CH2MHILL

VE of Regional Municipality of Durham's Courtice Water Pollution Control Plant

Presented to

Canadian Society of Value Analysis, 2004 Conference

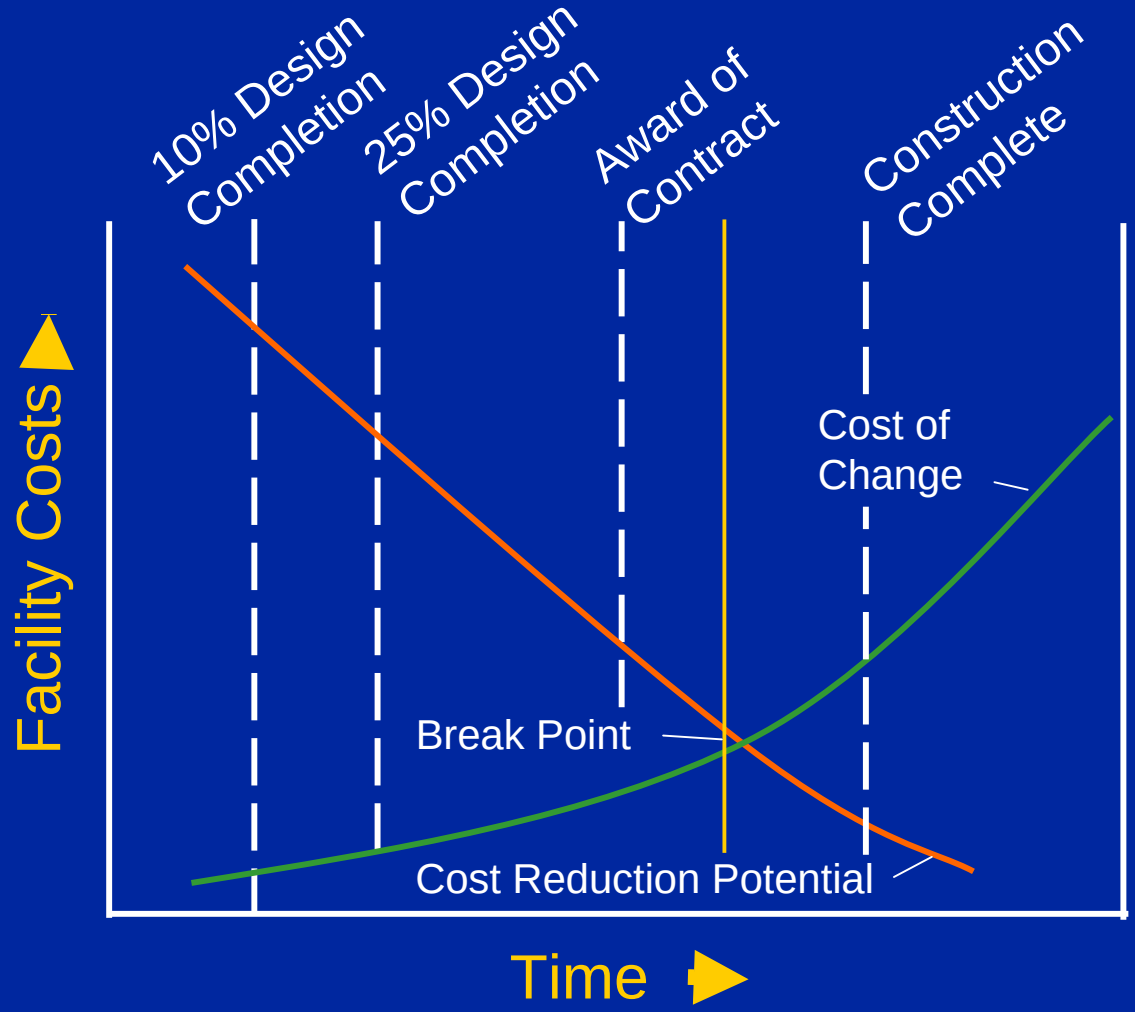
October 26, 2004

Why Use Value Engineering?

- Focus on essential functions, not systems or procedures
- Embraces creativity and out of the box thinking
- Uses life-cycle cost analysis for decision making
- Provides an organized framework for alternative development
- Consistently achieves the desired results (from 5:1 to 50:1 ROI)

CH2MHILL

Opportunities for Savings During Facility Life Cycle



CH2MHILL

Value Engineering Employs Six Steps

- Information
- Creative
- Analysis
- Development
- Presentation
- Implementation

CH2MHILL

Courtice WPCP Project History

- 1999 EA for Additional WPC Capacity for Greater Toronto Area along Lake Ontario; Whitby, Oshawa, Clarington (Courtice)
- 136,380 m^3/d (30 migd) WPCP Needed at Courtice to Meet Projected 20-Year Growth
- 65.5 ha site abutting Lake Ontario, west of Ontario Power Generation's Darlington Nuclear Generating Station
- Team Courtice: Engineering Firms of CH2M HILL, MacViro, Simcoe retained by Region for Design of WPCP

CH2MHILL

Courtice WPCP Description

- **Project 1 - Main Water Pollution Control Plant**
  Team Courtice
- **Project 2 - New Sewage Pump Station at Harmony Creek WPCP**
  EarthTech
- **Project 3 - Forcemain from Harmony Creek WPCP to New Courtice WPCP**
  Totten Sims Hubicki Associates
- **Project 4 - New Outfall to Lake Ontario**
  R.V. Anderson Associates
- **Project 5 - New Bridge over CNR Tracks to Provide Access to New Courtice WPCP**
  Totten Sims Hubicki Associates

CH2MHILL

VP & VE Studies for Courtice WPCP

- Value Planning (VP) Study at Concept Design, 2 day Study, August 2002
- Value Engineering (VE) Study at 40% Design Development, 4 day Study, February 2004
- Project Estimate: $135 million

CH2MHILL

Value Planning Team: 18 Team Members, 2 Day Study

- VE Team (4): Facilitator, Sr. Technologist for Wastewater Treatment Process, Mechanical Design Specialist, Air Quality/Biosolids Specialist
- Design Team (6): PM, Lead Design Engineer, Mechanical Process Engineer, Process Lead, Biosolids, Pump Station Design Lead
- Owner Team (8): Director of Eng, Director of Operations, Env Services, PM, Op's Staff, Planning Mgr, Tech Support Mgr, Program Mgr

Value Planning Study Approach

- **Plant Components**
  - Pump Stations
  - Site Access
  - Utilities
  - Headworks
  - Biological Reactors
  - Disinfection
  - Anaerobic Digesters
  - Biosolids Storage
  - Septage Receiving
  - Outfall
  - Decommission Harmony WPCP
- **Evaluated Options**

Value Planning Study Results at Concept Design

- 24 VP Proposals Suggested
- Potential Savings: $23 million
- 10 Proposals Rejected
- 14 Proposals Accepted, or Require Further Review
- Estimated Accepted Savings Range: $8 million to $17 million

Value Engineering Team: 17 Team Members, 4 Day Study

- **VE Team (8): Facilitator, Structural, Architect, Process, Civil/Mech, Elec/I&C, Cost, Op's**
- **Owner Team (9): Director of Operations, Mgr Env Svcs, Eng Env Svcs, Op's Staff, Tech Support Mgr, Program Mgr, Plant Ops Mgr, Bldg Svcs, Construction**
- ***Design Team Members (12) also at Orientation Meeting and VE Presentation***

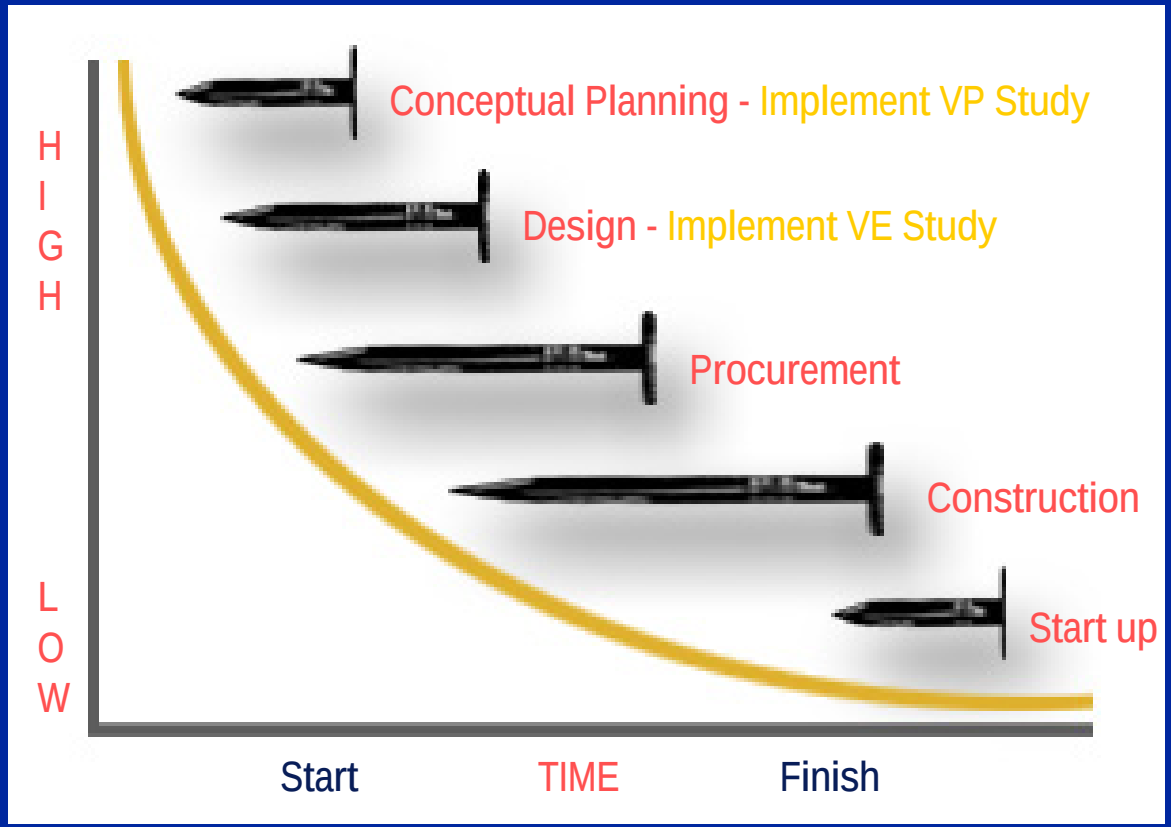
Value Engineering Study Approach (WPCP Only)

- **Plant Systems**
  - Architectural
  - Biosolids
  - Process Mechanical
  - Site Civil
  - Electrical

Value Engineering Study Results at 40% Design

- 26 Cost Saving Proposals Calc'd
- 18 Proposals Recommended for $15.2 million Saving
- 18 Proposals Accepted, Modified, or Requiring Further Review for Saving of Approx. $7.1 million
- 30 VE Observations

When and Why to Use Value Engineering



VP/VE is a proven methodology that enhances function and reduces cost

VP early in design gains Project Team's acceptance of appropriate alternative

VE at Mid-Design reduces cost without impacting function

Value Engineering Balances Cost, Reliability, and Performance Issues

Value Engineering is a proven management technique that uses a systematic approach to identify the best functional balance between the cost, reliability and performance of a product or project to meet the owner's objectives

CH2MHILL