Presentation to:

Northwest Construction
Consumer Council

Chatt Smith
Manager of Project Controls - Jacobs
Critical Success Factors

- Structured Work Process - JSTEPS\textsuperscript{sm}
  - Best in Class FEL
  - Best Practices/JVEPS
- Integrated Aligned Team
  - Business, Operations, Maintenance, Engineering, Projects
- Project Metrics
  - Safety, Cost, Schedule, Operability
  - Value Creation
- Disciplined Implementation of Change Management
What is JSTEPS\textsuperscript{sm}?

- Staged Gate Process
- Plan the Work, Work the Plan
- The “Plan” is defined during FEL
JSTEPS\textsuperscript{sm} - Objectives

• Through effective FEL and alternative selection, the BEST project is selected
• Improve the planning and execution of all projects
• Improve the identification, sharing and application of lessons learned and best practices.
• Improve single, multi- and virtual office project coordination and execution.
• Improves internal and external communications through a common language
FEL Plus VIP’s Enable Better Cost Performance

- **Relative Capital Cost (Industry Average = 1.0)**
  - FEL Improvement Only
  - FEL Improvement Plus Value Improving Practices

- **FEL Rating**
  - Best Practical
  - Good
  - Fair
  - Poor
  - Screening
JSTEPSSM Summary Map

**Ongoing Activities:** VEP’s, Performance Measurements, Quality Audits, Alliance Satisfaction Surveys, Progress Reporting, Cost and Schedule Control, Total Value Added
JSTEPS™ – Project Phases

Phase 1 - IDENTIFY BUSINESS OPPORTUNITY
Phase 2 - SELECT / QUANTIFY BEST OPTION
Phase 3 - FINALIZE / QUANTIFY THE PLAN
Phase 4 - COMPLETE DETAILED DESIGN / PROCURE MATERIALS / EQUIPMENT
Phase 5 – CONSTRUCT FACILITY
Phase 6 – STARTUP FACILITY
Phase 7 - EVALUATE COMPLETED PROJECT/ CLOSEOUT PROJECT
PHASE 3 - Continued
Preliminary Engineering

JSTEPS
Cross-Functional Map - Chemical Process Industry (CPI)

CLIENT

PROJECT MANAGEMENT SERVICES

PROCESS ENGINEERING ENVIRONMENTAL

DESIGN DISCIPLINES

MATERIALS MANAGEMENT

CONSTRUCTION

OTHERS (INTERNAL)

SUPPLIERS

OTHERS (EXTERNAL)

Preliminary Cost Estimate
Updated Based on Estimate
Updated Economic Analysis
Project Schedule

Preliminary Engineering Phase Report
Completed

Definitive Cost Estimate
(10% to 50%)
Completed

PDR or IPA PEL Assessment
Process Risk, Cost & Schedule Risk Analysis Completed
Project Sched- Developed

3-11

CRITICAL EQUIPMENT/ MATERIALS SPECIFICATIONS QUANTITIES REQUESTED

3-12

DATA SHEETS

3-10

startup deliverables

3-13

3-17

FROM PHASE 3 TASK 3-7

FROM PHASE 3 TASK 3-2

CONSTRUCTION

OTHERS (INTERNAL)

SUPPLIERS

OTHERS (EXTERNAL)

Preliminary Applications

Preliminary Environmental Applications Evaluated

JACOBS

JSTEPS client1.ppt

See Glossary for explanation of terms and definitions of Standard Operating Procedures, Value Enhancing Practices, and Measures.

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Standard Operating Procedure

Jacobs Value Enhancing Practices™

Management Measurement

Task(s)

Regional Task(s)

Decision

Involvement

Process Control or Terminators

Rev No. 1 Page 5 of 16
Rev Date: June 13, 2001
Approved by: D. Harrington
JSTEPSSM - Application

- Potential starting point of JSTEPSSM application:
  - Planning discussions with the team, before and after receipt of work and during project execution
  - JSTEPSSM Training at the beginning of each stage
  - Guide during Interactive Planning
  - Basis for developing the Project Execution Plan and Project Quality Plan
  - Basis for monitoring performance during the execution of a project.
Jacobs Value Enhancing Practices (JVEPs℠)

Definition:

- Best Practices, Identified by CII and IPA, that when used consistently Significantly Increase the Value of the Project
JVEPs℠

**Definition:**

- Best Practices, Identified by CII and IPA, that when used consistently Significantly Increase the Value of the Project

<table>
<thead>
<tr>
<th>V-1</th>
<th>Client Expectations</th>
<th>V-12</th>
<th>Total Value Added</th>
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<tbody>
<tr>
<td>V-2</td>
<td>Client Surveys</td>
<td>V-13</td>
<td>Class of Plant Quality*</td>
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<tr>
<td>V-3</td>
<td>Constructability*</td>
<td>V-14</td>
<td>Customized Standards/Specs*</td>
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<td>V-4</td>
<td>Design to Capacity*</td>
<td>V-15</td>
<td>Energy Optimization*</td>
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<td>V-5</td>
<td>Execution Planning</td>
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<td>Process Reliability Modeling*</td>
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<td>V-8</td>
<td>Team Alignment</td>
<td>V-19</td>
<td>Technology Selection*</td>
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<td>PDRI</td>
<td>V-20</td>
<td>Waste Minimization*</td>
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<td>V-10</td>
<td>Project Objectives</td>
<td>V-21</td>
<td>Integrated CAE*</td>
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<td>V-11</td>
<td>Value Engineering*</td>
<td>V-22</td>
<td>Change Management</td>
</tr>
</tbody>
</table>
CII Best Practices

- Zero Accident
- Pre-Project Planning
- Constructability
- Change Management
- Team Building
- Alignment during PPP
- Materials Management
- Quality Management
- Partnering

- Design Effectiveness
- Dispute Resolution

- HazAsmtSafActPln
- JSTEPS\textsuperscript{sm} - Phases 1-3
- JVEP\textsuperscript{sm} V3
- JVEP\textsuperscript{sm} – Proj Cntrls
- JVEP\textsuperscript{sm} V8
- JVEP\textsuperscript{sm} V8
- JVEP\textsuperscript{sm} V5, V6
- Surveys, Audits
- Relationship Co., Client Surveys, Alliances
IPA VIPs

- Technology Selection
- Class of Plant
- Design to Capacity
- Process Simplification
- Process Reliability Modelling
- Predictive Maintenance
- Value Engineering
- Customized Standards and Specs
- Constructability
- Energy Optimization
- Waste Minimization
- 3D CADD
JVEPs™ need to be done at the right time…
or they become lost opportunities
Integrated Aligned Teams

• Include all stakeholders in kickoff meetings and “scope review” meetings (business, operations, maintenance, engineering, projects, construction)
  – Request business rep kicks off meeting
• Team building
• Interactive Planning
• Project Execution Planning
Interactive Planning Session

- Develop Overall Plan
- Brings together Project Stakeholders
- Ability to place and move activities
- Everyone sees the overall schedule
Potential Metrics

- Safety
- Cost vs. FEL estimate (AFE / AFC)
- Schedule performance
- Work process compliance
- Change management
- Workhours
- IPA results (FEL score)
- Customer survey
Change Management

TIC Change Orders

- TIC Value (Thousand $s)
- Number of CO's

TIC CO $ Submitted
TIC CO $ Apprvd-Client

# of COs
"Leading" metrics lay the groundwork for project success - BEFORE

<table>
<thead>
<tr>
<th>COMPLIANCE BY PRACTICE</th>
<th>Pre-Flight Conditions</th>
<th>Staffing/Resources</th>
<th>In-Flight Gauges</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Team</td>
<td>No 1st Party Proj.</td>
<td>Project Kick-off &amp; rinsals</td>
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<td>Design &amp; Drawn</td>
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<tr>
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<td>Scope</td>
<td>Good Ed. Estimate</td>
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<td>Good Schedule</td>
<td>Project Fully Funded</td>
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<td>Jacobs is Lead Ed.</td>
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<td>Exp.</td>
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<td>Infrastructure</td>
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<td>Proc. End Loading</td>
<td>Project End Loading</td>
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<td>Proc. Adherence</td>
<td>Project Proc. Adherence</td>
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<td>Document Control</td>
<td>Project Document Control</td>
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<tr>
<td>Jacobs is Lead Team</td>
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<td>On or Ahead of Schedule</td>
<td>On or Ahead of Schedule</td>
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<td>Jacobs is Lead Team</td>
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<td>PGM Review</td>
<td>PGM Review in Status Meetings</td>
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<tr>
<td>Jacobs is Lead Team</td>
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<td>Status Meetings</td>
<td>Status Meetings in PGM Review</td>
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<tr>
<td>Jacobs is Lead Team</td>
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<td>Value Plus</td>
<td>Value Plus in Status Meetings</td>
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<td>Jacobs is Lead Team</td>
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<td>Project Close-Out</td>
<td>Project Close-Out in Value Plus</td>
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</table>

<table>
<thead>
<tr>
<th>COMPLIANCE BY PROJECT</th>
<th>58-P977 PIPE LINES</th>
<th>58-P975 LOCATION A</th>
<th>58-P974 LOCATION B</th>
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<tr>
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<td>Project B</td>
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<td>Project C</td>
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<td>Project D</td>
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<td>Project E</td>
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<tr>
<td>PROJECT</td>
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</table>

| LOCATION A            |                     |                    |                    |
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|                       |                     |                    |                    |

| LOCATION B            |                     |                    |                    |
|                       |                     |                    |                    |
|                       |                     |                    |                    |
|                       |                     |                    |                    |

| MARINE TERMINALS      |                     |                    |                    |
|                       |                     |                    |                    |
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|                       |                     |                    |                    |

| LAND TERMINALS        |                     |                    |                    |
|                       |                     |                    |                    |
|                       |                     |                    |                    |
|                       |                     |                    |                    |

Legend:
- Status is Acceptable
- Status Warrants Monitoring or is Not Ideal
- Status is Unacceptable

1 = Acceptable
0 = Monitoring or Not Ideal
-1 = Unacceptable

ML = Status is Acceptable
0 = Status Warrants Monitoring or is Not Ideal
-1 = Status is Unacceptable

JSTEPSclient1.ppt
### “Leading” metrics lay the groundwork for project success - AFTER

<table>
<thead>
<tr>
<th>Status Pre-Flight Conditions</th>
<th>Staffing/Resources</th>
<th>In-Flight Gauges</th>
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<tbody>
<tr>
<td>Current Phase of Project</td>
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<tr>
<td>Kick-Off Meeting</td>
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<td>Defined and Doable Scope</td>
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<td>Good Budget</td>
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<tr>
<td>Good Schedule</td>
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<td>Safety is Job #1</td>
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<td>Value Plus</td>
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<td>Project Close-Out</td>
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<tr>
<td>COMPLIANCE BY PRACTICE</td>
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<tr>
<td>PIPE LINES</td>
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<tr>
<td>MARINE TERMINALS</td>
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<tr>
<td>LAND TERMINALS</td>
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<tr>
<td>CITY TERMINALS</td>
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</tr>
<tr>
<td>OTHER ASSETS</td>
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<tr>
<td>SUPPORT SERVICES</td>
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</table>

#### COMPLIANCE BY PROJECT MONTH

#### COMPLIANCE BY PRACTICE

<table>
<thead>
<tr>
<th>Proj. No.</th>
<th>Change from Prior Month</th>
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<tr>
<td>PIPE LINES</td>
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<td>MARINE TERMINALS</td>
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<td>LAND TERMINALS</td>
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<tr>
<td>CITY TERMINALS</td>
<td></td>
</tr>
<tr>
<td>OTHER ASSETS</td>
<td></td>
</tr>
<tr>
<td>SUPPORT SERVICES</td>
<td></td>
</tr>
</tbody>
</table>

#### NOTE:
1. For projects with status CE or PE, only pre-flight conditions and staffing/resources should be filled out.
2. For projects with status DE or CN, pre-flight conditions should be frozen, and staffing/resources and in-flight gauges should be updated.
3. For projects with status CO, all conditions are frozen except Project close-out (last column).
Cost Predictability and Control

Jacobs Alliance
In-Service Projects – Cost Predictability

Total Program Size = $32MM
Project Range = $100K to $5.5MM
Individual and team recognition help change behaviors and improve results
Change Management

- Freeze Scope at End of FEL
- FEL Gate Review
- Client and Project team “sign off” on Scope
- Client/Jacobs jointly define change at end of FEL (for example, No changes unless it won’t work or unsafe)
- Identify changes promptly including cost/schedule impact and obtain approval.
Challenges

• Didn’t do all this on last project
• Don’t have the time
• My Project is Different
• Time to make decision for selected option (FEL2)
• “Checking boxes” vs ensuring value (VIPs, fully completing FEL)
• Including all stakeholders to define and freeze scope (construction, operations)
• Continuing to change/improve design after scope is frozen
• Timely identification/control/approval of changes
Success Stories
When one of three chillers operating in parallel at Chemical Co’s site failed, operations immediately opted for replacement. Our team, guided by our work process...

- analyzed the system
- provided alternate recommendations to improve operation
- optimized energy savings
- avoided capital spending
- saved over $1MM.
Stimulating “What are you trying to accomplish?” behaviour delivers the “quantum leap” change

Plastics Company

Using our FEL process, combined with intentional innovation, we maintained the project objectives while reducing overall project cost from $220MM to $185MM.
## BP Cherry Point Project

<table>
<thead>
<tr>
<th>Leading Indicators</th>
<th>Early Phase 3</th>
<th>End Phase 3</th>
<th>Forecast</th>
<th>Recommended</th>
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<tr>
<td>FEL</td>
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<td>4.25</td>
<td>&lt;5</td>
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<td>131</td>
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<td>&gt;50%</td>
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<td>Team Development</td>
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<td>&gt;Good</td>
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<table>
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<tr>
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Questions