

# Reclamation Manual

## Directives and Standards

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<b>Subject:</b>	Cost Estimating
<b>Purpose:</b>	To set forth the Bureau of Reclamation's requirements for cost estimating and ensure all cost estimates required by Reclamation's mission are effectively prepared and properly used. The benefits to Reclamation include improved quality and consistency of cost estimates, the facilitation of corporate oversight for these projects to support successful project accomplishment, improved ability to maintain credibility with water and power users and other customers, and otherwise sustain Reclamation's credibility.
<b>Authority:</b>	Reclamation Project Act of 1902 as amended, Reclamation Safety of Dams Act of 1978 as amended, and specific authorizing legislation; Federal Acquisition Regulation (FAR) 48 CFR 36.203.
<b>Approving Official:</b>	Director, Technical Resources
<b>Contact:</b>	Director, Technical Service Center, 86-68000

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1. **Introduction.** This Directive and Standard (D&S) supports the requirements of Reclamation Manual (RM) Policy, *Cost Estimating* (FAC P09) and addresses the development of cost estimates.
2. **Scope.** These requirements apply to all Reclamation program activities, Reclamation force account work, and as appropriate services for non-Reclamation clients. Various levels of cost estimates are required as a project progresses through development phases such as planning, congressional authorization and appropriations, construction, and into operation. Refer to RM D&S, *Instructions on Budgeting for Construction – Estimates, Schedules, and Supporting Documents* (BGT 01-04) for how cost estimating supports Reclamation's construction program.
  - A. This D&S addresses six levels of cost estimates used to support Reclamations programs and projects; these are:
    - (1) Preliminary
    - (2) Appraisal
    - (3) Feasibility
    - (4) Percent [%] Design (post-authorization)
    - (5) Prevalidation of Funds (Prevalidation)
    - (6) Independent Government Cost Estimate (IGCE)

# Reclamation Manual

## Directives and Standards

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- B. Cost estimates are typically developed in the chronological order shown above, and each supersedes the previous one. They differ in degree of detail, refinement, use, and confidence, and are dependent upon the amount of certainty contained in the available engineering and geological data, and other factors (e.g., environmental considerations, land acquisitions costs, and procurements methods) known at the time of preparation of the cost estimates.
  - C. The sequencing of the various levels of cost estimates is standard; however, the timeframe for these cost estimates within the various project stages may vary depending on the project and its objectives. Because of program requirements and management decisions, some levels of estimates may not be required. Refer to Appendix A for a graphical presentation of various stages of a Reclamation project and the associated levels of cost estimates.
3. **Definitions.**
- A. **Appropriation Ceiling.** This is the maximum authorized allowable appropriation expenditure for projects in construction status. The project cost estimate (PCE), at the feasibility level, is submitted to the Congress for approval and generally establishes the initial appropriations ceiling. This limit is subject to allowable adjustments generated by cost indexing as provided for in the authorizing legislation. Not all projects have a specific authorized ceiling.
  - B. **Bidders/Offerors.** These descriptors refer to non-Reclamation entities that submit offers of contractual obligation to perform specific work for an established financial fee. These entities are not considered contractors until after actual award.
  - C. **Construction Cost Estimate (CCE).**
    - (1) The CCE consists of the costs of the construction of the physical features of the project (i.e., contract costs), the land and rights, relocation of existing real property, clearing and restoring lands, service facilities, investigations, engineering (preparation of design and specifications, construction management, and contract administration), and other general expenses. A CCE is first developed in the planning stage of a project and maintained through subsequent stages of the project completion. The costs included in the CCE at any stage of the project will include a combination of actual expenditures for work completed to date and estimated costs for all remaining work.
    - (2) A CCE will contain cost details such as listings of work item details required to construct various features. These details may include work or materials descriptions, units of measure, and unit pricing, along with line items for design contingencies and construction contingencies. See Paragraph 4.E.(1) and (3) for more information on design and construction contingencies.

# Reclamation Manual

## Directives and Standards

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- D. **Construction Cost Trends (CCT).** Cost indices for construction are updated and published for use throughout Reclamation. The indices are prepared for the major features involved in Reclamation construction work. These features are described in the TSC *Cost Estimating Handbook* which contains discretionary guidance.
- E. **Contract Cost.** The contract cost is intended to represent the estimated cost of the contract at time of bid or award. This value will include allowances for design contingencies and for procurement strategies, but not construction contingencies.
- F. **Cost Authority.** A congressionally authorized account from which appropriated funds may be expended for specific project development.
- G. **Cost Estimate.** A cost estimate identifies the expected financial obligations which may be incurred for the development and support of various project features and programs associated with Reclamation's mission. The key elements of Reclamation's cost estimates are detailed in Paragraph 4.
- H. **Distributive Costs.** Distributive costs refer to that portion of the non-contract costs which is of such a broad non-specific nature that it can only be attributed to the project as a whole. These costs are eventually proportionately allocated to specific plant accounts and property classes. See Paragraph 4.H. of this document and Paragraph 6 of RM D&S, *Construction Cost Estimates and Project Cost Estimates* (FAC 09-02) for further discussions of distributive costs.
- I. **Field Cost.** The field cost is an estimate of the capital costs of a feature or project from award to construction closeout. The field cost equals the contract cost plus construction contingencies. Construction contingencies are intended to account for costs resulting from changes in designs and/or differing site conditions encountered during construction. Non-contract costs are not included in this value.
- J. **Non-contract Costs.** Non-contract costs refer to the costs of work or services provided by Reclamation staff and/or service contractors in support of the project. See Paragraph 4.H. of this document and Paragraph 6 of RM D&S *Construction Cost Estimates and Project Cost Estimates* (FAC 09-02) for further discussions of non-contract costs.
- K. **Program.** A program is a group of projects managed in a coordinated way to obtain benefits not available from managing them individually. Many programs include elements of ongoing operations. In Reclamation, a program is usually a group of projects, administered at a Reclamation-wide level, with parts delegated to the regions. Reclamation programs do not have to be specifically authorized but must have a budget line item. Whereas a program's timeframe may continue past any individual project, each project usually results in a unique product. Examples of some Reclamation programs are the Dam Safety Program and the Title 16 Program.

# Reclamation Manual

## Directives and Standards

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- L. **Project.** A project can be defined in terms of its distinctive characteristics; a project is a temporary endeavor undertaken to create a unique product or service. In Reclamation, a project is usually a congressionally authorized activity that allows Reclamation to do something specific and is administered at the area office or regional level. Traditionally, projects are groups of infrastructure, such as the Central Arizona Project or the Central Valley Project.
- M. **Project Cost Estimate.**
- (1) The PCE is a summary of the costs found in the CCE. Information on the PCE does not extend below the plant account level (feature name). It is used in planning reports, in seeking congressional authorization, and in support of requests for construction appropriations.
  - (2) After construction begins, PCEs are updated once annually (March/April), in conjunction with updated CCEs, or as required, to support budget and program schedules submitted for future fiscal years.
- N. **Total Construction Cost.** For the purpose of completing the PCE, a total construction cost is calculated for each property class attributable to the project. A total construction cost consists of a sum of the construction cost for each feature within a property class. A feature construction cost is a sum of the total field costs plus non-contract costs. Within the PCE, the summation of all the total construction cost line items is equivalent to the total project cost.
- O. **Total Project Cost.** For the purpose of completing the CCE and PCE, the total project cost consists of the summation of the total construction cost values for the various property classes within a project.
- P. **Uniform Classification of Accounts (Plant Accounting).** This is a cost accounting methodology used by Reclamation in which the various costs of a project are assigned to specific property classes, identified properties, construction/plant accounts, and account components.
4. **Key Elements of Cost Estimates.** The following are key elements and fundamental considerations in the preparation of cost estimates. Examples of a typical cost estimate worksheet and a bid schedule are contained in the *Cost Estimating Handbook*.
- A. **Pay Items.**
- (1) Pay items as used in estimates and in the bidding schedules of solicitations consist of abbreviated descriptions of the elements of work for which payments or charges to accounts are to be made. The pay items represent the most logical and practical breakdown of the proposed scope of work into separate and distinct classes of work.

# Reclamation Manual

## Directives and Standards

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- (2) See the *Cost Estimating Handbook* for a comprehensive listing of standard pay items.
- B. **Quantities.** In preparing estimates, the quantities for the various pay items are represented by a number and a unit of measure such as pounds, cubic yards, or another unit which most appropriately represents the measurement for the particular pay item of work.
- C. **Unit Prices.** Unit prices include the various cost components for labor, materials, and equipment necessary to perform the work designated in the various pay items for the proposed scope of work. Current unit prices shall be used in all estimates, except in those instances where actual contract bid prices are available (for the CCE only). Each estimate shall be dated and reflect the price level (e.g., Jan/Apr/Jul/Oct and calendar year) of the unit price data used therein. As an example, an estimate completed in February 2005 reflects a price level of January 2005. Unit prices are not to be increased to cover contingencies.
- D. **Field Data.** The individuals responsible for collecting and providing design data required by design staff (RM D&S, *Design Activities* (FAC 03-03)) shall also transmit or provide any pertinent field data that might influence the cost estimate. Field data shall include all information which may have a direct influence on the unit prices; examples of this include duration of working season, climatic conditions, danger from floods and other hazards, topographic conditions, geology of site, access limitations, staging constraints, records of foundation explorations, nature and location of aggregate deposits and sources of other building materials, kind of terrain over which materials must be hauled, labor market, housing accommodations, utility interferences, right-of-way constraints, operational outages, special taxes, local regulations which may impact production and costs, and addressing public relations requirements.
- E. **Special Allowances.**<sup>1</sup>
- (1) **Design Contingencies.**
- (a) This special allowance category for design contingencies is intended to account for three types of uncertainties inherent as a project advances from the planning stage through final design which directly affects the estimated cost of a project. These include: (i) unlisted items, (ii) design and scope changes, and (iii) cost estimating refinements. In light of these uncertainties, preliminary, appraisal, feasibility, and percent-design estimates shall contain a percentage allowance shown as a separate line item to account for the cost of these **minor** items of work. The allowance for design contingencies

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<sup>1</sup> See the *Cost Estimating Handbook* for further information on each of these Special Allowances.

# Reclamation Manual

## Directives and Standards

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represents the amount required to achieve comparability between these estimates prepared during the earlier stages of the project and the Prevalidation estimate or IGCE.

- (i) Unlisted items include **minor** items required to construct a project for which it is not practical to develop designs and quantities during early stages of a project.
  - (ii) Design and scope changes are intended to cover minor design refinements which are not practical to anticipate early in the project but typically arise as the project advances through final design. These are typically associated with: (aa) **minor** design changes to reflect additional site specific design data collected as the project progresses, (bb) **minor** design changes as the level of design advances, (cc) **minor** changes in project requirements, and (dd) **minor** quantity variations.
  - (iii) Cost estimating refinements are intended to cover minor cost considerations which are not practical to anticipate early in the project but typically arise as the project advances through final design. These are typically associated with: (aa) **minor** changes to unit prices to reflect additional site specific cost data collected as the project progresses, (bb) **minor** price adjustments, and (cc) **minor** escalation increases (above those projected).
- (b) Professional judgment is to be used in assigning reasonable percentage allowances for design contingencies, but in general, the less refined the estimate, the higher the percentages used. The availability and quality of applicable design data and the magnitude of the work items that may be affected by deficient design data as well as the risk associated with a changing design or scope of work, shall be considered when establishing the percentage allowance to be used for the design contingencies. Allowances for design contingency will rarely be included in Prevalidation cost estimates and shall not be included in IGCEs.

### (2) Allowance for Procurement Strategies.

- (a) A line item allowance for procurement strategies (considerations) may be included in preliminary, appraisal, feasibility, percent-design, and Prevalidation cost estimates to account for additional costs when solicitations will be advertised and awarded under other than full and open competition. These include solicitations that will be set aside under socio-economic programs, along with solicitations that may limit competition or allow award to other than the lowest bid or proposal. Examples of these practices include: Hub-zone, 8(a) competitive and negotiated procurement, small

# Reclamation Manual

## Directives and Standards

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business set aside, Public Law 93-638 Indian Self-Determination Act, or Request for Proposal where award may be based on technical considerations.

- (b) The magnitude of this allowance, whether it is either a percentage of the priced items or an absolute maximum dollar adjustment, shall be at the discretion of and determined by the regional director or delegate. This determination will be verified by the area offices, with support from the TSC, with special consideration of their knowledge of local factors such as project size, project complexity, and available qualified competition to complete the work. This allowance can be incorporated by the region or by the estimator. If it is to be incorporated by the estimator, the estimator should be informed by the project office of the need for this allowance and its characteristics in order that a special line item can be added to the estimates being prepared.

### (3) **Construction Contingencies.**

- (a) Preliminary, appraisal, feasibility, and percent-design estimates shall include a percentage allowance for construction contingencies as a separate item to cover minor differences in actual and estimated quantities, unforeseeable difficulties at the site, changed site conditions, possible minor changes in plans, and other uncertainties. Estimated quantities or unit prices are not to be increased as a means for including construction contingencies. The allowance used should be based on engineering judgment of the major pay items in the estimate, reliability of the data, adequacy of the projected quantities, and general knowledge of site conditions. The allowance will vary inversely with the certainty of the engineering and geological information and data. It is impractical to establish a fixed set of contingency factors. The allowance normally ranges from 20 to 25 percent of the subtotal of all listed pay items including the allowance for design contingencies and allowance for procurement strategies.
- (b) Allowances for construction contingencies shall not be included in Prevalidation cost estimates or IGCEs.

F. **Contract Cost.** Refer to Paragraph 3.E. in this document for the definition of contract cost. As more refined levels of designs are performed, a higher degree of confidence is obtained for this line item. For estimates prior to IGCE, this is a rounded value.

G. **Field Cost.** Refer to Paragraph 3.I. in this document for the definition of field cost. As more refined levels of designs are performed, a higher degree of confidence is obtained for this line item.

H. **Non-contract Costs.** Those offices with the responsibility for completion and maintenance of the CCE shall include costs typically referred to as “non-contract”

# Reclamation Manual

## Directives and Standards

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costs. Non-contract costs refer to the costs of work or services provided in support of the project, some of which can be expensed against a specific plant account, and other work which is of such a broad non-specific nature that it can only be attributed to the project as a whole. These latter costs are also referred to as “distributive costs.”

- (1) Distributive cost items include but are not limited to facilitating services, investigations, design and specifications, construction management, environmental compliance, and archeological considerations. Refer to RM D&S *Construction Cost Estimates and Project Cost Estimates* (FAC 09-02) for further information as to how these costs are to be formatted and shown within the CCE.
- (2) The project manager typically has the responsibility of ensuring that all non-contract costs are recorded into the CCE and PCE.

I. **Total Construction Cost.** This value generally only appears in the CCE and PCE. Refer to Paragraph 3.N. in this document for the definition of total construction cost.

J. **Escalations.**

- (1) For projects which are to be developed over an extended period of time, or at some distant time in the future, it is prudent that some consideration of the time value of money be incorporated.
- (2) Escalation for two distinct periods of time must be considered. First, the time from when the estimate is prepared until notice to proceed, and second, the duration of the construction contract. Depending on the nature of the authorizing legislation, one of the following approaches shall be used to account for escalation:
  - (a) For cost estimates being prepared for projects with written legislative language to accommodate escalation prior to construction, as shown in Paragraph 1.A. of RM D&S, *Updating Construction Appropriation Authorization Estimates* (BGT 05-01), the estimator shall account for escalation that may occur during construction. These levels of estimates shall be prepared at the current price level.
  - (b) For cost estimates (primarily preliminary, appraisal, feasibility, and percent design) being prepared for projects which have not or will not include the legislative language discussed above, escalation for both periods noted above shall be included (e.g., Safety of Dams construction projects and operation and maintenance (O&M) projects).
- (3) For cost estimates at the Prevalidation and the IGCE levels, the unit pricing or detailed pricing will consider escalation (i.e., escalation would be included in each unit price) for the construction duration.



# Reclamation Manual

## Directives and Standards

- K. **Rounding.** For preliminary, appraisal, feasibility, and percent-design level cost estimates, the contract cost, field cost, and construction cost line items are rounded to nominal values per the rounding guidelines contained in the *Cost Estimating Handbook*. These nominal values are within 2.5 percent of the actual calculated values.
  
- 5. **Sequence of Development of Cost Estimates.** Reclamation uses a variety of terminology to describe the sequence of activities from inception through operation of a project. A variety of cost estimates are prepared to support these activities throughout the life of a project. In the most general terms, Reclamation defines the status of a project as being one of the following: Planning, Construction, or O&M.
  - A. Within each status category, the project moves through various stages of development. Six increasingly refined levels of costs estimates are produced as the project progresses through these stages.
  - B. The following table identifies the levels of estimates and displays where they occur in the project development timeline. Appendix A presents this data graphically.

PROJECT STATUS	PROJECT STAGE	LEVEL OF COST ESTIMATE PRODUCED
Planning	Planning	Preliminary
		Appraisal
		Feasibility
Construction	Design	Percent Design [Updated feasibility]
	Solicitation	Prevalidation of Funds
	Construction	Independent Government Cost Estimate [Award]
Construction	Construction	Independent Government Cost Estimate for Contract Modifications
	Operations	One or more of the previously identified estimates

- C. The project stages and the cost estimates developed during that stage are described in the following paragraphs:
  - (1) **Planning.** When a project is in Planning Status, it is considered to be at the Planning Stage. Up to three levels of cost estimates may be produced during the Planning Stage of a project; Preliminary is the lowest level estimate produced, followed by an Appraisal and finished by a Feasibility. These estimates are prepared per the request of project or program managers having the authority to obligate funds. Congressional authorization is required to conduct a feasibility study and prepare the feasibility level design and cost estimate for new construction.

# Reclamation Manual

## Directives and Standards

---

- (a) **Preliminary Estimate.** Preliminary cost estimates are prepared for studies conducted at the very early stages of the planning process. They are developed and produced to document a very preliminary analysis performed to look at a given problem, need, or opportunity utilizing readily available data. The estimates do not meet the criteria used for preparation of either Appraisal or Feasibility cost estimates. While no minimum criteria or formal standards exist for the development of the prices and costs associated with this estimate level, sound estimating practices must be utilized in estimate preparation. The estimates produced for these types of documents shall identify and document at a minimum the items listed in Paragraph 4 of RM D&S, *Representation and Referencing of Cost Estimates in Bureau of Reclamation Documents Used for Planning, Design and Construction* (FAC 09-03).
- (b) **Appraisal Estimate.**
- (i) Appraisal cost estimates are used in appraisal reports to determine whether more detailed investigations of a potential project are justified. These estimates may be prepared from cost graphs, simple sketches, or rough general designs which use the available site-specific design data. These estimates are intended to be used as an aid in selecting the most economical plan by comparing alternative features such as dam types, dam sites, canal or transmission line routes, and powerplant or pumping plant capacities.
- (ii) Appraisal cost estimates are not suitable for requesting project authorization or construction fund appropriations from the Congress due to the early stage of project development.
- (c) **Feasibility Estimate.** Feasibility cost estimates are based on information and data obtained during investigations for pre-authorization activity. These investigations provide sufficient information to permit the preparation of preliminary layouts and designs from which approximate quantities for each kind, type, or class of material, equipment, or labor may be obtained. These estimates are used to assist in the selection of a preferred plan, to determine the economic feasibility of a project, and to support seeking construction authorization from the Congress.
- (i) A project feasibility study and feasibility-level cost estimate, which are intended to support funding authorization for new construction, cannot be conducted without authorization and appropriation of funds by the Congress. This requirement is established in Section 8 of the Federal Water Project Recreation Act of July 9, 1965 (Public Law 89-72). Once the Congress appropriates funds for construction, typically at the conclusion of the feasibility study, the planning status is complete.

# Reclamation Manual

## Directives and Standards

---

Certain feasibility-level cost estimates can be prepared for other purposes without the need for specific authorizing legislation, e.g., Safety of Dams modifications and O&M work.

- (ii) The CCE and PCE will be at the feasibility level when used in support of the request for initial appropriated construction funds. Because feasibility investigations become the basis for the congressional action on the project, the total project cost estimate must be adequate to support the funding of feasibility studies, the construction authorization, and the appropriations ceiling established for the project. For information on completing the CCE and PCE, refer to RM D&S, *Construction Cost Estimates and Project Cost Estimates* (FAC 09-02).
  - (iii) The CCE and PCE must be completed prior to project authorization. If language is included in the authorizing legislation allowing indexing during construction, updating of costs to compute a funding authorization ceiling will be performed in accordance with RM D&S, *Updating Construction Appropriation Authorization Estimates* (BGT 05-01). Refer to Paragraph 9 of this document for direction on indexing or re-pricing of cost estimates in support of the CCE.
- (2) **Construction.** Construction status extends from project authorization to the completion of construction during which final designs are prepared, supply and construction specifications/solicitations are issued, contracts are awarded, and construction is completed and the project is transferred to O&M status.
- (a) **Design Stage.** Upon completion of the feasibility study, and after authorization and appropriation of funds for construction, the design stage begins. Two levels of cost estimates are produced during the design stage of the project. These are the Percent-Design and the Prevalidation. Percent-Design level estimates are produced as the final design progresses through various percentage milestones of final design, but all such estimates are considered to be Percent-Design level estimates. A Prevalidation is produced at the end of the design stage just prior to issuance of a contract document.
    - (i) **Percent [%]-Design Estimates**<sup>2,3</sup> are estimates used to aid in the selection or refinement of the preferred alternative or design, and to keep the Congress apprised of the latest estimate of funding requirements prior to construction. They are typically prepared after project authorization, during the early stages of Reclamation's Final

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<sup>2</sup> For reference, a 30 percent design level estimate is equivalent to a cost estimate prepared at "ConceptC."

<sup>3</sup> See "Final Design Process Guidelines" for definitions of design milestones.

# Reclamation Manual

## Directives and Standards

---

Design Process. These estimates, which are updated feasibility-level estimates, are used in the annual update of the CCEs in support of the requests for funds to initiate and continue construction.

- (ii) **Prevalidation Estimates** are provided to the Contracting Officer (CO) to ensure that sufficient funds are available to proceed with the solicitation, per the requirements of the Anti-Deficiency Clause of the FAR. These estimates are prepared as early as practicable before the issuance of a solicitation for each contract for construction or construction-related supply items. Prevalidation estimates are developed using the best available information including technical specifications and drawings. Although the technical package may be incomplete, it is essential that the prevalidation estimate be prepared with as much diligence as available data and time permit. It is permissible for the cost estimator to include an allowance for unquantified requirements and procurement strategies, but not construction contingencies (see Paragraph 4.E.(3)(b)), to ensure that adequate funds are available. Prevalidation estimates shall provide the estimated cost at award for performing specific work identified in the bidding schedules of the solicitation for a particular supply, equipment, or construction contract. When the construction duration and award date or completion date are known, the prevalidation estimate shall include an allocation of contract earnings by fiscal year. Prevalidation estimates do not include non-contract costs or other projects costs not directly associated with the upcoming solicitation. Information regarding the development, confidentiality, handling, and release of Prevalidation estimates are presented in Paragraph 7.
- (b) **Solicitation Stage.** IGCEs are prepared to establish the estimated cost of performing specific work called for in the bidding schedules of the solicitation for a particular supply, equipment, or construction contract. These estimates are prepared from final contractual and technical specifications (including all amendments) and detailed drawings. They are used to assess whether bids submitted by the offerors are fair, reasonable, and acceptable.
- (i) IGCEs are based upon completed designs and specifications as published in the solicitation including quantities of each kind and class of labor, materials, and equipment required.
  - (ii) IGCEs are prepared after careful review of the solicitation, including specifications and drawings as well as any other pertinent information including all published amendments. The IGCEs will be used for
    - (aa) assessing the acceptability of bids and proposals for contract award;

# Reclamation Manual

## Directives and Standards

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and (bb) purposes of analyses or negotiation for obtaining a fair and reasonable price for both competitive and noncompetitive negotiated contracts.

- (iii) Reclamation practice is to prepare an IGCE for each construction and construction-related supply contract action estimated to exceed the threshold set forth in FAR 48 CFR 36.203(a). IGCEs may be prepared for contract actions below the threshold at the COs discretion. IGCEs will be prepared in as much detail as though the government were competing for the award.
  - (iv) Details regarding the development, confidentiality, handling, and release of IGCEs are presented in Paragraph 7.
  - (c) **Construction Stage.** Cost estimates are prepared to define contract modifications and change orders. The cost thresholds for determining a required IGCE preparation are the same as the solicitation stage. IGCEs for contract modifications may be prepared for contract actions below the threshold at the COs discretion. Refer to Paragraph 8 for information regarding the preparation and handling of these estimates.
- (3) **Operation and Maintenance.** When a project has moved into O&M Status, it is considered to be at the Operations Stage. Cost estimates produced during the operations stage of a project will follow the sequence of levels previously noted as maintenance activities are planned, designed, and constructed.
- (a) The PCE encompasses what is generally considered new construction and other project costs and is closed out when the features are completed and placed in a condition for satisfactory operation. The estimate will not be reopened to include costs of minor additions, retirements, replacement, reconstruction, abandonment, maintenance, or similar work that normally takes place during O&M.
  - (b) It may be decided to do major additions or improvements in connection with a completed feature while the project as a whole is still in the construction status. Where a lapse in construction has occurred, it is preferable not to change the estimate for the completed property, but to establish a new identified property to facilitate scheduling and budgeting. For information relative to plant accounts and property class related to cost classification, refer to the *Cost Estimating Handbook*.
  - (i) **Estimates for Project Upgrades.** Estimates for rehabilitation work on old projects or structures, or for reconstruction must be kept separate from estimates for new construction and be clearly labeled.

# Reclamation Manual

## Directives and Standards

---

- (ii) **Estimates for Operation and Maintenance.** Following construction when a project has entered the Operations Stage, estimates are prepared annually for operations, maintenance, replacements, and additions. Refer to RM D&S, *Instructions on Budgeting for Operation and Maintenance – Estimates, Schedules, and Supporting Documents* (BGT 01-05) for more information on the required estimates.
6. **Special Studies.** Special studies address a variety of activities that are required to make responsible resource management decisions; they are primarily used to both assist future planning efforts and provide specialized information that contributes to the decision-making process. These reports are not used to propose to or request from the Congress an action or decision, but can be used to document information requested by the Congress. Depending on the intended use of the conclusions of the special study, estimates produced for these studies shall be completed to the appropriate level as defined in Paragraph 5 of this document.
7. **Preparation and Handling Procedures for Prevalidation of Funds Cost Estimates and Independent Government Cost Estimates.** Both the Prevalidation and the IGCE are sensitive documents in the procurement process. They both have limited access and knowledge stipulations, and they are critical in ensuring adequate funding for the award and assessing the reasonableness of the proposals or bids received. Because of this, special care and consideration are required during their preparation and handling.
- A. **General.**
- (1) Estimators shall be kept informed and involved in the total acquisition process. The project manager shall determine the likelihood of a noncompetitive procurement during the planning status. The CO, project manager, or designated responsible party should inform the cost estimator during the design stage and prior to design completion (see Appendix A), what procurement strategy and process will be followed (i.e., competitive procurements (sealed bid), negotiated procurements (contracts with the Small Business Administration under Section 8(a) of the Small Business Act)), sole source procurements, and modifications to existing contracts for the purpose of providing the cost estimate with an appropriate amount of detail.
- (2) For projects that are conducted under Public Law 93-638, the cost estimator shall be aware of the special allowances in preparation of the cost estimate.
- (a) **Prevalidation Cost Estimate.** The Prevalidation cost estimate is intended to identify the funds required to be set aside for contract cost prior to issuing the solicitation. This cost estimate shall be used by appropriate personnel for use in preparation of the requisition.

# Reclamation Manual

## Directives and Standards

---

### (b) **Independent Government Cost Estimate.**

- (i) The IGCE is prepared to reflect the “fair and reasonable” cost of the scope of work as might be expected from bidding in “full and open competition.” No specific allowances for contractor inefficiencies or inexperience as a result of noncompetitive procurements are to be included in the IGCE. This practice permits the CO to measure the cost differences as a result of a noncompetitive procurement without influencing their decision for award. The estimator shall make allowances for the applicable special requirements stipulated in Public Law 93-638.
- (ii) The estimator will be available to assist the CO in conducting technical and/or cost analyses of contractor cost proposals and in preparing for and conducting negotiations as a member on the negotiation team.

### B. **Requesting Specific Estimates.**

- (1) **Preliminary, Appraisal, Feasibility, and Percent Design Cost Estimates.** These estimates can be requested by anyone within Reclamation having the authority to obligate labor resources, typically program or project managers.
- (2) **Prevalidation Cost Estimate.** Typically, this estimate is completed at approximately the same time as the technical specifications and drawings are finalized (SpecB). The person responsible for preparing the requisition and the CO must ensure that the Prevalidation cost estimate is requested and subsequently completed.
- (3) **Independent Government Cost Estimate.** The CO or the project manager is responsible for notifying the estimator of the need for an IGCE. The CO shall provide the published specifications, any amendments, and any other pertinent information to the cost estimator. If the CO determines that an acquisition will be negotiated or a contract will be modified, the CO will notify the estimator as soon as possible that a detailed estimate will be needed and the date it is required.

- C. **Developing the Cost Estimates.** The two techniques commonly used to develop the Prevalidation cost estimate and IGCE, unit price (historical) estimating and detailed estimating, are described in the *Cost Estimating Handbook*. It is more efficient for the estimator to use the same methodology to develop both estimates, which makes it essential that the estimator be fully informed of the acquisition process and any project issues that will influence the development of accurate pricing.

# Reclamation Manual

## Directives and Standards

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### D. Handling.

- (1) Prevalidations and IGCEs are sensitive documents with restrictions regarding their availability and distribution. The Prevalidation is not to be disclosed prior to bid opening to any person without a need to know without the approval and facilitation of the CO. IGCEs are not to be publicly disclosed prior to bid opening although they may be used administratively, before bid opening, to project the effect of an award on the total estimated project cost, and on project appropriation and repayment ceilings.
- (2) Details of the content, format, and distribution procedures applicable to Prevalidations and IGCEs are presented in the *Cost Estimating Handbook*.

### 8. Independent Government Cost Estimates for Contract Modifications.

- A. **General.** IGCEs for contract modifications shall be detailed estimates. In some instances, the detail of the estimates (i.e., estimates required for issuance of change orders) shall be commensurate with the information provided. The detailed information contained in IGCEs for contract modifications is an essential tool to assist the CO or designated responsible party in negotiating a fair and reasonable price. As soon as it is determined, the CO shall notify the estimator if and when an IGCE will be required for the contract modification and identify the scope of the modification.
- B. **Handling.** IGCEs for contract modifications require special handling considerations similar to those afforded Prevalidations or IGCEs (Award). Refer to the *Cost Estimating Handbook* for details regarding handling procedures.
- C. **Special Considerations.**
  - (1) IGCEs for contract modifications differ significantly from ones developed for new contracts, due to the effects that existing requirements may have on the work added and/or deleted by the modification, and due to the effects that the modification may have on existing requirements. Refer to the *Cost Estimating Handbook* for discretionary items to be considered by the estimator.
  - (2) The CO shall provide pertinent information to assist the cost estimator in preparing the IGCE for the contract modification. In addition, the award contractor's general and administrative expenses allowance and any established profit percentages must be provided by the CO, if known, to the cost estimator for use in developing the IGCE.

9. **Revisions or Updates to Cost Estimates.** Because the development of projects from inception to transfer into O&M status can take many years, numerous updates of the various cost estimates may be needed to ensure the estimates reflect current market conditions. Two primary alternatives exist for updating the cost estimates to the most current period of time;



# Reclamation Manual

## Directives and Standards

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these are indexing the elements of the cost estimate or its overall summation using Reclamation's CCT or re-estimating the entire estimate with current labor and materials pricing data. When considering the two alternatives, cost indexes shall not be applied to estimates over 5 years old. IGCEs shall not be indexed.

- A. **Cost Indexes.** Cost indexes provide a means of measuring changes in construction cost relative to time. They provide a rapid means of determining the current cost of construction of various properties based on previous estimates. The study and use of cost indexes, together with the consideration of trends in costs of labor and materials, will enable an estimator to compare the costs for any year with those of another year.
- (1) Cost indexes for construction are updated and published quarterly by the Estimating, Specifications, and Value Program Group (86-68170) and published on the Internet at [http://www.usbr.gov/pmts/estimate/cost\\_trend.html](http://www.usbr.gov/pmts/estimate/cost_trend.html) for use throughout Reclamation. The indexes are prepared for the major features involved in Reclamation construction work, including but not limited to earth dams, concrete dams, pumping plant structures, pumping plant equipment, canals, laterals, conduits, powerplant structures, turbines and generators, and transmission lines. These indexes are particularly useful in preliminary, appraisal and feasibility estimates to roughly convert the estimated cost of features as of a given date to another date.
  - (2) Details of the process that may be used to generate the CCT indexes are described in the *Cost Estimating Handbook*. Also shown in the handbook is an example of the published cost trends data and a list of the property categories.
  - (3) The CCT index data is used by a second program in support of the Construction Ceiling Appropriation. Information related to updating construction appropriation authorization estimates can be found in RM D&S, *Updating Construction Appropriation Authorization Estimates* (BGT 05-01).
  - (4) This second program is also capable of generating projected CCT index numbers by using the projected inflation numbers published by the Office of Management and Budget. These projected indexes can be calculated for up to a 4-year period from the current CCT quarter. The standard practice is to restrict access to the projected indexes to internal use only.
- B. **Re-Pricing.**
- (1) Re-pricing (re-estimating) is the most accurate method for determining current construction bid values for a specific project. The index values within the CCT are intended to reflect the change in dollar value for construction work. Because of a number of significant considerations, this is not the same as determining the current bid value for similar construction at a specific location. The two alternatives are not comparable for several reasons which are:

# Reclamation Manual

## Directives and Standards

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- (a) **Source.** Unit prices are developed for specific construction work taking into account many factors such as local material prices, local wage rates, and economic conditions. Cost indexes are based on historical indicators which may not show local variations in costs nor reflect uncertainty and competition. Thus in any given area, the indexed value may not show the local trend in costs.
  - (b) **Inflation.** Because of the methods used to develop cost indexes, the index values will lag actual price escalations during periods of high inflation. The current quarterly indexes of the CCT do not contain any consideration for recent or projected adjustments that would be required during high inflationary periods; thus re-pricing is the much better approach to determine accurate market values.
  - (c) **Technology.** Changes in equipment, design, and construction techniques continually affect the unit prices. Indexes do not contain any provision for technology changes other than to alter the blend of parameters to more closely model current construction practices. Thus, in a period of change in construction practices and efficiencies, indexes will not immediately reflect those changes.
  - (d) **Legal.** Laws which have been passed since the original estimate was produced may require additional work or practices to be followed in construction pay items. These current costs are added to bid prices and appear in unit prices in estimates but cannot be accounted for in preparation of indexes which are for general classes or features of work. As these requirements are added to construction, the indexed value will fall farther behind the unit prices.
- (2) Considering all of these factors causing indexed values to deviate from current prices, cost estimates shall be re-priced at least once every 5 years rather than risking an underestimate caused by indexing.
10. **Updating Appropriation Authorization Estimates.** All active projects in construction status which are being funded through the Water and Related Resources appropriation are to be considered in the appropriation ceiling updating and reporting process. Such consideration will continue until final work is complete and a final ceiling statement is prepared.
- A. The amount authorized for each project is derived from the PCE contained in the feasibility report which was submitted to support the authorizing legislation. Estimates must include sufficient details on each of the project features to classify the field costs according to available indexes for such items as land and rights, dams, canals, laterals,

# Reclamation Manual

## Directives and Standards

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etc.; and further determine the preauthorization cost and the percentage of non-contract costs. Such an authorizing estimate and plant account cost classification is necessary to complete the appropriation ceiling indexing process.

- B. Refer to RM D&S, *Updating Construction Appropriation Authorization Estimates* (BGT 05-01) for the methodology required for calculating appropriation ceiling adjustments.

11. **Safety of Dams Cost Estimates.** In support of the Dam Safety Program, cost estimates will be prepared at various stages of planning through construction. The Dam Safety Office prepares a Modification Report which is used to seek authorization from the Congress for construction of modifications to Reclamation facilities. The cost estimate that will be used for the Modification Report will be at the feasibility level. Appraisal level cost estimates will only be used during the scoping stages of the Corrective Action Study to identify which alternative(s) will be estimated at the feasibility level.

- A. In addition to the normal feasibility level cost estimates that are prepared, at least one feasibility level cost estimate for each design alternative is required to consider risks that may affect construction costs of the project. These risks need to be defined for such items as potential design changes, construction considerations, and any other factors that may affect costs associated with construction contract. For example, additional design data or refined analysis during final design may result in design changes that affect costs. Additionally, constraints (environmental, local conditions, facility operations, material sources, etc.) placed on a project during construction will likely affect costs.
- B. Refer to RM D&S, *Reclamation Dam Safety Program* (FAC 06-01) and *Safety of Dams (SOD) – Modifications Reports for Congressional Review* (FAC 06-03) for information regarding the cost estimate requirements of the Dam Safety Program.

12. **Operation and Maintenance Estimates.** Cost estimates are required during the budget planning stages for most O&M activities, particularly replacement, additions, and extraordinary maintenance (RAX) items. During the budget planning stages, preliminary, appraisal, and feasibility level cost estimates will be used for determining the required budget for construction, supply, and services. Refer to RM D&S, *Instructions on Budgeting for Operation and Maintenance – Estimates, Schedules, and Supporting Documents* (BGT 01-05) for information regarding the required cost estimates.

- A. The first milestone or lowest level of budget planning that is typically encountered would be at the 4 or more out year(s) budget. The project is not well defined at this time and has not been incorporated in any Reclamation budget documents. Costs are typically generated using experience from previous projects and may not be formally prepared. At this time, the appropriate office will be defining the required RAX project work to be performed at some time in the future.

# Reclamation Manual

## Directives and Standards

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- B. The second milestone is at the current budget year plus 3 years for award of a construction contract. This information is developed for use in budget planning documentation required for Reclamation's Budget Review Committee (BRC). The cost estimate that is prepared for this milestone is at an appraisal level. Typically drawings, sketches, and/or general layouts are prepared for this level of cost estimate. Sufficient backup materials along with the appraisal level cost estimates should be provided to the BRC for their evaluation and review. Consideration must be given to preparing feasibility level cost estimates (in lieu of appraisal) for projects or features that either present unique requirements or are in excess of \$10 million total construction cost.
- C. Higher priority RAX items are typically designated for final design. At that time, the construction, supply, or service contracts will follow the normal design process providing appropriate cost estimates at the required milestones.

### 13. Oversight and Review of Cost Estimates.

- A. **Internal Reviews.** Cost estimates prepared within Reclamation will be reviewed per the established policies and procedures of the offices preparing the estimates. It is recommended that estimates be reviewed for a comprehensive inclusion of all known required work items, accurate pay quantities, sound price development, and appropriate special allowances. Special attention shall be given to major cost drivers, work items having high levels of risk, and anticipated noncompetitive procurements. Refer to RM Temporary Release Policy, *Independent Oversight of Design, Cost Estimating, and Construction* (FAC TRMR-12) for information regarding independent reviews of Reclamation cost estimates.
- B. **Reviewing Cost Estimates Prepared by Third Parties (Non-Reclamation Employees).** Cost estimates for Reclamation projects and the designs upon which they are based are sometimes prepared by entities outside of Reclamation (i.e., Architect/Engineer, Consultant, etc.). In such situations, the outside entity who prepares these products is responsible for the technical adequacy of their designs and the accuracy of the associated cost estimates.
  - (1) Information on Reclamation's review of designs prepared by others is available in RM D&S, *Design Activities* (FAC 03-03). Information on Reclamation's review of cost estimates prepared by others is as follows:
    - (a) For projects which meet the criteria for review by the DEC Oversight Office (as outlined in *Independent Oversight of Design, Cost Estimating, and Construction* (FAC TRMR-12)), the project design and cost estimate shall be independently reviewed in accordance with the provisions of that Policy.
    - (b) The agreement with the outside entity whose estimate is to be reviewed in accordance with the provisions of *Independent Oversight of Design, Cost*

# Reclamation Manual

## Directives and Standards

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*Estimating, and Construction* (FAC TRMR-12) shall include provisions to supply the following data to facilitate Reclamation's review:

- (i) Detailed design drawings, design data, quantity estimates, and quantity estimate worksheets must be provided which clearly illustrate the nature and scope of the project components;
  - (ii) All supporting information for estimate assumptions for the bid items and unit prices that make up the cost estimate must be included. Lump sums shall be broken down into component parts so that the reviewer(s) can understand at the cost element level the work requirements contained within.
  - (iii) Major cost drivers in the cost estimate (defined as those project components which make up significant percentage of the construction cost) must be supported by full understanding of the development of the unit prices and/or lump sums with price quotes (if available) or the cost reference where the cost were obtained.
- (c) Reclamation review of cost estimates prepared by others is also encouraged for projects which do not meet the criteria in *Independent Oversight of Design, Cost Estimating, and Construction* (FAC TRMR-12) for independent review but may be reviewed via a less formal process. In these cases, the review materials noted above must be included as a required deliverable from the outside entity producing the design and associated cost estimate.
- (d) Strong consideration will be given to preparation of a Prevalidation estimate and an IGCE by government personnel on any project designed for Reclamation by an outside entity to preclude or limit any real or perceived conflict of interest and to prevent any dissemination of secure procurement information before bids are received.

### 14. Other Considerations.

#### A. Estimating Personnel (Estimator).

- (1) Cost estimators are expected to have a full and open exchange of data regarding the design, construction, and procurement methodologies applicable to the project upon which they are working. This exchange of information benefits not only the estimator but also the design staff and procurement officials. However, in the actual preparation of the cost estimates, the estimating staff is expected to work independently of the designers (if resources are available), procurement officials, and potentially competing contractors, as possible, to eliminate any real or perceived influence or conflict of interest in the preparation of the cost estimate.

# Reclamation Manual

## Directives and Standards

---

- (2) Cost estimators must receive appropriate training in cost estimating procedures; be knowledgeable in construction methodologies and contracting procedures; and be able to determine current cost conditions as they impact the development of the CCEs.

**B. Value Analysis.** Value studies are used to quickly consider alternate proposals against the baseline design. Information on Reclamation's Value Program can be found in RM Policy, *Reclamation Value Program* (CMP P05) and D&S, *Reclamation Value Program* (CMP 06-01). Cost estimates are an integral part of a value study. A value engineering study will typically use a Feasibility or Percent-Design cost estimate for the baseline and is used for the basis in developing costs for the various value study proposals. The appropriate level of cost estimate required for value study proposals will typically be no better than the baseline cost estimate. Value study proposal cost estimates are inherently less defined than the baseline cost estimates as a result of the constraints of the value study process. As a result, these cost estimates shall not be used for any purpose other than evaluating costs for design and construction alternatives relative to the baseline cost estimate. Should an alternative be selected from this process, the design will need to be refined and the cost estimate prepared with enough time, resources, and detail as appropriate.