

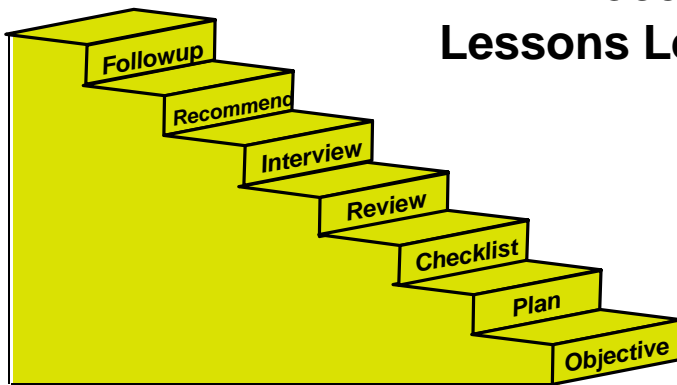
Section 3.2: Cost-Estimate Validation Process/Lessons Learned



Section 3.2



Cost-Estimate Validation Process/ Lessons Learned

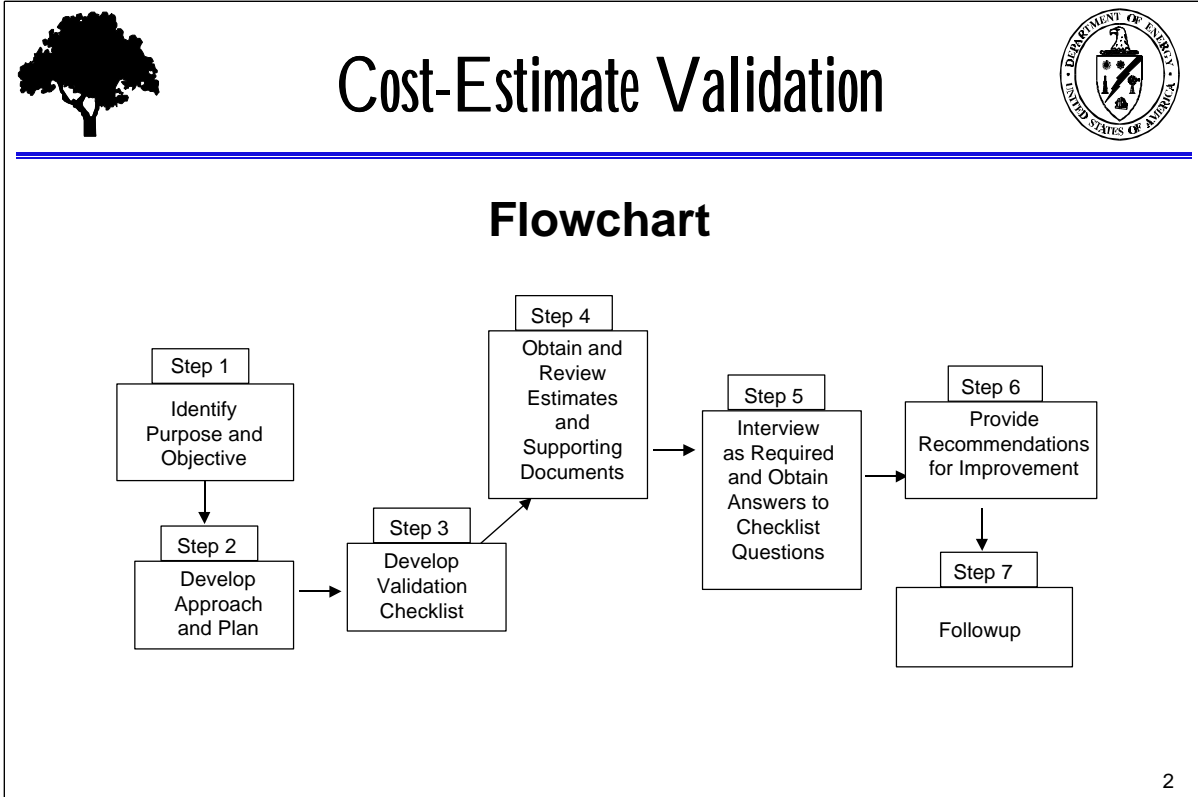


1

The section will discuss how to validate a cost estimate. A flow chart for this process will be presented, and application of each process step will be discussed.

Notes / Discussion Points / Lessons Learned: _____

Section 3.2: Cost-Estimate Validation Process/Lessons Learned




Discussion Leader/Facilitator Notes: Leave this slide on the second projector as a visual reference while going through the example.


The steps involved in the validation process are represented in this flowchart and will be discussed in general terms on the following pages.

Notes / Discussion Points / Lessons Learned: _____


Section 3.2: Cost-Estimate Validation Process/Lessons Learned



Step 1: I identify Purpose and Objective



- Identify the validation purpose
- Define the validation objective(s)



3

Discussion Leader/Facilitator Notes: Remember the steps of the validation process just discussed. Put the validation flowchart on one projector and the individual step overheads on the second projector.

General Application - Step 1

The validation purpose and objective must be clearly identified. An understanding of the validation purpose and objective will aid in identifying both the appropriate validation method and the approach.

The purpose identifies why the validation is being done, such as validation of a program baseline or an individual project estimate. This definition provides the scope of the validation effort.

Example Purposes:

- Verify the reasonableness, correctness, and completeness of the XYZ project estimate
- Verify the proposed project baseline for project execution

Based on the defined validation purpose, the validation objectives clearly identify the validation focus and approach.

(Continued on next page)

Notes / Discussion Points / Lessons Learned: _____

Section 3.2: Cost-Estimate Validation Process/Lessons Learned

Example Objectives:

- Provide well-supported project funding recommendations to the Chief Financial Officer.
- Examine the planning, technical, cost, schedule baseline, and facilities management aspects of the project.
- Assure departmental management that line item projects are ready for inclusion in the department's Internal Review Budget.
- Ensure that the cost estimate is consistent with the scope of work.

Notes / Discussion Points / Lessons Learned: _____

Section 3.2: Cost-Estimate Validation Process/Lessons Learned



Step 2: Develop Approach and Plan



- **Develop a well-organized, planned, and executable approach.**
- **Structure the approach to accomplish the identified purpose and objective.**
- **Determine individual or team.**
- **Plan the communications**



5

General Application - Step 2

The validation process, like any well-executed effort, deserves a well-planned and organized approach.

The validation approach must be structured to accomplish the identified validation purpose and objective(s).

The validation plan must include the selection of the validator or the validation team. Once the validation purpose and objectives have been identified and the validation approach is established, the individual or team members should be selected based on the skill mix required to accomplish the objectives.

Effective communications must be planned into the validation process.

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Notes / Discussion Points / Lessons Learned: _____

Section 3.2: Cost-Estimate Validation Process/Lessons Learned



Step 2: Develop Approach and Plan (Continued)



Planning communications into the validation process:

- Plan for early communication between the validators and the validatees.
- Publish the validation plans and schedule.
- Provide a checklist up front to the validatees.
- Request the necessary documents and information early.
- Establish a team approach between the validators and the validatees.



6

General Application - Step 2 (continued)

Communication is the key to executing a validation effectively. It must be part of the planned process and can be accomplished by

- Planning for early communications between the validators and the validatees.
- Publishing validation plans and schedules to all team members and validatees.
- Providing the validatees with the checklist up front to allow them to prepare answers to checklist questions.
- Requesting required documents and information as early as possible.
- Establishing a working relationship and a team approach between the validators and the validatees.

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Notes / Discussion Points / Lessons Learned: _____

Section 3.2: Cost-Estimate Validation Process/Lessons Learned



Step 2: Develop Approach and Plan (Continued)



Considerations during validation planning:

- The intent should always be to help and improve.
- The validation provides fresh eyes.
- Develop a team effort between the validators and the validatees.
- Avoid the us-versus-them intimidation.



7

General Application - Step 2 (continued)

Considerations to remember when planning a validation:

- The intent of the validation is always to improve and validate the estimate.
- The plan should develop a team effort between validators and the validatees.
- Avoid the us-versus-them intimidation in the validation process.

Notes / Discussion Points / Lessons Learned: _____

Section 3.2: Cost-Estimate Validation Process/Lessons Learned

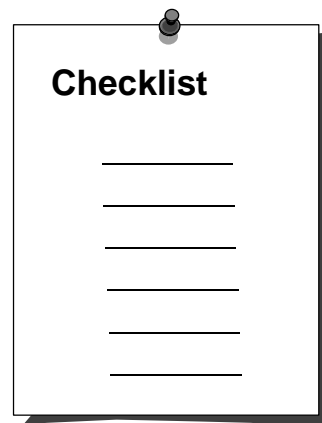


Step 3: Develop Validation Checklist



Development of a bottom-level (detailed) validation checklist:

- Ensures that all appropriate areas are covered
- Keeps the validation team on track
- Allows for preparation and attention to be focused on appropriate issues



8

General Application - Step 3

Development of a validation checklist:

- Ensures that all areas that support the validation purpose and objective are covered.
- Keeps the validation team on track.
- Allows both the validators and the validatees to prepare and focus attention and energies on appropriate issues.

Notes / Discussion Points / Lessons Learned: _____

Section 3.2: Cost-Estimate Validation Process/Lessons Learned



Step 3: Develop Validation Checklist (Continued)



Things to consider when preparing a validation checklist:

Background and conditions

- **Method used and documentation provided for definition of scope and technical approach**
- **Appropriateness of estimate type, approach, and method related to estimate objective and stage of project definition**

9

General Application - Step 3 (continued)

The following factors should be considered when you are preparing checklist items:

Background and conditions

- Understanding how the scope was defined and how well it is documented will provide insight as to the potential for consistency and completeness within the estimate.
- Evaluating the estimate type, approach, and method related to the objective of the cost estimate and the stage of project definition will provide the validators up-front information as to the appropriateness and even the correctness of the estimate.

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Notes / Discussion Points / Lessons Learned: _____

Section 3.2: Cost-Estimate Validation Process/Lessons Learned



Step 3: Develop Validation Checklist (Continued)



Background and conditions (Continued)

- Use of estimating tools and software
- Completeness of estimate basis and assumptions made
- Estimate and scope review process

10

General Application - Step 3 (continued)

Background and conditions (continued)

An understanding of the estimating tools and software used will provide the validators information on the items that do not need to be reviewed. An example would be that the validators identify that the estimate was prepared using a particular commercial estimate package. Knowing this information, the validators are confident that there would not be a mathematical error in the estimate summarization or in the calculation of such items as escalation. On the other hand, if the validators identify that the estimate was prepared using a spreadsheet, a check of the spreadsheet formulas may be required.

- The estimate basis and the assumptions made are vital to the validators' understanding of both the project and the estimate.
- The number and types of reviews that the estimate has undergone provide the validators key information relevant to the estimate completeness and accuracy. It is almost always safe to say that the more reviews an estimate has undergone by credible sources, the more accurate and complete it will be.

Notes / Discussion Points / Lessons Learned: _____

Section 3.2: Cost-Estimate Validation Process/Lessons Learned



Step 3: Develop Validation Checklist (Continued)



Direct Costs

- **Where and how were the quantities obtained?**
- **Verify the method of arriving at the labor hours.**
- **Were any productivity or job factors considered and applied?**
- **Verify the consistency and correctness of the wage rates applied to labor hours.**
- **Verify the method(s) used for costing.**
- **Review the reasonableness of manpower loading and scheduled time periods.**

11

General Application - Step 3 (continued)

Direct Costs

- An understanding of where and how the quantities were obtained can often be gained from the estimate review. Typically, quantity calculation will be included in the estimate.
- A review of the estimate should also clearly communicate the method for arriving at labor hours.
- The validators must understand what productivity factors may have been used and how they were applied and ensure that factors have not been duplicated. Factor duplication can often happen if the base rates used included an adjustment but a factor was still added (i.e., if the actual unit rates used were from a Level B dress-out project and a factor was also added for Level B dress out).
- Wage rates, whether loaded or unloaded, must be applied consistently and correctly.
- Knowing the costing sources used can help ensure confidence and credibility in the costs.
- The estimate and the schedule must be integrated, and manpower loading must be leveled for the schedule time periods.

Notes / Discussion Points / Lessons Learned: _____

Section 3.2: Cost-Estimate Validation Process/Lessons Learned



Step 3: Develop Validation Checklist (Continued)



Indirect Costs

- Are job indirect costs appropriate and reasonable for the jobsite conditions and the length of the job?
- Have overheads been applied appropriately and not duplicated?



12

General Application - Step 3 (continued)

Indirect costs may be one of the most vulnerable parts of DOE estimates. In this area, including duplicate costs is easy. The validators must evaluate appropriateness and correctness of overheads carefully.

Notes / Discussion Points / Lessons Learned: _____

Section 3.2: Cost-Estimate Validation Process/Lessons Learned



Step 3: Develop Validation Checklist (Continued)



Other Costs

- Have taxes been considered in the estimate?
- Have DOE-published escalation rates been calculated correctly and applied properly?
- How was project risk evaluated? Has it been accounted for in both the estimate and the schedule process?

13

General Application - Step 3 (continued)

Other Costs

This part of the estimate may be vulnerable to overlooked or miscalculated costs.

Notes / Discussion Points / Lessons Learned: _____

Section 3.2: Cost-Estimate Validation Process/Lessons Learned



Step 3: Develop Validation Checklist (Continued)



Schedule

- Are milestones and activities portrayed properly and consistently between the estimate and the schedule?
- Are costs assigned at an activity level?
- Are activity durations justified and documented?

14

General Application - Step 3 (continued)

Schedule Analysis

Schedule analysis and consistency between the estimate and the schedule are important in verifying the estimate feasibility and accuracy. If the schedule and the cost estimate are not consistent, the estimate could have very serious accuracy problems.

The scheduling and cost-estimating processes are concurrent and iterative. A cost estimate cannot be prepared without consideration of activity durations. Many costs are directly related to time. A schedule cannot be completed without consideration of costs and hours. Many activity durations are based on estimated hours and the availability of staffing.

A review should involve evaluating the cost estimate and the schedule separately and comparing them.

Both the cost estimate and the schedule must be consistent with both the technical scope and each other. As a general rule, activities that do not appear in the schedule should not appear in the cost estimate. Depending on the detail in the schedule, however, some activities costed in the cost estimate may not appear explicitly in the schedule because they have been consolidated.

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Notes / Discussion Points / Lessons Learned: _____

Section 3.2: Cost-Estimate Validation Process/Lessons Learned

The key point to remember when reviewing the cost estimate and the schedule against the budget authority/budget outlay (BA/BO) schedule is that funds for activities (e.g., procurement) must be available when they are needed in the amounts indicated on the cost estimate.

Also, as a general rule, carry-over funds should be built into the BA/BO schedule for any particular year to cover at least part of the funding requirements for activities scheduled for the first quarter of the subsequent fiscal year. The carryover helps to avoid project delays that could result if funding for a project is delayed at the beginning of a fiscal year.

Both cost contingency and schedule contingency should be determined based on an analysis of activity-specific risk, so they are likely to be larger or smaller for the same activities.

Notes / Discussion Points / Lessons Learned: _____

Section 3.2: Cost-Estimate Validation Process/Lessons Learned

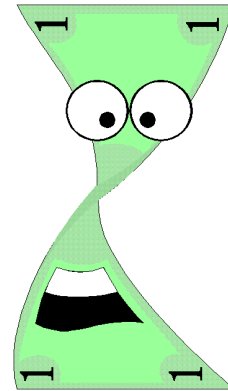


Step 3: Develop Validation Checklist (Continued)



Have any estimate analyses been done, such as

- **Alternative approaches,**
- **Application of value engineering,**
- **Cost savings/avoidance, or**
- **Sensitivity analysis?**



16


General Application - Step 3 (continued)

Estimate analysis


The validation process will be aided by an understanding of what analysis efforts the project has undergone in terms of evaluation of alternative approaches, application of value engineering, cost savings or avoidances that have been considered, and any sensitivity analysis that has been done.


Notes / Discussion Points / Lessons Learned: _____

Section 3.2: Cost-Estimate Validation Process/Lessons Learned



Step 3: Develop Validation Checklist (Continued)





Example

***The DOE EM-40 Environmental Management Project Manager's Handbook for Improved Project Definition, February 1995
(Appendix G)***

17

Discussion Leader/Facilitator Notes: Don't go through this checklist, but merely point it out as a good example to use.

An example validation checklist is provided in Appendix G to give an idea of typical checklist questions. Checklists should be tailored to focus the validation toward accomplishment of the validation purpose and objectives.

Notes / Discussion Points / Lessons Learned: _____

Section 3.2: Cost-Estimate Validation Process/Lessons Learned



Step 4: Obtain and Review Estimates and Supporting Documents



- **Request necessary documentation early.**
 - **Ensure that you have all pertinent documentation.**
 - **Communicate with contractors to obtain any missing information.**

- **Become familiar with the project.**
 - **Technical scope**
 - **Major activities and milestones**
 - **Project history**

18

Discussion Leader/Facilitator Notes: *To get to the application of this step, cover the slide material and do not discuss all the detail provided in the student notes.*

General Application - Step 4

Pertinent information you should have includes the following:

- Technical scope description, including WBS and WBS dictionary
- Assumptions and exclusions
- Methodology and historical basis
- Contingency and escalation analyses
- Appropriate schedule with milestones
- Previous and current cost estimates and estimate back-up sheets
- Change control documentation, if appropriate
- Breakdown of indirect costs
- Identity of individuals who developed and validated the schedule and the cost estimate

Validators are encouraged to communicate with the validatees at this point to clarify any uncertainties or to obtain additional information, such as how the cost estimate and the schedule were prepared, before proceeding with a review of the cost estimate or the schedule.

In becoming familiar with a project's history, be sure to review any prior cost estimates and schedules, information on past activities conducted, any performance data to date, and any information on changes in the project.

Notes / Discussion Points / Lessons Learned: _____

Section 3.2: Cost-Estimate Validation Process/Lessons Learned



Step 4: Obtain and Review Estimates and Supporting Documents (Continued)



Evaluate the estimate (answering checklist questions) to consider the following issues:

- **Consistency**
- **Feasibility/appropriateness**
- **Accuracy**

19

General Application - Step 4 (continued)

Consistency

Cost estimates should be consistent with

- Technical scope and schedule,
- Assumptions,
- Risk and uncertainties,
- Budget/funding cycle, and
- Type of funding.

Checking consistency with technical scope is especially important when you have made prior changes to either the cost estimate or the schedule.

Assumptions regarding contracting requirements, any research and development needs, and any training and certifications should be reflected in the cost estimate and the schedule. Procuring contractors can take significant time. Training and certifications can be a big cost for large, highly technical projects. Research and development needs and training and certifications may be program costs rather than project costs.

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Notes / Discussion Points / Lessons Learned: _____

Section 3.2: Cost-Estimate Validation Process/Lessons Learned

The level of detail of the cost estimate and schedule and the amount of cost and schedule contingency should be commensurate with project complexity and uncertainty.

The cost estimate and the schedule should roll up into the BA/BO schedule.

You must ensure that operating funds and plant and equipment (PACE) funds are being used properly.

Feasibility/Appropriateness

- Milestones should be achievable and measurable.
- Completion of critical path activities should be possible under known risks.
- Cost estimates must be realistic.
- The amount of cost and schedule contingency should be appropriate for project risks.
- Current DOE-approved escalation rates should have been used.
- Approved indirect rates should have been applied.
- Resources should be sufficient and appropriately allocated.
- Procurements, research and development, and training and certifications must be achievable within time and financial constraints.

Accuracy

- All costs must add up to the total.
- The durations of activities must be justified and documented.
- Milestones and activities must be properly portrayed.
- Current and approved escalation rates must be properly applied.

Notes / Discussion Points / Lessons Learned: _____

Section 3.2: Cost-Estimate Validation Process/Lessons Learned



Step 4: Obtain and Review Estimates and Supporting Documents (Continued)



Additional Key Questions to Ask:

- **Has adequate information for evaluating cost performance been provided?**
- **Are the costs for activities reasonable?**
- **Has escalation been included and properly calculated?**
- **Has cost contingency been included and justified?**

21

General Application - Step 4 (continued)

In evaluating whether adequate cost information has been provided, assess whether all activities described within the technical scope have been identified and costed.

Ensure that all direct costs and subcontractor costs are included in the estimate and that indirect costs have been properly applied. As a general rule, as projects become better defined, their cost estimates should become more detailed.

It is not always practical to evaluate every element that composes the cost estimate for a project. Pay particular attention to elements that appear to have the greatest contribution to the overall cost of the project.

Attempt to ensure that appropriate historical data were used in developing cost estimates for project activities. The data should be reasonable, and their selection should be documented. Any assumptions regarding how data were used should be reasonable.

Properly calculated escalation should be based on current DOE-approved rates and formulas and should be arithmetically accurate.

(Continued on next page)

Notes / Discussion Points / Lessons Learned: _____

Section 3.2: Cost-Estimate Validation Process/Lessons Learned

Like schedule contingency, cost contingency should be calculated based on activity-specific risks and on reasonable assumptions. All assumptions regarding its calculation should be well documented. Cost contingency should never be a lump-sum value calculated as a percentage of the overall project cost.

Notes / Discussion Points / Lessons Learned: _____

Section 3.2: Cost-Estimate Validation Process/Lessons Learned



Step 4: Obtain and Review Estimates and Supporting Documents (Continued)



Additional Key Questions to Ask:

- Are allowances or lump-sum rates explained and well-documented?
- Are site/contractor indirects realistic and based on approved rates?
- Does the estimate add up?

23

Be suspicious of allowances and lump-sum rates, and ensure that any such amounts in the cost estimate have been explained and well-documented. Check to see what they comprise and ask your contractors why they needed to be included in the estimate.

Although many contractors develop estimates using computer software, you may still need to check the math. You should also check for any blatant errors or omissions.

Notes / Discussion Points / Lessons Learned: _____

Section 3.2: Cost-Estimate Validation Process/Lessons Learned



Step 5: Interview as Required and Obtain Answers to Checklist Questions



- Interview as required to obtain answers for unresolved checklist questions.
- Address the following areas of concern.
 - Question assumptions.
 - Get clarification of details when necessary.
 - Recalculate costs.
 - Get answers.



24

Discussion Leader/Facilitator Notes: At this point, the project team will be interviewed and questioned to obtain answers to questionable items.

General Application - Step 5

When interviewing


- Provide validatees with specific areas/questions to be addressed.
- Try to address all questions at one time thereby preventing multiple returns.
- Minimize the time that validatees are tied up; their time is our money.
- Be up front and honest; put all concerns and findings on the table early.
- Take a positive approach.

Typical areas of concern in cost estimates:


- Not sufficiently detailed
- Not credible
- Too many “soft” areas
- Too many overcharges, hidden contingency, and design allowances
- Unable to explain how costs were developed
- Too low; not commensurate with scope

Notes / Discussion Points / Lessons Learned: _____

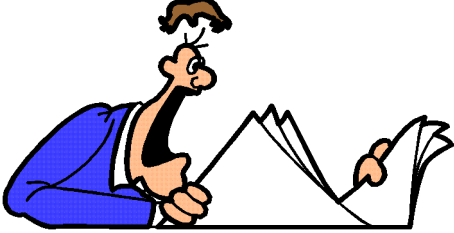
Section 3.2: Cost-Estimate Validation Process/Lessons Learned



Step 6: Provide Recommendations for Improvement



- **Ensure that no surprises await the validatees.**
- **Focus on improvement.**
- **Provide the report promptly.**
- **Ensure that the improvement process is iterative.**
- **Ensure that communication flows both ways.**



25

General Application - Step 6

Communication should be open and two-way throughout the validation process to ensure that no surprises to the validatees occur when the final recommendations are reported.

- The focus of the validation and the recommendations should be on improvement and should not be “critical.”
- Recommended improvements should be provided in a promptly.
- The improvement process will be an iterative process until improvements are satisfactorily implemented.
- Improvement requires two-way communication between the validators and the validatees.

Notes / Discussion Points / Lessons Learned: _____

Section 3.2: Cost-Estimate Validation Process/Lessons Learned



Step 7: Followup



- **Without follow-through to implement improvement, validation has not served its full purpose.**
- **Modifications should be within the technical scope of the project.**
- **Documentation of any and all modifications is required.**



26

Discussion Leader/Facilitator Notes: *The facilitator is to lead the group through defining follow-up steps that will support implementation of recommended improvements.*

General Application - Step 7

The implementation of improvement is a very important step in the validation process. If necessary improvements are not implemented effectively, the validation has not served its full purpose.

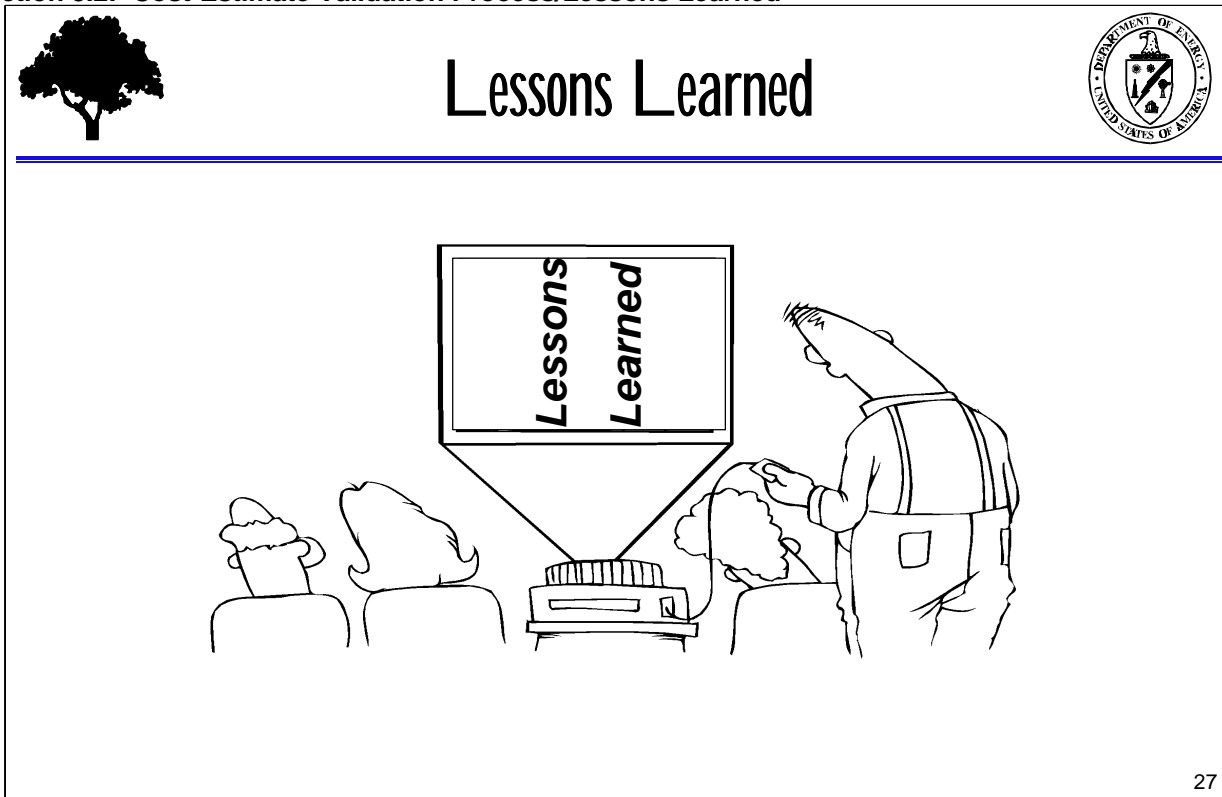
Changes and modifications to the estimate should be implemented.

Each modification to the cost estimate or schedule, including changes based on the validation, should be accompanied by a well-documented paper trail that

- Specifies all changes in detail;
- Provides rationale for changes; and
- Provides the name of a contact to answer questions.

Notes / Discussion Points / Lessons Learned: _____

Section 3.2: Cost-Estimate Validation Process/Lessons Learned



1. Which values of increase are used to define when a project will be validated?
2. Should validation data have official signatures included?
3. Traceability throughout the data is important. What do you do when this does not occur?
4. Is it key/paramount that the code of accounts be provided in the estimate survey? If so, why?
5. How are “we/them” problems alleviated?
6. Good personnel are always working and not available. How do you find good team members for a validation? How do you get their full commitment?
7. How do you know as validator whether wage rates are correct? How do you know whether they are loaded or not?

Notes / Discussion Points / Lessons Learned: _____

