>2. Construction Productivity</td>
<td>0</td>
<td>5000</td>
<td>0%</td>
<td>50%</td>
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<tr>
<td>3. Construction labor escalation</td>
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<td>0%</td>
<td>50%</td>
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<td>4. Non-module materials escalation</td>
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<td>Guarantees</td>
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<tr>
<td>Other</td>
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### Strategic Risk Assessment

**Project:** Production Plant  

<table>
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<th>Risk Description</th>
<th>Best Case</th>
<th>Worst Case</th>
<th>Risk Factor</th>
<th>Weighted Best</th>
<th>Weighted Worst</th>
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<td><strong>Company Performance Factors</strong></td>
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<td>Company Performance Factors</td>
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<td>0%</td>
<td>50%</td>
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<tr>
<td>2. Construction Productivity</td>
<td>0</td>
<td>5000</td>
<td>0%</td>
<td>50%</td>
<td>0</td>
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<tr>
<td>3. Construction labor escalation</td>
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<td>7500</td>
<td>0%</td>
<td>50%</td>
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<td>4. Non-module materials escalation</td>
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<td>0%</td>
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<tr>
<td><strong>Guarantees</strong></td>
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</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Project Risk Range</strong></td>
<td>1,000</td>
<td>22,000</td>
<td></td>
<td>100</td>
<td>11,150</td>
</tr>
</tbody>
</table>
## Strategic Risk Assessment

**Project:** Production Plant  
**Date:** 29-Aug-07

<table>
<thead>
<tr>
<th>Risk Description</th>
<th>Best Case Millions US$</th>
<th>Worst Case Millions US$</th>
<th>Risk Factor Best Case %</th>
<th>Risk Factor Worst Case %</th>
<th>Weighted Best Millions US$</th>
<th>Weighted Worst Millions US$</th>
<th>Selected Risk Value</th>
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<tbody>
<tr>
<td><strong>Scope</strong></td>
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</tr>
<tr>
<td>Company Performance Factors</td>
<td>1000</td>
<td>5000</td>
<td>10%</td>
<td>50%</td>
<td>100</td>
<td>2500</td>
<td>2500</td>
</tr>
<tr>
<td><strong>Execution</strong></td>
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</tr>
<tr>
<td>1. XYZ contract increase</td>
<td>0</td>
<td>2500</td>
<td>0%</td>
<td>50%</td>
<td>0</td>
<td>1250</td>
<td>1000</td>
</tr>
<tr>
<td>2. Construction Productivity</td>
<td>0</td>
<td>5000</td>
<td>0%</td>
<td>50%</td>
<td>0</td>
<td>2500</td>
<td>2500</td>
</tr>
<tr>
<td>3. Construction labor escalation</td>
<td>0</td>
<td>7500</td>
<td>0%</td>
<td>50%</td>
<td>0</td>
<td>3750</td>
<td>2000</td>
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<tr>
<td>4. Non-module materials escalation</td>
<td>0</td>
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<td>0%</td>
<td>90%</td>
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<td><strong>Schedule</strong></td>
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<td>0%</td>
<td>25%</td>
<td>0</td>
<td>250</td>
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<tr>
<td><strong>Other</strong></td>
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</tbody>
</table>

**Project Risk Range:**  
$1,000 $22,000 $100 $11,150

**Selected Project Risk Value:** Recommend Project Risk: $9,150
## Strategic Risk Assessment

**Unmitigated Strategic Risk $9.1 Million**

### Project: Production Plant

**Date:** 29-Aug-07

<table>
<thead>
<tr>
<th>Risk Description</th>
<th>Best Case Millions US$</th>
<th>Worst Case Millions US$</th>
<th>Risk Factor Best Case %</th>
<th>Risk Factor Worst Case %</th>
<th>Weighted Best Millions US$</th>
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<tr>
<td><strong>Company Performance Factors</strong></td>
<td>1000</td>
<td>5000</td>
<td>10%</td>
<td>50%</td>
<td>100</td>
<td>2500</td>
<td>2500</td>
</tr>
<tr>
<td><strong>Execution</strong></td>
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<td></td>
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<tr>
<td>1. XYZ contract increase</td>
<td>0</td>
<td>2500</td>
<td>0%</td>
<td>50%</td>
<td>0</td>
<td>1250</td>
<td>1000</td>
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<tr>
<td>2. Construction Productivity</td>
<td>0</td>
<td>5000</td>
<td>0%</td>
<td>50%</td>
<td>0</td>
<td>2500</td>
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<tr>
<td>3. Construction labor escalation</td>
<td>0</td>
<td>7500</td>
<td>0%</td>
<td>50%</td>
<td>0</td>
<td>3750</td>
<td>2000</td>
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<tr>
<td>4. Non-module materials escalation</td>
<td>0</td>
<td>1000</td>
<td>0%</td>
<td>90%</td>
<td>0</td>
<td>900</td>
<td>900</td>
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<tr>
<td><strong>Schedule</strong></td>
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<tr>
<td><strong>Guarantees</strong></td>
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<td>0%</td>
<td>25%</td>
<td>0</td>
<td>250</td>
<td>250</td>
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</tr>
<tr>
<td><strong>Project Risk Range</strong></td>
<td>$1,000</td>
<td>$22,000</td>
<td>$100</td>
<td>$11,150</td>
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<tr>
<td><strong>Selected Project Risk Value</strong></td>
<td>Recommend Project Risk: $9,150</td>
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</tbody>
</table>

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Westney Risk Resolution™ has developed a random number generated simulation of the best and worst case of each identified risk such that a “Monte Carlo” type probability curve can be developed by the volume of model iterations. The curve is a good fit for the skewed distribution of the Strategic Risk. Most importantly, it is not “anchored” to the estimate as a likely case.
Strategic Risk Simulation

Cumulative % of SR’s in Range (smoothed)

Strategic Risks ($) above deterministic estimate plus contingency
Cost and Schedule Risk
Cumulative Probability Curve

Cost and Schedule Risk Profile
Production Plant

Millions US$

P90

P10

P50

3/3/08 4/2/08 5/2/08 6/1/08 7/1/08 7/31/08 8/30/08 9/29/08

P19 Current M/C Date 4/23/08 M/C Date 6/27/08 M/C Date 8/28/08

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The Risk Resolution℠
Strategic Risk Process

• The Risk Resolution Process is focused on defining the Financial Exposure. Funding is a management decision based on the developed information.

• The process has proven to be a great source for management or executive understanding of risk:
  – Values in financial terms (currency) has proven to be a good communication tool about the project and risks.
  – Executive participation is limited to critical events only maximizing understanding and minimizing time away from other duties.
Mitigation

- Use project risk framing and financial valuation from the Strategic Assessment as a basis for mitigation
- Evaluate mitigation potential
- Develop mitigation plan and financial goal for each identified risk that can be mitigated
- Agree, budget, and action mitigations
- Periodically review progress of actions against financial goal for mitigation
- Manage continuously!
## Risk Mitigation Chart

**Project: Production Plant**

All values in US $ Millions

<table>
<thead>
<tr>
<th>Risk to Project Success</th>
<th>Current Valuation</th>
<th>Mitigation</th>
<th>Action - Responsibility - Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Best</td>
<td>Worst</td>
<td>Selected</td>
</tr>
<tr>
<td>Scope</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Company Performance Factors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Management Staffing and additional vendor surveillance due to market</td>
<td>1,000</td>
<td>5,000</td>
<td>2,500</td>
</tr>
<tr>
<td>Execution</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. XYZ Contract Increase</td>
<td>0</td>
<td>2,500</td>
<td>1,000</td>
</tr>
<tr>
<td>2. Construction Productivity</td>
<td>0</td>
<td>5,000</td>
<td>2,500</td>
</tr>
<tr>
<td>3. Construction Labor Productivity</td>
<td>0</td>
<td>7,500</td>
<td>2,000</td>
</tr>
<tr>
<td>4. Non-module material escalation</td>
<td>0</td>
<td>1,000</td>
<td>900</td>
</tr>
<tr>
<td>Guarantees</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Operability issues leading to redesign and changes after delivery to</td>
<td>0</td>
<td>1,000</td>
<td>250</td>
</tr>
<tr>
<td>Schedule</td>
<td></td>
<td></td>
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<tr>
<td>Other</td>
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<tr>
<td>Totals</td>
<td>1,000</td>
<td>22,000</td>
<td>9,150</td>
</tr>
</tbody>
</table>

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“CAPEX VaR<sup>SM</sup>” A probabilistic provision for the amount that the projects might financially exceed the sanction / estimate inclusive of “contingency” due to strategic or background risks.
CAPEX VaR<sup>SM</sup> Financial Management

![Graph showing cumulative probability vs. total project cost with key terms: Base Estimate, Contingency, Financial Consideration, CAPEX VaR<sup>SM</sup> at 100% probability.]

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Portfolio CAPEX VaRS"
CAPEX VaR$^{SM}$:

- Allows management to ensure that all risks that can reasonably be expected to occur, are considered in the financial process.
- Provides an Internal Control process for compliance with the “Disclosure Controls” requirements of the Sarbanes Oxley Legislation.
Risk Resolution

• Traditional method of “laying the risk off” on others, will not work today

• New approach must:
  – Enable all parties to understand each other’s risks
  – Provide a means by which an equitable allocation of risks and costs can be made

• Cost and Risk to all parties are reduced

• Disputes are avoided

• This new approach is “Risk Resolution”
Key Elements of Risk Resolution

- **Address Risks away from the negotiation table, with all parties equal**
- **Facilitate the Risk Resolution process**
  - Mutually agree risks, probabilities and impacts
  - Allocate each risk to the party best suited to assume it
  - Eliminate and/or mitigate risks by agreement on issues
  - Fund appropriate risks by agreement, using pricing or a risk pool
The Risk Resolution Process

Risk Resolution™ is achieved when all parties are in agreement as to how project risks are to be allocated and mitigated; and how each party will fund the risks it bears.

- **Risk Discovery**™
  - Identify & Understand All the Risks of All Parties

- **Risk Assessment**
  - Determine the Probability and Severity of Project Risks

- **Risk Allocation**
  - Determine Which Parties Should Take Which Risks

- **Risk Mitigation**
  - Reduce Probability and Severity of Risks

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