

## Chapter 1 Introduction

### 1-1. Purpose and Scope

This manual presents a discussion of the general, architectural and structural considerations applicable to the design of hydroelectric power plant structures. It is intended for the guidance of those elements within the Corps of Engineers responsible for the planning and design of such structures. It should also be used in establishing minimum criteria for the addition of hydro-power facilities at existing Corps of Engineers projects, whether by Corps of Engineers or a non-Federal developer.

### 1-2. Applicability

This manual applies to HQUSACE elements, major subordinate commands, districts, laboratories, and field operating activities having responsibility for design of civil works projects.

### 1-3. References

Required and related publications are listed in Appendix A.

### 1-4. Codes

Portions of the codes, standards, or requirements published by the associations or agencies listed below are applicable to the work.

*a.* American Association of State Highway and Transportation Officials (AASHTO).

*b.* Institute of Electrical and Electronics Engineers (IEEE).

*c.* American Society of Civil Engineers (ASCE).

*d.* American Society of Mechanical Engineers (ASME).

*e.* National Board of Fire Underwriters (NBFU).

*f.* National Bureau of Standards (NBS).

*g.* National Electrical Manufacturers Association (NEMA).

*h.* National Fire Protection Association (NFPA).

### 1-5. Criteria

The design methods, assumptions, allowable stresses, criteria, typical details, and other provisions covered in this manual should be followed wherever practicable. However, it is expected that judgment and discretion will be used in applying the material contained herein. It is realized that departures from these standards may be necessary in some cases in order to meet the special requirements and conditions of the work under consideration. When alternate methods, procedures, and types of equipment are investigated, final selection should not be made solely on first cost but should be based on obtaining overall economy and security by giving appropriate weight to reliability of service, ease of maintenance, and ability to restore service within a short time in event of blast damage or radiological contamination. Whether architect-engineers or Hydroelectric Design Center personnel design the power plant, the criteria and instructions set out in Appendix A of guide specification CE-4000 should be followed.

### 1-6. Hydroelectric Design Center

*a. Utilizing installations.* The engineering of hydroelectric projects is a highly specialized field, particularly the engineering design and operational activities. In order to assist field operating activities (FOA), the Corps of Engineers has established a Hydroelectric Design Center (HDC), located at Portland, Oregon, for utilization for all hydroelectric installations, including installations at existing dams.

*b. FOA services.* The FOA will retain complete responsibility and authority for the work, including funding, inspection, testing, contract management, and administration. The HDC will perform the following engineering and design services in accordance with ER 1110-2-109:

(1) Provide the technical portions of reconnaissance reports and other pre-authorization studies for inclusion by the requesting FOA in the overall report.

(2) Provide the architectural, structural, electrical, and mechanical design for the powerhouse including switchyards, related facilities, and all hydraulic transient studies.

(3) Prepare preliminary design reports and the feature design memoranda for hydroelectric power plants for the requesting FOA.

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(4) Prepare plans and specifications for supply and construction contracts and supplemental major equipment testing contracts.

(5) Provide technical review of shop drawings.

(6) Provide technical assistance to the Contracting Officer's representative at model and field tests. The HDC will analyze results and make recommendations.

(7) Assist in preparation of Operation and Maintenance Manuals.

(8) Provide necessary engineering and drafting to transfer "as-built" changes to "record" tracings and ensure complete coordination of such changes.

(9) Participate in review of plans and specifications for non-federal development at Corps of Engineers projects in accordance with ER 1110-2-1454.