



Overview of Value Engineering Program

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**Americas CF&S Kick
Off Meeting**

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What is Value Engineering?

- **Value Engineering (VE) is defined as an organized effort directed at analyzing the functions of systems, equipment, facilities, services, and supplies for the purpose of achieving the essential functions at the lowest life-cycle cost consistent with required performance, quality, reliability and safety.**

At its most basic level, the VM Process is designed to answer the following critical questions:

- 1) What is it (the need or problem)?
- 2) What must it do (the function)?
- 3) What does it cost (life-cycle)?
- 4) What else will do it (the alternative)?
- 5) What will that cost (life-cycle)?

Source: OMB Circular A-131, Value Engineering, May 23, 1993



What is Value Analysis, Value Management & Value Control?

- **The terms value analysis, value management, and value control are considered synonymous with VE. Recently DOE is using the term Value Management.**
- **VE is a technique directed toward analyzing the functions of an item or process to determine “best value,” or the best relationship between worth and cost. In other words, “best value” is represented by an item or process that consistently performs the required basic function and has the lowest total cost.**

Source: Society of American Value Engineers (SAVE) International



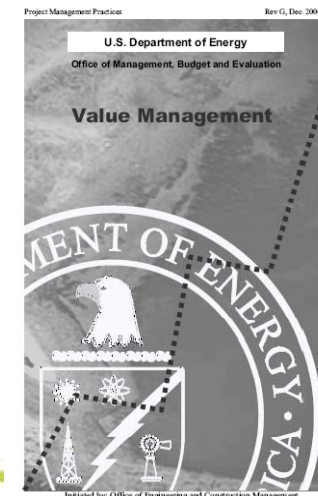
Why should WE perform Value Engineering?

- **Since 1993, federal agencies and departments have been required to use value engineering “as a management tool to ensure realistic budgets, identify and remove nonessential capital and operating costs, and improve and maintain optimum quality of program and acquisition functions.”**
- **This requirement was established by;**
 - **Public Law 104-106, Section 4306 - Value Engineering for Federal Agencies,**
 - **OMB Circular A-131 – Value Engineering, and the**
 - **Government Performance and Results Act (GPRA) of 1993.**



History of VE at DOE

- **DOE Order 4010.1A - Value Engineering, 5/14/92**
 - Implements OMB Circular A-131 Requirements
- **DOE Order 430.1A - Life Cycle Asset Management, 10/14/98**
 - Cancels DOE O 4010.1A, requires Process Tool, such as VE, be used to improve efficiency and cost-effectiveness
- **DOE Order 413.3 - Program and Project Management for the Acquisition of Capital Assets, 10/13/00**
 - Requires use of VE to derive the lowest life-cycle cost of a capital asset
- **DOE “Value Management” 12/2004,**
provides the latest guidance



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VE Program Objectives

- **To help DOE live up to its responsibility to deliver capital assets on schedule, within budget, and fully capable of meeting mission performance and environmental, safety, and health standards.**
- **To conform to the letter and spirit of Public Law 104-106, National Defense Authorization Act For Fiscal Year 1996 and OMB Circular A-131.**
- **To not unduly impede the efficient and effective delivery of capital assets while meeting DOE objectives to obtain quality products, ensuring timeliness of performance, controlling costs, and mitigating adverse events.**

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Value Management

Welcome

Welcome to the U.S. Department of Energy's Value Management Information Center (VMIC). The VMIC has been created to assist the Department's value and project management communities in sharing relevant information, discussing issues, learning more about the value methodology, and providing a forum to share lessons-learned across the DOE community.

The Value Method (VM) is a systematic and organized way to develop and compare alternatives that will get the job done (provide all of the essential functions) with the greatest value (greatest efficiency, economy, and quality with the least delay). The Value Method produces recommendations, not decisions. The Value Method includes the processes known as Value Analysis, Value Engineering, and Value Management. It is sometimes also referred to as Value Control, Value Improvement or Value Assurance.

The VMIC is sponsored by the Office of Engineering and Construction Management.

Announcements

Value Engineering Policy
 To establish Department of Energy (DOE) value engineering policy that meets the requirements of Public Law 104-106, Section 4306 as codified by 41 United States Code 432. This law states that each agency shall establish and maintain cost-effective value engineering (VE) procedures and processes. Additionally, Office of Management and Budget (OMB) Circular A-131, Value Engineering, requires that all Federal agencies use VE as a management tool, where appropriate and using a graded approach, to ensure realistic budgets, identify and remove nonessential capital and operating costs, and improve and maintain optimum quality of program and acquisition functions. [read more...](#)

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<http://oecm.energy.gov/Default.aspx?tabid=77>

Additionally, Office of Management and Budget (OMB) Circular A-131, Value Engineering, requires that all Federal agencies use VE as a management tool, where appropriate and using a graded approach, to ensure realistic budgets, identify and remove nonessential capital and operating costs, and improve and maintain optimum quality of program and acquisition functions.



VE Requirements DOE M 413.3

- **PEP must include;**
 - **Determination of whether the projects meet DOE requirement for conducting a formal VE Study, and**
 - **Formal Plans, if required, to conduct formal VE studies.**
- **CDR should include on a tailored basis;**
 - **Systems Engineering Plan defining Value Engineering requirements, and**
 - **Assessments of and strategy for Value Engineering. For projects having a TPC greater than \$5M, formal plans and actions are required.**



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CoE Program

- The US Army Corp of Engineers (CoE) has a department that provides organized VM for projects. We used a team for the NuMI project to help conduct a formal VM.
- The steps are similar to that in the DOE guidance.
- I like the CoE titles



A Results-oriented Approach

Value Engineering offers a platform to find and explore other ways of doing things. It is done by employing the VE methodology, which contains six phases.

Information Phase

Information is extracted from many sources. It is dependant primarily on team composition and what information the team members bring to the Study. Obviously, this information can take many forms, from documents (design, planning, estimating, diagram, acquisition, system, organizational, etc.) to the experiences, thoughts, discussions and communications of the team members.

Function Analysis Phase

The purpose of this phase is to clearly identify the function of the Project (or Issue at hand), and to formulate a concept from which new directions can be taken. A Function Analysis Study Technique (FAST) Diagram is an end product of the Information Phase.

Speculation Phase

The Study Team then embarks on a brainstorming session. Quantity and "Free wheeling" are the goals of this speculation phase. Criticism is not allowed during this phase. The product of the Speculation Phase is a listing of ideas

Analysis Phase

The Analysis Phase reduces the speculation list by evaluating each idea. Those ideas that become technically sound must withstand the "Value" test.

Development Phase

Those feasible ideas that survive the analysis phase are then developed into proposals. Usually, more research and in-depth resolution is pursued to substantiate the proposal. Sometimes this attempt to substantiate the proposal results in the modification or even elimination of the original idea. Development generally takes the form of a written document that clearly expresses the proposed idea, usually a "Before" and "After" depiction.

Presentation Phase

A presentation is made to those who have an interest in the outcome of the proposals.

OVEST's Special Qualifications

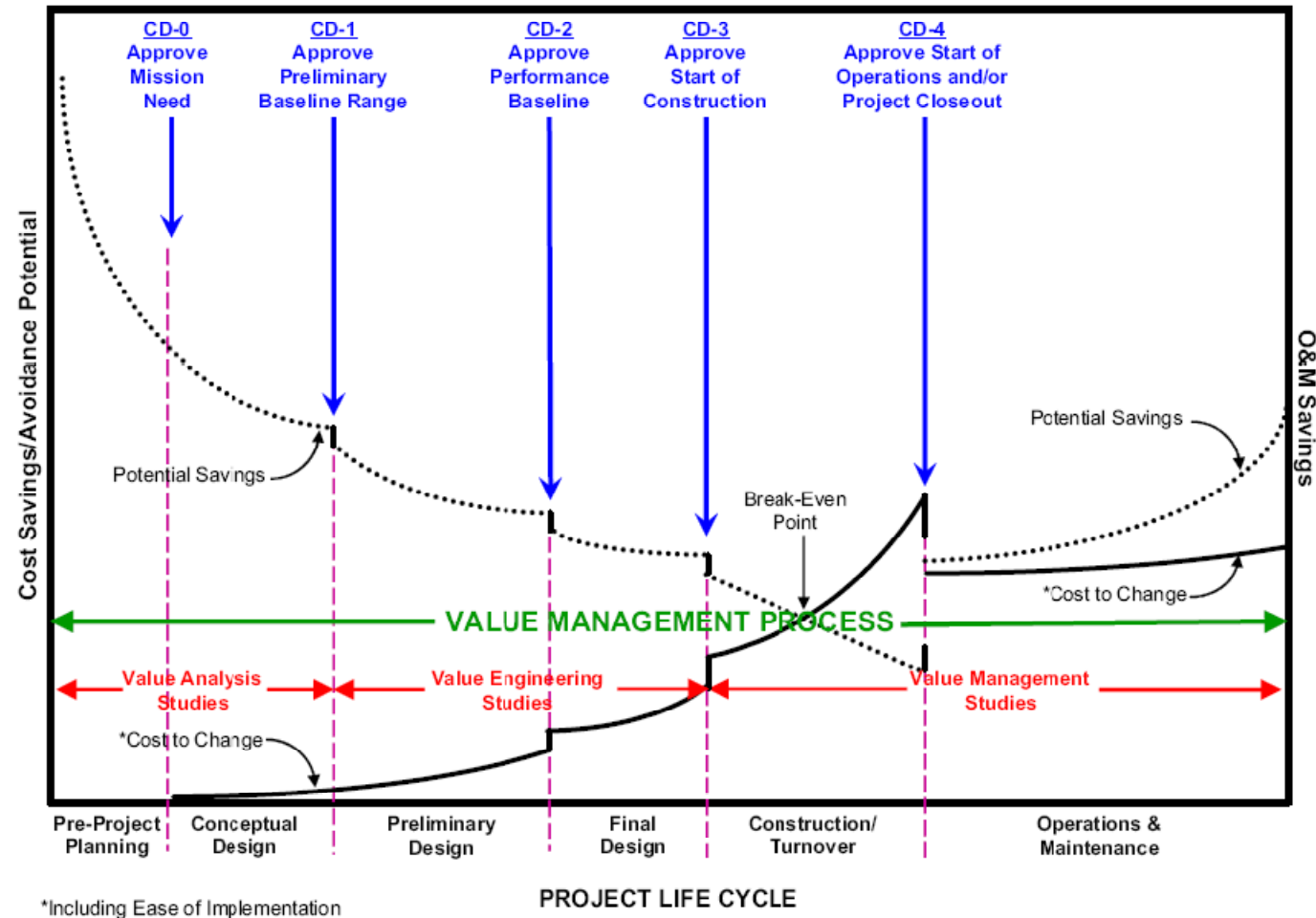
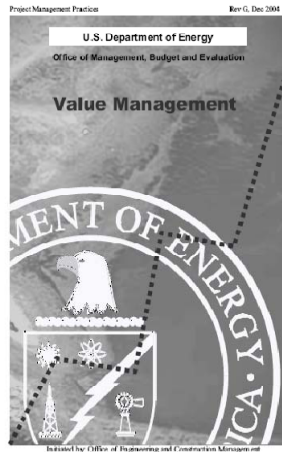
Basically, the foregoing process is adequate to perform a VE study. However, achieving *results*, using the VE methodology, is another matter. The methodology is merely the vehicle and road map. One still needs to learn how to drive it, how to read the map, and especially, how to determine the destination of all this activity. These are skills that can only come about after 22 years of performing successful (over 500) VE studies.

- Who We Are
- What We Do
- How We Do It
- Track Record
- Working With Us
- Reaching Us
- E-mail OVEST



A few 413.3 Excerpts

APPLY VALUE MANAGEMENT THROUGHOUT THE DOE PROJECT LIFE CYCLE



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- While the “Option” studies might look at adding value to the project, they do not meet the DOE definition of VM.
- A single VM study to look at the entire project would be unmanageable and time consuming.
- Suggest looking at narrowing to areas that related such as power and cooling.



What a “Formal” VM study might Entail

Information Phase

Information is extracted from many sources. It is dependant primarily on team composition and what information the team members bring to the Study. Obviously, this information can take many forms, from documents (design, planning, estimating, diagram, acquisition, system, organizational, etc.) to the experiences, thoughts, discussions and communications of the team members.

- This first phase will take between 40 and 60 hours to assemble a package to distribute information to invitees. Plus oral presentation at beginning of study.



The fun part

- **Function Analysis Phase-**
The purpose of this phase is to clearly identify the function of the project and to formulate a concept from which new direction can be taken.
- **Speculation Phase –** The study team embarks on a brainstorming session. Quantity and free wheeling are the goal...Criticism is not allowed. The product is ideas.
- **Analysis Phase –** The analysis phase reduces the speculation list by evaluating each idea
- A reasonable timeframe would be 2 to 2 ½ days.
- Attendance by project members, engineers and scientists from other similar type projects and folks from industry. Could be 20 to 30 participants.
- Strongly suggest getting an outsider to proctor the process



Fun's over

- **Development Phase -** Those feasible ideas that survive the analysis phase are then developed into proposals. Alternate designs are made, depiction of “Before” and “After” is generated.
- **Presentation Phase –** A presentation is made to those who have interest.
- Real engineering, real work, is required in this phase, no more hand waiving. Impacts on stakeholders, impacts on costs, performance, science all need to be studied.
- Informally presentations can be made to management, formally would be submittal to change control



Proposed Next Steps

- Continue with “Option Studies” to firmly establish the baseline (deep-near surface: two tunnels-one tunnel....and so on)
- We should aim to schedule two or three “formal” VM studies over the next year. One on civil construction and one on power and cooling.



**VALUE ENGINEERING PROPOSAL
(SEE PROPOSAL #9)**

PROPOSAL #7

DESCRIPTION:

Reduce lighting to emergency lighting in the Decay Tunnel and other restricted areas.

ORIGINAL DESIGN:

The original design has 24-2 bulk, 40w, fluorescent light fixtures. This provides a fixture roughly every 90'. There are 12 normal power and 12 emergency powered fixtures.

PROPOSED DESIGN:

Reduce the number of lights to 12 total and reduce the circuits, wiring and conduits to emergency only.

ADVANTAGES:

Reduced costs, both initial & maintenance.

DISADVANTAGES:

180' between light will not provide enough light to provide safe egress.

Code requirement to have exit lighting from two sources not provided.

JUSTIFICATION:

The decay and carrier pipes are not normally occupied space and will require a permit to enter, except in emergency conditions. There is nothing to do in the Decay or Carrier Tunnel to cause occupancy except for some minor maintenance.

COST ESTIMATING WORKSHEET

ORIGINAL DESIGN

ITEM	U/M	QTY	UNIT COST (\$)	TOTAL (\$)
Light fixtures	Each	12	185.76	2229.12
Lighting wiring devices	Lot	1	351	351.00
Lighting raceway	Feet	4800	5.55	26,640
Lighting wiring	Lot			7968
SUBTOTAL				\$37,188

PROPOSED CHANGE

ITEM	U/M	QTY	UNIT COST (\$)	TOTAL (\$)
Light fixtures				
Lighting wiring devices				
Lighting raceway				
Lighting wiring				
SUBTOTAL				-----

<i>Net savings</i>				37,188
MARK-UPS (60%)				22,000
TOTAL SAVINGS				\$59,000

*Mark-Ups: Contractor's mark-up for OH & Profit, contingencies & S&A where applicable.