Value Engineering
for the
SOUTH PEEL WATER AND WASTEWATER EXPANSION PROGRAM

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Program Highlights

- **$532M budget with the majority of projects to be complete in 5 years**
  - Expand Lakeview WWTP
    - *392 ML/day to 448 ML/day*
    - *$270M*
    - *10 contracts*
  - Expand Clarkson WWTP
    - *163 ML/day to 200 ML/day*
    - *$110M*
    - *7 contracts*
  - Expand Lakeview WTP
    - *560 ML/day to 820 ML/day*
    - *$152M*
    - *4 contracts*

Program Highlights (cont'd)

- 5 Year Duration
- 3 Design Teams
  - **CH2MHill – Lakeview WTP**
  - **KMK/B&V – Lakeview WWTP**
  - **Earth Tech – Clarkson WWTP**
- 20 total VE sessions
  - **3 conceptual design**
  - **4 preliminary design**
  - **13 constructability**

Lakeview WWTP in 2002

Lakeview WWTP in 2006

Clarkson WWTP in 2002

Clarkson WWTP in 2006

Lakeview WTP in 2002

Lakeview WTP in 2006

Why Use VE?

- Complex projects require melding design options into cohesive plan that addresses many difficult issues, provides greatest overall benefit to owner and other stakeholders
- Usually done by trial and error, takes lots of time
- VE techniques streamline this effort, help select concept that delivers maximum benefits at optimum life cycle cost

Goals of the VE Program

- Ensure that appropriate treatment processes are used
- Optimize the design to minimize both capital and operating costs
- Ensure that all aspects of constructing, owning and operating the facility are considered
- Optimize how the project is contracted
- Ensure that construction runs smoothly

Multi-phased VE Process

- Review the total concept for each plant and confirm the process selection
- Review major construction elements at preliminary design level
- Perform constructability reviews on each construction project

Advantages of Using a VE Process at the Conceptual Design Stage

- Obtain early consensus on requirements
- Help diverse stakeholders to focus on requirements
- Allow tough decisions to be made efficiently
- Promote buy-in from stakeholders
- Reduce time required to obtain optimal solution, while considering multitude of issues

Advantages of Using a VE Process at the Preliminary Design Stage

- Optimizes design of individual project elements
- Addresses operational issues early in the design
- Saves unnecessary costs
- Allows sufficient time for designer to implement changes suggested without compromising schedule

Advantages of Using a VE Process at 90% Design

- Confirms that project can be constructed as portrayed on construction documents
- Assesses and addresses risk
- Ensures that sufficient information is provided for the contractor to bid and construct the project
- Assists in reducing requests for information, change orders and claims
- Ensures that construction documents are coordinated and interferences are minimized
- Ensures that plant operations can continue uninterrupted during construction

Participants in South Peel VE sessions

- At concept phase, combination of design team, Region of Peel, OCWA and independent consultants
- At Pre-Design Level, combination of Region of Peel, OCWA and independent consultants
- At 90% Design Complete Level – OCWA and independent consultants

VE Consultant Team

- Prime Consultant – MacViro Consultants Inc.
- VE Facilitator – Lewis & Zimmerman Associates Inc.
- Process Consultant – Metcalf & Eddy Inc.
- Mechanical Contractor – Gowing Contractors
- General Contractor – Bob Lanza
- Instrumentation and Control - Eramosa

VE Program Results

- Validation of the Region's project and water and wastewater quality goals by an independent team of industry experts prior to presentation to Council and the public
- Assisted in separating contracts to avoid the Region from becoming constructor
- Broke up contracts into manageable chunks to get more competition and better prices
- With such tight sites with restricted contractor access, identified a need for additional construction sequencing information in the contract documents

VE Program Results (cont'd)

- **Owner Controlled Insurance Policy (OCIP) helped the Region streamline contractor insurance**
- **Recommendation for pre purchase of major pieces of equipment was implemented**
  - 10 total agreements
- **Detailed technical analysis of alternative treatment processes allowed a good baseline for justifying the alternative selected**

VE Program Results - Example

- **Several major technical alternatives were incorporated into the final design for the HLPS.**
  - Greatly improved the operability and the eventual tie-in with the existing facility
  - Changes included a significant modification to the High Lift Pump Station yard piping and suction piping material and layout
  - Saved capital dollars by improving building layout and minimizing rock excavation

Conclusion

- **The VE process was a major contributor to the current success of South Peel's major expansion of its water and wastewater facilities**

Project Update

- **13 of 21 contracts complete**
- **6 to be complete by EO 2006**
- **1 to be complete in 2007**
- **1 to be complete in 2009**
- **The overall project schedule is being met within budget**
- **VE has now been used on two additional projects for conceptual design and constructability review**

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