VALUE BY DESIGN - ALIGNING APPLICATION OF
VALUE ENGINEERING WITH TRIPLE BOTTOM LINE-

- A case Study from a Canadian Crown Corporation.

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British Columbia, Canada.

Professional Development Seminar
23 Sept 2009
Presentation Outline

BC Hydro & Sustainable development

Value Engineering 101

What is Triple Bottom Line?
What is “Value”? What is creativity?
Why Value Engineering? Is it a ‘novel’ approach?
Function Analysis System Technique (FAST)
Stages in VE process

VE Experience @ Ruskin
VE Process undertaken
VE Proposals developed
Selected Proposals
Accomplishments
Lessons learned
Three Bottom Lines

BC Hydro is accountable to British Columbians to take care of the environment, meet community needs and deliver excellent financial results.

BC Hydro is committed to a path of sustainability whereby we balance, track and measure our performance along environmental, social and economic bottom lines.
Three Bottom Lines

The environmental bottom line looks at how we manage impacts from our operations, weigh environmental values with economic ones and plan for a future with more green energy in our system.

Social Values
The social bottom line includes how we ensure the safety and well-being of people—our employees, customers and the general public—and the health of the communities in which we live and work.

Financial Values
The economic bottom line means making it possible to stay in business forever, by being an efficient, productive and profitable company, and by providing value to our customers and the province.
Reporting on the TBL is keeping BCH to remain the regional Sustainability leader

Our Department is EARG – Engineering Aboriginal Relations and Generation

Reliable Power at low cost to generations

VALUE ENGINEERING
Motivation to do a VE Study at BC Hydro:

Possible alignment with TBL
Possible further leadership in sustainability
Seek possible synergy with “Safety by Design” initiative

In house VE enthusiast took the ownership

The Ruskin Dam upgrade project is part of the infrastructural renewal* that will enhance the safety and reliability of the system.

* More than $2 billion Capital work
What is ‘value’?

- **Value** is a personal perspective of your willingness to pay for the performance delivered by a product, process or project.

- Good value is achieved when the necessary performance can be accurately defined and delivered at the lowest life cycle cost.

Both Nano and Jaguar are owned by TATA

- Use Value
- Cost Value
- Exchange Value
- Esteem Value
- Goodwill
- “Feel good” Value

Tata Nano $2000

Hummer $50,000+

Both Nano and Jaguar are owned by TATA

Reliable power, at low cost, for generations. Reliable power, at low cost, for generations. Reliable power, at low cost, for generations. Reliable power, at low cost, for generations.
What is Creativity?

“Every man with new ideas is a crank until those ideas actually work”

-Mark Twain

What is Value?

Value = \frac{\text{Worth}}{\text{Cost}}

VE combines concepts of VALUE with CREATIVITY
Why Value Engineering?

- Value Engineering has saved the private industry and governmental agencies many $Billions since its inception in 1947.

- The VE approach promotes the philosophy of “Do the Right Thing Right the First Time.” (DTRT RTFT)

Value Engineering (VE) aims at achieving the lowest life cycle cost meeting or exceeding all the functional requirements and criteria such as quantity, quality, safety, durability and sustainability.

Cost: Financial, Social and Environmental. looking at 3 bottom lines
What is value?

Value = \frac{\text{Worth}}{\text{Cost}}

V.E. Objective is to make \( \frac{W}{C} \approx 1.00 \)

Best Value is not about cost cutting, it is about improving the understanding of the business/project needs.
How is Value Engineering done?

Value Engineering uses a combination of creative and analytical techniques to identify alternative ways to achieve objectives.

The use of Function Analysis differentiates Value Engineering from other problem solving approaches.

Function Analysis Systems Technique

FAST
The determination of **Value** may be an informal management/design decision process or a rigorously formal review/selection process.

Three key questions regarding the function:

- **What must it do?** (primary requirements, basic needs)
- **What else will do that?** (develop alternatives)
- **What's the best alternative?** (select the best, optimum option)
Larry Mile’s 6 questions on a function

- What is it?
- What does it do?
- What must it do?
- What does it cost?
- What else would do the job?
- What does that cost?

VE aims at achieving the **lowest life cycle cost** meeting or exceeding all the functional requirements and criteria such as quantity, quality, safety, durability and **sustainability**
Why Function Analysis?
By identifying the function of a product or procedure with two words, a verb and a noun, we are better able to explore alternatives.

**Verb + Noun = Function**

(Active)  (Measurable)  (end result)

- Makes marks pencil enable writing
- Conveys liquid pipe operate wash room
- Projects light projector support presentation
- Creates heat projector *not a needed function!
- Conveys information book tell stories

A two-word description for clarity and focus

Removes the problem-solving focus away from the item and towards its **function**
History of VE

1942  Larry D Miles : Second World war  
     G.E:  $200Million saved at a cost of $1M

1950  – National professional body (later SAVE)

1960 – US Military adopted it as a strategy

1964 - FAST technique – Charley Bytheway

1995 – Federal US govt. saved more than a Billion $

In Canada: Canadian Society of Value Analysis
In US – Society of American Value Engineers
FUNCTION ANALYSIS

1. Listen to users
   - ensure they are present !

2. Identify functions
   - Separate functions to basic, secondary and constraints

3. Evaluate functions

4. Develop function costs

5. Develop alternatives

pencil makes marks enable writing
How do we Improve Value of a function?

Function performance
*Needed performance*

Cost of function?

Resulting Value

Enhanced Value

Enhanced Value

Enhanced Value

Ideal-Enhanced Value

Reliable power, at low cost, for generations.
What is the function of this pencil? "make marks"

- Band: Secure Eraser
- Barrel: Support Lead, Accommodate Grip, Transmit Force
- Eraser: Remove Marks
- Paint: Protect Wood, Improve Appearance
- Graphite: Make Marks
## Consider a Pencil costing 10 cents. What is its value?

<table>
<thead>
<tr>
<th>Function</th>
<th>Nature of function</th>
<th>Component</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make marks</td>
<td>primary</td>
<td>Lead</td>
<td>1.0 cent</td>
</tr>
<tr>
<td>Protect lead &amp; Enable hold</td>
<td>secondary</td>
<td>wood, plastic, rubber, metal?</td>
<td>3.5</td>
</tr>
<tr>
<td>Attract buyer</td>
<td>secondary</td>
<td>painting</td>
<td>1.5</td>
</tr>
<tr>
<td>Advertise</td>
<td>secondary</td>
<td>engrave?</td>
<td>1.5</td>
</tr>
<tr>
<td>Motivate seller</td>
<td>secondary</td>
<td>profit?</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Basic value = \(\frac{1.0}{10} = 0.1\)  
Esteem value = \(\frac{3.0}{10} = 0.3\) (say Mont Blanc!)

Resulted in unmarked pencils, mechanical pencils, etc.
V.E. Objective:

Utilize a systematic approach, to identify the required functions and deliver the project at the lowest possible cost, keeping the design intent unchanged.

Expectations:
1. Reduction on construction costs
2. Lower life cycle costs (Financial, social & environmental)
3. Improved operational performance
4. Reduced maintenance costs
5. Identification of risks and mitigation strategies (Safety by design?)
What is Value Engineering?

Value Engineering is a systematic approach for isolating high cost functions in design and arriving at the best balance between cost, performance and quality.

The basic VE job plan consists of the following five stages:

1. Information Stage
2. Creative Stage
3. Analysis Stage
4. Development Stage
5. Presentation Stage
6. Implementation Stage

For a Civil Engineering project, one can expect a savings of 5% to 15%, and a functional design (read improved value) constructible within budget.

Ontario MOT reports that a typical VE study involves a multi-disciplinary team at a workshop lasting 3 to 5 days. The payback from the investment in VE normally exceeds 10:1. MOT saved about 100 million since 1998.
### How is VE different from conventional methods?

<table>
<thead>
<tr>
<th><strong>Conventional Approach</strong></th>
<th><strong>VE Approach</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Item oriented</td>
<td>Function oriented</td>
</tr>
<tr>
<td>Analytical, based on habits</td>
<td>Creative and Innovative</td>
</tr>
<tr>
<td>Cost visibility by components (material, labor etc.)</td>
<td>not based on habits</td>
</tr>
<tr>
<td>Individually oriented (cost engineer peer reviewer?)</td>
<td>Cost visibility by function (primary, secondary, etc.)</td>
</tr>
<tr>
<td></td>
<td>Team oriented</td>
</tr>
<tr>
<td></td>
<td>(brain storming)</td>
</tr>
</tbody>
</table>
Is there a good time to do VE?

Potential Savings from VE Applications

Overall VE savings

VE costs

Time scale

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**VE Workshops**

*(3-5 days depending on project scope)*

- Multi-disciplined team approach
- Include all professionals (arch., struct., civil, mech. and elec., etc.)
- Involve the Owner, Consultants and Construction Manager.
- Must be done by a trained facilitator, CVS

The team approach used for VE studies are comprised of three specific phases:

**I  Pre-Study Preparation Phase**
- develop rapport among team members, gather data

**II  VE Study Phase**
- detailed study, analysis, create & develop ideas

**III  Post VE Study Phase**
- review the processes and lessons learnt
Information & Study Phase

Information Procedure
Component Identification
Component Costing
Criteria and Limits Analysis
Function Analysis
Function Costing
Function-logic Diagramming (FAST)
The Creative Workshop
• Record creative ideas on a flip chart
• Begin with high cost functions
• Structured & facilitated brainstorming
• Number ideas for cross-referencing
• List every idea no matter how unconventional
• No ridicule or judgment
• Enjoy!!

Functions → Ideas

Mind is like a parachute: It works best when open!
Evaluation phase

• Developing & ranking ideas against performance criteria
  • Pass / fail test
• Eliminating ideas that don’t have champions.
  • Feasible / realistic / lack of champions
• Voting on ideas through ‘Gut Feel Criteria’
  • Consensus / Wisdom
• Majority Decision
**Waste**

- Make it visible
- Make it tangible
- Seek / Identify opportunities to eliminate/modify
  - Small / large ideas, build on others ideas..

Unnecessary & secondary functions are like waste that may be eliminated by creativity

Visible waste

Hidden waste

Poor design
Poor training
Poor communication
Development Phase

Objectives:
Review Customer’s values and objectives
Expand Ideas
Develop the chosen ideas into written recommendations that include:

– Sketches
– Calculations
– Cost Analysis
– Advantages and Disadvantages
– Risks (cost and time) if possible.
Presentation Phase

Objectives:

Present workshop team recommendations
Welcome questions
Demonstrate depth, knowledge and thoroughness
Inspire confidence

Identify the Targets (Who)
Review the Study Objectives (Why)
Present the Conclusions (What)
Critical Success Factors for VE

Methodology
VE job plan must be followed systematically

Attitude of Participants
Right attitude, appropriate stakeholders, awareness of process

Executive support
VE workshops, sponsorship, implementation of results

Management of Process
Clear objectives, timelines, follow-up actions, review and feedback

Professional Workshop Facilitation
Probing with right questions, using appropriate tools, managing the process, maintaining momentum of team, etc. etc.
VALUE BY DESIGN!

• SYSTEMATIC APPROACH

• FULL USE OF CREATIVITY & TEAM WORK

• PRE DETERMINED CRITERIA FOR VALUE

• EVALUATION AND ASSESSMENT BY TEAM

• LIFE CYCLE - COST, MAINTENANCE, SUSTAINABILITY
  • FINANCIAL, ENVIRONMENTAL & SOCIAL (TBL)

• WORKS WELL WITH SAFETY BY DESIGN STRATEGY

• KNOWLEDGE TRANSFER AND ORGANIZATIONAL LEARNING
VALUE ENGINEERING
Ruskin Dam Seismic Upgrade

Ruskin Dam Seismic Upgrade
Ruskin Dam Seismic Upgrade

VALUE ENGINEERING
Dam Upgrade Project
In-house design
• Upgrade the Right Abutment
• Demolish & Rebuild Upper Dam
• New Elect. & Mech. Systems
• ALARP – Safety by Design
$171 mil (-15%, +50%)
2009-2014

Powerhouse PROJECT
MWH design
$500 million
2009-2014
Dam Upgrade Project

The project is to upgrade the dam structure - upper concrete dam and the right abutment.

The Maximum Design Earthquake with an average Return Period of 10,000 years (7.5 on the Richter scale for that location)

Ruskin Dam VE Study is the first formal VE study in recent years within BC Hydro

Why seismic upgrade is important?
Key Objectives and WDB for Dam Upgrade Project

• **Address Dam Safety Issues**
  • Seepage and piping risk at right abutment
  • Seismic stability of right abutment
  • Seismic stability of concrete dam

• **Incorporate other User Requirements such as:**
  • Gate reliability
  • Physical security
  • Safety by Design principles

• Design Flood PMF: 3,650 m³/s
• Design Earthquake MDE: 0.71 g, M7.5
Purpose of the Ruskin VE Study *

Review and evaluate the methods and approaches specified in the feasibility design documents developed to-date.

Study the effectiveness of the proposed design solutions, including scheduling and phasing.

Develop and/or refine concepts or components to improve performance and/or reduce cost, while maintaining design standards and codes, safety and reliability.

* As per RFP to select a CVS
Ruskin Dam Seismic Upgrade

Existing single lane roadway is to be replaced with double lane.

Piers & gates are to be demolished and replaced with new piers & 5 gates.
Project Site

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Ruskin Dam Seismic Upgrade

VALUE ENGINEERING

BChydro
Ruskin Dam Seismic Upgrade

Value Engineering

Project Site Photos

Right Abutment

Piers & gates are to be demolished and replaced with new piers & 5 gates

Crest of spillway

Piers
Conceptual Design - key features:

1. Remediation work on the Right Abutment that provides a downstream reverse-filter blanket, installation of a jet grout cut off wall in the area of the downstream drainage adit, and strengthening of the soils beneath the upstream concrete slab by jet grouting

2. For the Upper Dam, the upgrade program involves demolition and replacement of the 6 existing concrete piers, 7 radial (steel) gates, and the bridge deck with new piers, 5 larger gates, and a wider roadway bridge

3. Construction of new electrical, mechanical and hydraulic operational systems, and corresponding control rooms to operate the gates.

4. The project is guided by principles of “Safety by Design” and the entire project is being designed accordingly.
Organizational learning
Transferred to
other projects

Ruskin Dam SEISMIC UPGRADE PROJECT
VALUE ENGINEERING STUDY

VE Orientation- presentations
Aug- Oct. 2007

Appoint a VE Consultant
15 October 2007

VE workshop
Nov. 2-9, 2007

VE ‘Webinar’
25 October 2007

VE Report
30 November 2007

Implement in Design
Dec. 2007 to Jan 2010

Implement in Construction
2010-2014

EARG – Ruskin Dam Seismic Upgrade
VALUE ENGINEERING
<table>
<thead>
<tr>
<th>VE Phase</th>
<th>Agenda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Phase</td>
<td>• Webinar</td>
</tr>
<tr>
<td></td>
<td>• Detailed Project Presentations</td>
</tr>
<tr>
<td></td>
<td>• Defining Problem/Opportunities</td>
</tr>
<tr>
<td>Function Analysis</td>
<td>• Identifying Project Functions/FAST</td>
</tr>
<tr>
<td>Creativity</td>
<td>• Defining Targets</td>
</tr>
<tr>
<td></td>
<td>• Creative Brainstorming</td>
</tr>
<tr>
<td>Evaluation</td>
<td>• Screening of Ideas to be Championed</td>
</tr>
<tr>
<td></td>
<td>• Detailed Evaluation</td>
</tr>
<tr>
<td>Development</td>
<td>• Mid-Workshop Review Meeting with Owner/Agency</td>
</tr>
<tr>
<td></td>
<td>• Technical Write-ups of VE Proposals</td>
</tr>
<tr>
<td>Presentation</td>
<td>• Team Presentation of VE Proposal</td>
</tr>
</tbody>
</table>

**VE Workshop Agenda**

Reliable power, at low cost, for generations. Reliable power, at low cost, for generations. Reliable power, at low cost, for generations. Reliable power, at low cost, for generations.
VE Study Summary

• VE Ideas Summary:
  - 176 Ideas Generated
  - 60 Ideas Shortlisted
  - 26 Ideas Developed into VE Proposals
<table>
<thead>
<tr>
<th>Ref. Function</th>
<th>Basic Functions</th>
<th>No. of Ideas Selected for proposals</th>
</tr>
</thead>
<tbody>
<tr>
<td>CF</td>
<td>Control Flow</td>
<td>8 Ideas</td>
</tr>
<tr>
<td>CS</td>
<td>Control Seepage</td>
<td>3 Ideas</td>
</tr>
<tr>
<td>EC</td>
<td>Estimate Correction</td>
<td>1 Idea</td>
</tr>
<tr>
<td>FC</td>
<td>Facilitate Construction</td>
<td>3 Ideas</td>
</tr>
<tr>
<td>MG</td>
<td>Maintain Gates</td>
<td>1 Idea</td>
</tr>
<tr>
<td>OG</td>
<td>Operate Gates</td>
<td>7 Ideas</td>
</tr>
<tr>
<td>PW</td>
<td>Protect Workers</td>
<td>1 Idea</td>
</tr>
<tr>
<td>SG</td>
<td>Support Gates</td>
<td>2 Ideas</td>
</tr>
<tr>
<td><strong>Total VE proposals developed</strong></td>
<td><strong>26 Ideas</strong></td>
<td></td>
</tr>
</tbody>
</table>

EARG - Ruskin Dam Upgrade

VALUE ENGINEERING
## Summary of VE Proposals & Recommendations:

<table>
<thead>
<tr>
<th>Description</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rejected VE Proposals due to increased costs &amp; not commensurate with benefits</td>
<td>2</td>
</tr>
<tr>
<td>VE Proposals considered for Design improvements (9 accepted)</td>
<td>12</td>
</tr>
<tr>
<td>Rejected VE Proposals after general considerations</td>
<td>7</td>
</tr>
<tr>
<td>Accepted VE Proposals for further consideration*</td>
<td>2</td>
</tr>
<tr>
<td>Accepted VE Proposals at the Preliminary Design*</td>
<td>3</td>
</tr>
</tbody>
</table>

*Note: 1 proposal has been since modified and adopted*
Three major proposals with high impact

Following have been adopted and are currently being pursued with detailed assessment and cost estimation.

1. Install a plastic concrete cut off wall
   VE Proposal CS-10 – savings of $8.00 million – adopted additional environmental benefits.

2. Use parts of temp bulkhead to form perm. Bulkhead in lieu of stop logs
   VE Proposal MG-16 – potential savings of $7.0 million
   Project Management is still undecided on this.

3. Maintain existing pier designs and use a design for the new gates so as to accommodate potential deformation of the skin plates.
   VE Proposal SG-02 (modified) - design and cost impact is being studied for a hybrid idea. i.e., new gates with ductile behaviour
Ruskin Dam Seismic Upgrade

- Upper Slope Excavation, Retaining Wall and Vegetation
- Wilson St. Relocation
- Sheet Pile Cutoff Wall
- Filter Blanket

Photo Representation Of the Proposed work

Reliable power, at low cost, for generations. Reliable power, at low cost, for generations. Reliable power, at low cost, for generations. Reliable power, at low cost, for generations.
### Design Suggestions / Improvements selected for further consideration

<table>
<thead>
<tr>
<th>Suggestion</th>
<th>Proposal No.</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Locate Electrical rooms in such a way that the seismic loads are less than 1.0g)</td>
<td>VE Proposal OG-01</td>
<td>Adopted</td>
</tr>
<tr>
<td>2. Dampen the electrical room</td>
<td>VE Proposal OG-02</td>
<td>Discarded</td>
</tr>
<tr>
<td>3. Use armoured cabling for all dam runs</td>
<td>VE Proposal OG-05</td>
<td>Adopted</td>
</tr>
<tr>
<td>4. Automatic control of emergency generator</td>
<td>VE Proposal OG-11</td>
<td>Adopted</td>
</tr>
<tr>
<td>5. Locate the circuit breakers inside electrical room, not on piers</td>
<td>VE Proposal OG-12</td>
<td>Adopted</td>
</tr>
<tr>
<td>6. Provide hydraulic by-pass for oil for gate control system</td>
<td>VE Proposal OG-14</td>
<td>Adopted</td>
</tr>
<tr>
<td>7. Minimize the hydraulic cylinder size</td>
<td>VE Proposal OG-18</td>
<td>Adopted</td>
</tr>
<tr>
<td>8. Seismic dampening of gate skin plates</td>
<td>VE Proposal CF-11</td>
<td>Further study</td>
</tr>
<tr>
<td>9. Use a self-balanced bulkhead with no support from piers</td>
<td>VE Proposal FC-10</td>
<td>Discarded</td>
</tr>
<tr>
<td>10. Include a fuse-able bulkhead for emergency flood relief</td>
<td>VE Proposal FC-17</td>
<td>Discarded</td>
</tr>
<tr>
<td>11. Provide access for slab inspection at right abutment</td>
<td>VE Proposal PW-12</td>
<td>Adopted</td>
</tr>
<tr>
<td>12. Include the lost power revenue in calculations</td>
<td>VE Proposal EC-01</td>
<td>Adopted</td>
</tr>
</tbody>
</table>
The rejected major proposals were:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>1. Install a <strong>fuse gate</strong> in one bay with new pier configuration</td>
<td>VE Proposal CF-01 A</td>
</tr>
<tr>
<td>2. Install 2 fuse gates with the old pier configuration</td>
<td>VE Proposal CF-01B</td>
</tr>
<tr>
<td>3. Install 3 fuse gates in the exiting bays</td>
<td>VE Proposal CF-01C</td>
</tr>
<tr>
<td>4. Use <strong>flap gates</strong> replacing all the 7 existing gates</td>
<td>VE Proposal CF-15</td>
</tr>
<tr>
<td>5. Use radial gates on the sides and flap gates in the centre</td>
<td>VE Proposal CF-24</td>
</tr>
<tr>
<td>6. Use <strong>strong back system</strong> to secure right abutment slabs</td>
<td>VE Proposal CS-29</td>
</tr>
<tr>
<td>7. Distribute the loads from the centre piers to end piers by using bridge deck</td>
<td>VE Proposal SG-12</td>
</tr>
</tbody>
</table>
Accomplishments - Ruskin VE Study.

1. VE proposals resulted in significant design decisions with impact on cost estimate. **Cost savings of a minimum of $8 million achieved with a potential for additional savings.**

2. Several VE proposals adopted in design with no significant impact on cost, but improved the quality of design.

3. VE study resulted in confirming that most of the design decisions thus far have been appropriate and thereby validating them.

4. Established the VE study as a tool for the management to ascertain that almost all possible design options have been studied before making major design decisions.

5. Created enhanced trust and reliance on the classic VE study which will potentially be applied to all major projects in BC Hydro. This will hopefully result in a shift in culture of project delivery within the organization.
Lessons Learned

1. Gained valuable insight and an appreciation of the benefits of performing formal Value studies on major project initiatives.

2. VE study done at an earlier stage of the Ruskin Project would have been much more effective as more broader options could have been entertained in the creativity sessions.

3. Many of the design decisions had already been in place (sacred cows—don’t touch) and it was too late to make major changes at the time of VE study.

4. During the workshop, many salient aspects beyond the scope of VE study emerged impacting the final product. They include the safety aspects, environmental issues, public consultation, etc.

5. Provided another opportunity to be due diligent in the design process

6. Several design improvements have been identified and adopted adding value to the project.
7. Cost estimates developed in the VE workshop are only ‘order of magnitude’

8. More design development and rigorous cost estimates are required to ascertain idea feasibility and acceptability.

9. Detailed follow-up study is required to meaningfully capture the impact of VE proposals.

10. Due diligence and detailed study are expected to take place after the VE proposals are developed at the workshop before accepting or rejecting them.

11. ‘Safety by Design’ - VE workshop gave ample insights into the safety aspects.

12. A Safety by Design workshop followed the VE study workshop and the team members observed that the VE study & SbD have many common themes.
14. Management / Executive support is critical to success of a VE Study.

15. A champion to the cause of Value Engineering is critical to create an interest and sense of importance of the process amongst the team members.

16. The ‘webinar’ conducted for the study was well appreciated by all-saved time and was very effective.

17. For significant engineering projects, success of the Value Engineering study depends on the effectiveness of the facilitator and He/she must be a Value Engineering professional, a Certified Value Specialist.

18. By undertaking the VE study, the Corporation has saved a minimum of $8 million with a potential for additional savings. This represents a significant rate of return as the Value Engineering task cost had been only about $150,000.
Value Engineering and Safety by Design share common principles.

VE study is in line with BC Hydro’s Triple Bottom Line approach.

$2 billion+ worth of construction is on the books!

Value Engineering Study - a vehicle to bring triple bottom line and sustainability in practice.

VE as a practice will result in

- Significant revisions with cost impact
- Cost neutral revisions.
- Validation of design decisions
- Management tool for due diligence
- Cultural shift towards project delivery

EARG – Ruskin Dam Seismic Upgrade
VALUE BY DESIGN!

- SYSTEMATIC APPROACH
- FULL USE OF CREATIVITY & TEAM WORK
- PRE DETERMINED CRITERIA FOR VALUE
- EVALUATION AND ASSESSMENT BY TEAM
- LIFE CYCLE - COST, MAINTENANCE, SUSTAINABILITY
- WORKS WELL WITH SAFETY BY DESIGN STRATEGY
- KNOWLEDGE TRANSFER AND ORGANIZATIONAL LEARNING
- GOOD SYNERGY WITH SAFETY BY DESIGN
- TRIPLE BOTTOM LINE CONSIDERATIONS (NOT JUST $$)
Value engineering

Strengths

• Optimization of Quality / Performance
• Overall Cost Optimization
• Appropriate Technology
• Sustainable (Reduce, Reuse and Recycle) Approach
• Enhanced Reliability & Safety
• Risk Mitigation (bad news upfront)

Limitations

• VE team should be involved right from the beginning
• Reliance on creativity and lateral thinking
• Team work is a must
• Can result in many intangibles
• Initial cost (time and effort)
Ruskin Dam VE Study

Winner of Outstanding Accomplishment

2009 SAVE Annual Conference – Detroit 29 June to 2 July 2009