Reclamation Manual

Directives and Standards

Subject: Design Activities

Purpose: Establishes Bureau of Reclamation requirements for coordination, process, and performance of design activities. The benefits of this Directive and Standard (D&S) are to ensure standardized design processes among Reclamation offices and Reclamation designs produced by contractors.

Authority: Reclamation Act of 1902 and all supplementary amendments thereto; Reclamation Safety of Dams Act of 1978 as amended

Approving Official: Deputy Commissioner, Operations (DCO)

Contact: Director, Technical Service Center (TSC) (86-68000)

1. **Introduction.** Design activities are performed within the Bureau of Reclamation to develop and maintain project infrastructure, perform new initiatives, respond to emergencies, and provide technical assistance in support of the agency's mission. Coordination of design activities among all Reclamation offices, including the regional, area, and construction offices; the TSC; and the Commissioner's Office is essential to ensure that design activities are performed in a professional, timely, and cost-effective manner that satisfies all technical and safety requirements. In addition, such coordination is essential to ensure that design activities are consistent with authorized service agreements between the office performing the design activities (service provider) and the office requesting the service (program office). Reclamation resources, supplemented as needed, will accomplish Reclamation's design workload in a manner that utilizes existing technical capability, utilizes opportunities to develop sustainable staff capability for the future, and minimizes the dilution of expertise. Reclamation managers will ensure the utilization and development of Reclamation's design capabilities through the effective use of existing staff resources, collaborative development of work plans that carry out the agency's mission, adherence to and monitoring of corporate business practices, and providing services to non-Reclamation clients as appropriate. For detailed information, refer to Reclamation Manual (RM) D&S, *Workload Distribution Practices for Technical Services Work* (CMP 10-03), and the Final Design Process Guideline.

2. **Applicability.**

   A. This D&S applies to all Reclamation personnel and non-Reclamation entities engaged in Reclamation design activities that require the application of engineering principles and practices consistent with RM D&S, *Professional Registration for Engineers and Architects* (HRM 05-01).

   B. Design activities may be associated with a multitude of programs, projects, or other activities related to the Reclamation mission, including planning studies, operation and maintenance (O&M) programs, the Safety of Dams Program, emergency response

work, final designs leading to construction, and other technical assistance supporting the agency's mission. Risk reduction objectives and security issues are included when required.

3. **Definitions.**

A. **As-Built Drawing.** For the purpose of this D&S, an as-built drawing is a specific revision to a contract drawing that documents actual details of constructed features after completion of a construction contract.

B. **Complex Items.** Complex items have quality characteristics, not wholly visible in the end product, for which contractual conformance must be established progressively through precise measurements, tests, inspections, and other controls.

C. **Critical Items.** A critical item is one for which a failure could injure personnel or jeopardize the success of the project or a vital agency mission.

D. **Design Project Management Plan.** A subsidiary management plan to the overall project management plan that describes in detail the scope of design work, deliverables, schedules, budgets, and other topics identified in the *Project Management Framework*.

E. **Drawing.** For the purpose of this D&S, a drawing is defined as a graphical depiction (with notes as required) of a site, feature, object, or concept which is produced to convey engineering, scientific, or other technical information.

F. **Program Office.** In accordance with RM Policy, *Bureau of Reclamation's Business Model for Managing Technical Services* (CMP P10), a program office is defined as any Reclamation organizational unit that has been assigned the authority and allocated the budget necessary to operate and maintain projects and to conduct programs for which it is responsible.

G. **Project.** For the purpose of this D&S, a project is a temporary endeavor undertaken to create a unique product, service, or result. A project has a discrete and definable commencement and conclusion.

H. **Service Agreement.** For the purpose of this D&S, a service agreement is used to document the scope, schedule, budget, deliverables, and funding source for a project. When signed by the program office and service provider, the service agreement becomes the contract for performance of the design work. Service agreements for design activities may be supplemented by design project management plans.

I. **Written Specifications.** For the purpose of this D&S, the term "written specifications" means the written portion of Section C – Description/specifications of the solicitation. The written specifications do not include the drawings or the clauses and provisions of the solicitation.

4. **Responsibilities.** The following paragraphs define the responsibilities of various positions in Reclamation and the interaction among these positions to ensure successful design coordination and completion of design activities.

   A. **Regional Director.** Regional directors are responsible for accomplishment of Reclamation programs involving design activities within their regions. Regional directors will coordinate with their area managers, regional division managers, power managers, construction engineers/construction managers, the TSC Director, and others to accomplish design activities.

   B. **Area Managers, Construction Engineers/Construction Managers, Power Managers, and Regional Division Managers.** Area managers, construction engineers/construction managers, power managers, and regional division managers will perform the work as directed by the regional director and ensure that the requirements of this D&S are implemented. To aid in accomplishment and coordination, programs are often divided into projects. The office assigned responsibility for a project is the program office for coordination of design activities. If the design activity is not associated with a Reclamation program or project, such as work for other Federal agencies authorized under Title VI of the Economy Act of June 30, 1932 (47 Stat. 382, 417), the office assigned the responsibility from the appropriate director for the design activities is the program office for coordination of design activities.

   C. **TSC Director.** The TSC Director prescribes the engineering and technical standards and guidelines used to prepare designs to promote consistent application of both Reclamation standards and current industry standards. The TSC Director also manages the staff of the TSC. The TSC provides technical services as requested by the program offices to support program accomplishments.

   D. **Project Management Team (PMT).**

      (1) The manager/director of the Reclamation office with program responsibility will initiate the formation of the PMT on safety of dams and other critical, complex, or controversial projects. The PMT will be responsible for executing an efficient and cost-effective project process, coordinating the project through design and construction, and ensuring that construction issues are communicated to the appropriate organizational structure and the design team. Generally, the PMT will be comprised of managers who are one supervisory level above the primary personnel actively performing the work, as well as representatives from the program office, area office, design office, and construction office. The team members at this level have management authority over resources and have the authority to set work priorities, establish project priorities, and resolve problems that could not be resolved at the working level.

      (2) In the specific case of safety of dams projects, the PMT will be appointed by and report to the area manager; Chief, Dam Safety Office; and the regional director. See RM Policy, *Decisions Related to Dam Safety Issues* (FAC P02).

E. **Project Manager.** The program office will appoint a project manager responsible for the overall coordination of the project and development of the project management plan. The project manager has responsibility for initiating work on a project, identifying service providers, working with service providers to determine scope of work, coordinating and monitoring work through project completion, and closing out the project. The project manager is responsible for coordinating among internal and external stakeholders and facilitating effective communications between service providers and the program office. See RM D&S, *Project Management* (CMP 07-01).

F. **Project Management Group.** The project management group is established and directed by the project manager and includes the leaders of the various subteams that support development of the project. These subteams may include, but are not limited to, teams that deal with different aspects of the project such as design data collection, geologic exploration, design, environmental and cultural resources compliance efforts, real estate, acquisition, and construction. The design team is the subteam responsible for accomplishing design activities for a project. See Appendix A, *Suggested Final Design Project Checklist,* for final design activities to be considered by the project management group.

G. **Design Team Leader.** The design team leader is responsible for all design activities and design support during construction for the project. The design team leader, with the support of the design team members, develops the service agreement (and supplemental design project management plan if required), which includes: defining the scope of the work, identifying deliverables, identifying resources and data requirements, developing design team budget, and developing design schedule. The design team leader will present the completed service agreement (and supplemental design project management plan) to the project manager or the dam safety PMT (whichever is appropriate) for approval. The design team leader will track team progress and participate in the design closeout process.

H. **Design Team.** The design team functions as a subteam to the project management group. For small or less complex projects, the design team may be an individual. The primary functions of the design team are to define design data requirements, establish a design data submittal schedule, develop decision memoranda for the PMT or project manager as appropriate, identify and request special studies such as seismotectonic or hydrologic studies, share technical information, resolve technical issues, coordinate technical activities, develop cost estimates for planning studies or final designs, and produce drawings and a specifications package for the project features with enough information to economically and safely construct the project. The design team operates under the direction of the design team leader and is staffed by personnel from the office(s) providing design services for the project feature. The design team working under the direction of the design team leader is responsible for ensuring that the work receives the proper coordination, technical and peer reviews, and agency program review (such as value program and security reviews); and for ensuring that the work meets the requirements set by the project manager. The design team will typically

consist of a design team leader and representatives of key engineering and scientific groups involved in the development, design, and construction of project features. On teams where a principal geologist is utilized, this design team member will typically reside in the office performing the designs.

5. **Design Coordination.**

A. Coordination of design activities will vary, depending on the size, cost, or other issues; however, all projects require tracking from inception to completion to ensure that all milestones in the service agreement are met. For example, small projects performed under the simplified acquisition authority generally do not require as much coordination as larger, more costly projects. Points to be considered are:

(1) controversial issues;

(2) complex or critical items;

(3) new products or technology;

(4) dam safety;

(5) security issues; and

(6) other regulatory requirements such as life safety, historical, cultural, environmental, accessibility, or sustainability

B. The project manager, in conjunction with the service provider(s) performing the design activities, shall request assignment of a design team leader to the project. The design team leader will ensure proper coordination with the appropriate staff to complete design activities.

C. For projects with a PMT, the PMT will oversee the development of a project management plan covering all critical elements of the overall project. The PMT will meet as necessary during the planning and final design phases of a project to review actual progress to date. Specific meetings will be determined by the project manager or the PMT. The design team leader will prepare a status report for each PMT meeting that shows expenditures and progress of design activities.

6. **General Requirements for All Design Activities.** Regardless of the size or complexity of a project, these general requirements shall be followed for all Reclamation design activities.

A. **Statements of Work.** Statements of work shall be prepared as identified in RM D&S, *Fee-for-Service Business Practices for Technical Services Work* (CMP 10-02).

B. **Service Agreements and Design Project Management Plans.** After the design team leader is identified, service agreements (and supplemental design project management plans if required by the service provider organization or project manager) will be

prepared by the design service providers in cooperation with the program office and/or project manager. Service agreements will include the design scope of work, deliverables, budgets, schedules, and funding source as identified in CMP 10-02. Requirements for peer review; value analyses; cost estimating; and design, estimating, and construction (DEC) review will be included in the scope of work as required by project requirements and/or Reclamation policies.

C. **Design Criteria and Standards.** Design activities must be performed in accordance with established Reclamation design criteria; Reclamation engineering, architectural, or technical standards; and approved national design standards. Exceptions to this requirement will be pursued in accordance with the provisions of RM Policy, *Performing Designs and Construction Activities* (FAC P03). A step-by-step process for approving deviations from Reclamation design criteria is provided in Appendix C, *Process for Requesting Deviation from Reclamation Design Criteria*.

D. **Professional Registration.** Professional registration is required for certain Reclamation staff who approve engineering decisions or who are in responsible charge of architectural or engineering designs. Reclamation will employ the highest professional standards of practice as stipulated in FAC P03. Specific requirements for professional registration are included in HRM 05-01.

E. **Design Activities Performed by Others.**

(1) In cases where a non-Reclamation entity develops designs for an entire project, a specific project feature (e.g., pumping plant, bridge, etc.), or a specific component of a project feature (e.g., electrical controls for a pumping plant, dewatering design for an excavation, etc.), the entity is responsible for the technical adequacy of its design. If the designs meet Reclamation's criteria for preparation by a registered architect or engineer, the entity shall sign the written specifications and drawings in accordance with the provisions of this D&S, including designation of the signer's registration status. Reclamation participation will involve the appropriate engineering/architectural disciplines (including the individual(s) tasked with signing the drawings "Accepted," as outlined below) in the development of the Statement of Work, product reviews (throughout the development of the designs), and acceptance of the designs. Reclamation professionals are not to provide technical approval of the designs, but are to review the information and determine if Reclamation's overall needs are met. This review shall be conducted under the responsible charge of a Reclamation professional registered in the appropriate engineering/architectural discipline. The review will be documented by this registered professional's signature on the drawing, which signifies that the design drawing is "Accepted." However, Reclamation's review and acceptance does not relieve the entity from its responsibility for the technical adequacy of its design.

(2) In cases where Reclamation contracts for design services for a specific task (e.g., design, drawing production, design checking, peer review, etc.) as part of

the design process for a specific project feature, or a specific component of a project feature, the individuals from the outside company/organization will be responsible for signing Reclamation drawings on the applicable lines of the title block in accordance with all provisions of Paragraph 6.F. below. Reclamation professionals will similarly document their involvement in the development of the design and drawings by signing the applicable lines of the title block in accordance with all provisions of Paragraph 6.F. In cases where a Reclamation professional's involvement in the development of the design meets the criteria for signing the "Reviewed" line of a Feasibility Design drawing, or the "Technical Approval" line or the "Peer Review" line of a Final Design drawing, as defined in Paragraph 6.F., this Reclamation professional's signature on any of those lines eliminates the requirement for a Reclamation professional's signature on an "Accepted" line. In all other cases, the "Accepted" line will be included on the drawing and signed in accordance with the provisions of the preceding paragraph.

(3) In all cases where an outside company/organization is involved in development of a Reclamation design, the role of that outside company/organization, as well as Reclamation's role in the development and/or review of the design, shall be detailed in the service agreement between the program office and the service provider office providing design and/or review services, as well as in the contract with the outside company/organization.

(4) In cases where a non-Reclamation entity (e.g., foreign government, other Federal agency, State or local government, private sector) requests Reclamation review of designs prepared by themselves or others, Reclamation's role shall be detailed in the agreement between the non-Reclamation entity and the Reclamation office providing the design review service. Reclamation participation will involve the appropriate engineering/architectural disciplines to develop a comprehensive opinion of the design product. Reclamation professionals are not to provide technical approval of the designs, but must review the information to determine, if in Reclamation's opinion, technical analyses and designs, and the data upon which they are based, are adequate to support the results.

(5) At completion of a design by an outside company/organization, representatives from Reclamation and the company/organization shall participate in a design closeout process. A checklist is provided in Appendix B, *Project Closeout Checklist*.

F. **Written Specifications Formatting.** Specifications for solicitations issued by Reclamation for procurement of construction and supply contracts shall follow the *Reclamation Specification Format*.

G. **Signatory Responsibilities for Design Drawings.** In order to document the process by which designs are produced in Reclamation, each design drawing will be signed by those individuals directly involved in its development. Signatory documentation will be captured in the signature block and revision blocks of the drawings produced to

illustrate the design. Reclamation uses a standard signature block for its drawings, as noted in the *Information Management Handbook*, Volume III, "Drawing Management and Drafting Standards" (issued under RM D&S, *Engineering Drawings Management* (RCD 04-01)).

(1) Feasibility design drawings have design features which are developed for general evaluation purposes only. The designs depicted on these drawings are not of sufficient detail for use in construction or acquisition. Feasibility design drawings have a minimum of two signatures: "Designed" and "Reviewed." Given the impact these feasibility designs have on project cost estimates and, ultimately, on congressional appropriations, the person signing as the reviewer must be registered in the appropriate engineering/architectural discipline with the applicable professional designation after their signature, such as "P.E." for professional engineer or "R.A." for registered architect. The responsibilities of individuals who sign each signature line for feasibility designs are outlined below.

(a) **Designed.** By signing this line, the person assigned design responsibilities is certifying that the preliminary design layout depicted on the drawing is consistent with currently accepted engineering practice and generally satisfies all of the appropriate and available design criteria and data for this level of design. This person is also responsible for ensuring that the drawing conveys a feasible, functional, and compatible concept for all of the critical design requirements.

(b) **Reviewed.** By signing this line, the person making an independent review is certifying that the concept depicted on the drawing is feasible and that there is sufficient detail on the drawing. The person signing the "Reviewed" line must be registered in the appropriate discipline and is required to put their professional designation after their signature, such as "P.E." for professional engineer or "R.A." for registered architect.

(2) Final design drawings are drawings used in solicitations for construction or acquisition. The responsibilities of those individuals who sign each signature line for final design drawings are outlined below.

(a) **Designed.** By signing this line, the designer is certifying that the design is consistent with currently accepted engineering practice and incorporates the site conditions as depicted in the design data. The designer is also responsible for ensuring that the drawing accurately conveys the design intent. The designer need not be registered.

(b) **Drawn.** By signing this line, the person who developed the drawing is certifying that the drawing and the electronic models upon which it is based comply with Reclamation's *Information Management Handbook*, Volume III, "Drawing Management and Drafting Standards" (issued under RCD 04-01).

(c) **Checked.** By signing this line, the checker is certifying that he/she has personally reviewed the drawing to ensure that it accurately conveys the design intent. The checker is also responsible for either personally completing a detailed review of the design for compliance with currently accepted engineering practice and for incorporation of the site conditions as depicted in the design data, or verifying that this detailed review has been completed by others. The detailed review includes a check of calculations, tests, and methods used to develop the results shown in the document. The checker need not be registered.

(d) **Technical Approval.** The technical reviewer signs the "TECH. APPR." line on the drawing. By signing this line, the individual is accepting the responsibility for the technical information depicted on the drawing. The individual assuming this responsibility shall have been in responsible charge and intimately involved in the preparation of the design and the drawing. The individual must be familiar with the basic data, criteria, and procedures used to develop the results shown on the drawing. For drawings showing work from several disciplines, it is the signing individual's responsibility to ensure that all of the technical information prepared by other disciplines and depicted on the drawing is compatible with the overall design intent. However, technical approval of designs prepared by other disciplines shall be provided by the discipline preparing those design details. In cases where the designs depicted on the final design drawing meet the criteria for preparation by a registered engineer or architect in accordance with HRM 05-01, the person signing the "TECH. APPR." line of a final design drawing signature block must be registered in the appropriate discipline and is required to put their professional designation after their signature, such as "P.E." for professional engineer or "R.A." for registered architect.

(e) **Approved.** By signing this line, the approved signatory is affirming that a peer review or an administrative approval process was performed. The peer reviewer signs the "APPROVED" line on the drawing. The notation "PEER REVIEWER" and the peer reviewer's title must be added below the signature line (e.g., PEER REVIEWER - DIVISION CHIEF). Alternatively, the "APPROVED" signature confirms that an administrative approval process was performed. The notation "ADMIN. APPROVAL" and the administrative approver's title must be added below the signature line (e.g., ADMIN. APPROVAL – DEPUTY AREA MANAGER). The differences between these approvals are specified below:

(i) **Peer Reviewer.** A "PEER REVIEWER" designation on the signature line will be used when this final review is technical. A peer review is a technical quality assurance/quality control process performed by a professional who is independent of the work performed. It emphasizes a review of the basis of the technical approach, procedures used, and the

validity and suitability of the design. The peer review does not normally include a check of calculations, tests, and methods, but it does verify that review and checking have been completed by others and are adequately documented. The peer reviewer must possess technical qualifications, practical experience, and professional judgment to properly conduct a peer review and must be an experienced practitioner in the relevant discipline with recognized and verifiable credentials. Therefore, to sign as "PEER REVIEWER" on a drawing that is technically approved by a registered professional engineer or architect, the peer reviewer must also be registered in the appropriate discipline.

(ii) **Administrative Approval.** An "ADMIN. APPROVAL" designation will be used when this final review is focused on programmatic, operational, or similar administrative issues. This signature will typically be provided by a facility manager, area manager, project office manager, or program office manager, but it must be someone familiar with the project needs. Given the more general nature of such reviews, the person signing "ADMIN. APPROVAL" need not be registered.

(f) Each director under whom final design drawings are produced will develop a procedure to determine the type of review required for each aspect of a project's design. A minimum of three people must be involved in the development and approval of final design drawings, as specified below:

(i) **Designer.** In addition to his/her design activities, this person may also develop the drawing and provide the technical approval for the design. This person cannot also check the design or provide the peer review or the administrative approval of the design.

(ii) **Checker.** In addition to his/her checking activities, this person may also develop the drawing and provide the technical approval for the design. This person cannot also produce the original design or provide the peer review or administrative approval of the design.

(iii) **Peer Reviewer/Administrative Approval.** This person must maintain their independence from the design development process and limit their involvement to their peer review/administrative review responsibilities.

H. **Technical Approval and Peer Review.** The design team, under the guidance of the design team leader, is responsible for ensuring that proper technical oversight and peer reviews are performed, as well as ensuring that the person providing the technical oversight review of designs is qualified to sign the drawings as technically approved, if required, according to HRM 05-01. Reviews will be performed by another Reclamation office if the office performing the designs does not have the technical capability or capacity to perform the review. Peer review requirements must be discussed and included in the development of the service agreements.

I. **Signatory Responsibility for Written Specifications.**

(1) In order to document the process by which written specifications are produced and approved, written specifications will be accompanied by a signature sheet. The signature sheet will contain at least the following:

(a) Specifications No:

(b) Specifications Title:

(c) Project Title:

(d) Region:

(e) Prepared by: _____ Date: _____

(f) Technical Approval: _____ Date: _____

(2) The person signing the written specifications as "Prepared" shall have developed or assembled the written specifications.

(3) The person signing the written specifications as "Technical Approval" shall have been in responsible charge of the overall design including developing or assembling the specifications. This person will typically be the design team leader. In cases where the designs described by the specifications meet the criteria for preparation by a registered engineer or architect, according to HRM 05-01, the engineer or architect shall be registered with the applicable professional designation after their signature, such as "P.E." for professional engineer or "R.A." for registered architect. By signing this line, the person is certifying that the written specifications convey the design intent as portrayed on the drawings. For specifications containing designs from multiple disciplines, it is the signing individual's responsibility to ensure (using procedures defined by his/her organization) that the technical information prepared by other disciplines, and depicted in the document, is compatible with the overall design intent and that the documents used to depict that information (e.g., drawings) include signatures with appropriate professional registration designations.

(4) The signed signature sheet must be filed in the contract file by the acquisitions office.

J. **Drawing and Specifications Review.** Specifications and drawings shall be reviewed regardless of size and complexity. The drawing and specifications review is the final review of the drawings and specifications paragraphs prior to publishing as a solicitation, to ensure a complete and sufficient document for contracting the work. Review comments shall be provided to the design team leader by project members, design members, the contracting office, and other involved offices.

K. **Records Retention and Engineering Drawings Management.** Electronic drawing files and records must be retained in accordance with the *Information Management Handbook,* Volume III, "Drawing Management and Drafting Standards," and RM D&S, *Information Management* (RCD 05-01).

7. **Design Activities from Inception to Award.** The design process must follow the service agreement to ensure the successful accomplishment of design activities.

A. **Milestone Dates.** Schedules will be developed for submitting important information such as design data and deliverables. The design team leader will schedule progress reviews with the project manager or the PMT, whichever is appropriate.

B. **Design Reviews.** Design reviews will be scheduled at various stages of the final design process. Typically, a review will occur at the concept stage of final design (at about 30 percent complete), midway through final design (at about 60 percent complete), and near the end of the final design process (at about 90 percent complete). At this last design review, design drawings and specifications are complete, allowing one last review before they are published. More information on design reviews may be found in the Final Design Process discretionary guidance document.

C. **Site-Specific Design Criteria.** Site-specific requirements and assumptions need to be determined and documented by the program office in coordination with the offices collecting the design data and the service provider performing the design. General design criteria will be determined by the design team. Adequate design data must be collected and ample coordination must be accomplished to ensure successful execution of design activities.

(1) The design team will develop a listing of nongeologic design data needs and document these needs in a Design Data Request (DDR).

(2) Projects where collection of geologic design data is necessary require formation of an exploration team under the guidance of a geotechnical specialist. The geotechnical specialist or exploration team, as appropriate, will develop the exploration plan and document the plan in a Field Exploration Request (FER). The FER will include access, drilling, sampling, testing, documentation, permitting requirements, and estimated costs and schedules. The FER will be submitted to the program office for approval prior to commencement of exploration activities.

(3) The program office and service provider must agree on the content, level of detail, and schedule for receiving the data in response to a DDR and FER. Data submittals will be reviewed by the design team, and supplemental data requests will be made if necessary.

D. **Deliverables.**

(1) For appraisal and feasibility studies, the main design product will be an appraisal or feasibility design report containing cost estimates, preliminary designs (if required), and further recommendations. This information may take the form of a technical report of findings, including the appropriate decision documents.

(2) For final designs, the deliverables will generally contain final design drawings, written specifications, Government construction schedule information, prevalidation and independent Government cost estimates, Design Summaries, evaluation criteria when required for solicitation purposes, and other information, so the feature can be constructed or contracted for construction. Deliverables shall be listed in the service agreement.

E. **Cost Estimates.** At various stages of the project, cost estimates are to be developed to aid in the decisionmaking, value analysis, and contracting. The service agreement will define the number and level of cost estimates required for the design process. See RM D&S, *Cost Estimating* (FAC 09-01).

F. **Value Analyses.** The service agreement will identify if a value analysis study must be performed and at what stage of the design process (see RM Policy and D&S, *Reclamation Value Program* (CMP P05 and CMP 06-01)). Value analysis must be applied to an overall study to determine the best alternative, but value engineering may be applied to a specific design activity.

G. **Revisions.** Revisions to designs after drawings and written specifications are originally signed will be reviewed by a design team representative (typically the design team leader). When the design revisions meet the criteria for preparation by a registered engineer or architect in accordance with HRM 05-01, this review will be completed by a design team representative registered in the appropriate discipline and documented by including their professional designation after their signature (e.g., "P.E." for professional engineer or "R.A." for registered architect). The review of revised drawings must be documented on a revision block on the drawing as described in the *Information Management Handbook*, Volume III, "Drawing Management and Drafting Standards." The review of written specifications revisions must be documented on a signature sheet included with the revised written specifications.

H. **Design Documentation.** The steps used in the design process need to be documented and filed. This documentation will include design data used as the basis for designs, correspondence, design notes, design calculations, specifications, drawings, technical memoranda, decision documents, written reports such as the Design Summary and Designer's Operating Criteria, and documentation prepared during the design closeout process.

I. **Critical Path Method (CPM) and Earned Value Management (EVM).** The design project management plan for a large or complex project may require CPM scheduling or EVM tracking of tasks to ensure that the work is accomplished in an effective manner.

J. **Pre-award.** The design team must prepare, review, and provide to the contracting office specifications amendments, if required, for all projects in which they are involved, including special construction requirements. Small projects or projects without complex or critical features may be contracted by using simplified acquisition authority or Invitation-for-Bid acquisition. For large or complex projects, two-step, sealed bid or negotiated-type acquisition procedures that require participation of a Technical Proposal Evaluation Committee (TPEC) may be appropriate. At a minimum, the design team leader is to be a consultant to the TPEC, and at least one member needs to be registered as required in HRM 05-01.

K. **Design Closeout Process.** At the completion of the design phase, typically at the SPECB (100-percent Design Stage) milestone, a design closeout review shall be conducted to document lessons learned. Information gained from this review shall be entered in a completion report in accordance with CMP 10-02.

8. **Design Activities from Award through Construction.**

A. **Introduction.** Designers must be available for many activities after contract award. The design team must have enough involvement, including site visits, to ensure that the design intent is being achieved.

B. **Support During Construction.** The design team must provide a variety of assistance, support, and technical oversight during construction. This will include, but not be limited to, providing clarification of design drawings, making site visits for field inspections such as foundation inspections, contractor submittal reviews and approval, responding to contractor-proposed value concepts and requests for information or clarification, and contract modifications. Large projects or those with complex or critical features will have their own support staff assigned to construction management responsibilities; however, for small projects without complex or critical features, the design staff may also have construction management responsibilities, if necessary.

C. **Modification of Designs.** Any changes in a feature during construction in which there is a deviation from the original design intent will require a technical review by a design team representative who is registered in the appropriate discipline according to HRM 05-01. Revisions will be noted on design drawings and documented by a revision block on the drawing, as described in the *Information Management Handbook*, Volume III, "Drawing Management and Drafting Standards."

9. **Post-Construction Design Activities.** After completion of construction activities and prior to the project obtaining or returning to O&M status, several important design activities remain to complete the project. These include reviewing and revising drawings to show

actual construction details (as-built drawings), participating in the construction closeout process, documenting lessons learned, storing documentation so that it is accessible to future design efforts, assisting in the preparation of the construction report and geology report (if required), and developing Designer's Operating Criteria. The process for development and distribution of as-built drawings is discussed in the *Information Management Handbook*, Volume III, "Drawing Management and Drafting Standards." The as-built revision block shall be signed by a registered engineer or architect who can attest to the as-built conditions. Other post-construction design activities may involve:

A. participating in O&M transfer inspection(s);

B. providing input into O&M manuals; and

C. preparing a completion report in accordance with CMP 10-02.

10. **Accountability and Documentation.**

A. The project manager must identify project members responsible for planning and design activities, track budgets and expenditures, ensure that planning and design deliverables meet project requirements and other regulatory requirements, and ensure proper documentation and records management for the overall project.

B. The design team leader must ensure proper accountability of design activities, proper documentation of designs, and proper records management for the design portion of the project.

RECLAMATION
Managing Water in the West

RECLAMATION MANUAL TRANSMITTAL SHEET

Effective Date: **05/13/2015** Release No. **525**

Ensure all employees needing this information are provided a copy of this release.

Reclamation Manual Release Number and Subject

FAC 03-03 Design Activities

Summary of Changes

SUPERSEDES FAC 03-03 (329) 01/18/2015

NOTE: This Reclamation Manual release applies to all Reclamation employees. When an exclusive bargaining unit exists, changes to this release may be subject to the provisions of collective bargaining agreements.

Filing instructions

Remove Sheets	Insert Sheets
FAC 03-03 pp 1-14	**FAC 03-03 pp 1-15**
Appendix A pp 1-2	**Appendix A pp 1-2**
	Appendix B p 1
	Appendix C pp 1-2

All Reclamation Manual releases are available at http://www.usbr.gov/recman/

Filed by: _____ Date: _____