

UNITED STATES OF AMERICA  
BEFORE THE  
FEDERAL ENERGY REGULATORY COMMISSION

In the Matter of	)	October 17, 2005
	)	
State of California	)	
Department of Water Resources	)	Project No. 2100-52
	)	
For a New Major License	)	
Oroville Division, State Water Facilities	)	
“Oroville Facilities”	)	

**MOTION TO INTERVENE  
OF  
FRIENDS OF THE RIVER  
SIERRA CLUB  
SOUTH YUBA RIVER CITIZENS LEAGUE**

Pursuant to Rule 214 of the Federal Energy Regulatory Commission’s (herinafter “FERC” or “Commission”) Rules of Practice and Procedure, 18CFR 385.214, Friends of the River, Sierra Club, and the South Yuba River Citizen’s League move to intervene in the above captioned proceeding.

**DESCRIPTION OF THE INTERVENORS**

Friends of the River is a nonprofit 501(c)3 organization headquartered in Sacramento, California, working to protect, preserve, and restore California rivers and streams for both environmental and recreational purposes. Friends of the River has approximately 5,000 members in the state of California.

Sierra Club is a nonprofit 501(c)4 organization working to protect the national and world environment. The Sierra Club has approximately 700,000 members in the United States, and 20,000 members in the Mother Lode Chapter, where the project is located. The Sierra Club maintains an office in Sacramento, California.

The South Yuba River Citizens League (SYRCL) is a nonprofit 501(c)3 organization working to protect the Yuba River (a major tributary of the Feather River) and its immediate environments. SYRCL maintains offices in Nevada City, Nevada County, California, and has approximately 5,000 members, most of whom live in the Feather, Yuba, and Bear River watersheds.

Intervenors are environmental group members of the Yuba Feather Work Group (Work Group), a stakeholder-based collaborative formed to work on flood management and related environmental restoration issues in the Yuba and Feather River watersheds. The Work Group is composed of SYRCL, Friends of the River, Nevada County, Sutter County, Sierra Club, Yuba County Water Agency, and state and federal agencies comprising Cal Fed.<sup>1</sup>

Representatives of Friends of the River and the Sierra Club served as members of the California Floodplain Management Task Force and on committees of the Reclamation Board/U.S. Army Corps of Engineers Sacramento and San Joaquin River Basins California, Comprehensive Study (*Comprehensive Study*, a review of the flood management system of these two river basins and to make recommendations for its improvement).

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<sup>1</sup> Cal Fed Agencies include: California's Reclamation Board, Bay Delta Authority, State Departments of Parks and Recreation, **Water Resources, Fish and Game**, Conservation, Health Services, Food & Agriculture, the Delta Protection Commission, San Francisco Bay Conservation and Development Commission, State Water Resources Control Board; the U.S. Bureaus of Reclamation and Land Management, the **Fish & Wildlife Service**, EPA, **Army Corps of Engineers**, Geological Survey, Natural Resources Conservation Service, Forest Service, **National Marine Fisheries Service**, and Western Power Administration. Bolded agencies attend Work Group Meetings. The mission of the CALFED Bay-Delta Program is to develop and implement a long-term comprehensive plan that will restore ecological health and improve water management for beneficial uses of the Bay-Delta System. Facilitation for the Yuba Feather Workgroup is funded from a grant by Cal Fed.

Intervenor organizations have members that live and reside in the floodplains behind the Feather River levees and levees of rivers affected by flows from Oroville Dam. Members of intervenor organizations also use the Feather River upstream and downstream of Oroville Dam—along with affected tributaries of the Feather River—for recreational purposes.

Therefore FOR, Sierra Club, and SYRCL have a direct interest in the relicensing proceedings and are not represented by any other party.

All filings, orders, and correspondence respecting this intervention should be sent to the following:

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## PROJECT FACILITIES AND OPERATIONS

### Setting and Description of the Oroville Facilities:

The Oroville Facilities consist of Oroville and Thermalito Dams and their associated reservoirs, power-generation facilities, power transmission facilities, fish hatchery, other project works, Oroville Wildlife Area, and project-related recreational facilities.



**Figure 1. Oroville Dam, Powerhouse, and Spillways.** Ungated spillway lip is the lengthy low point to the left of the main service spillway. Regulated design-release out flows of up to 150,000 cfs could flow downslope across the hillside during Corps of Engineers required surcharge operations.

DWR, 2005

Immediately upstream of Oroville Reservoir, the Bald Rock Canyon wild river zone of the Middle Fork Feather National Wild and Scenic River ends at elevation 900 feet,<sup>2</sup> the gross pool elevation of the Oroville Reservoir, approximately 1,500 feet within Project boundaries.

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<sup>2</sup> *River Plan, Middle Fork of the Feather River*, Plumas National Forest, Calif., June 8, 1978, p 2.



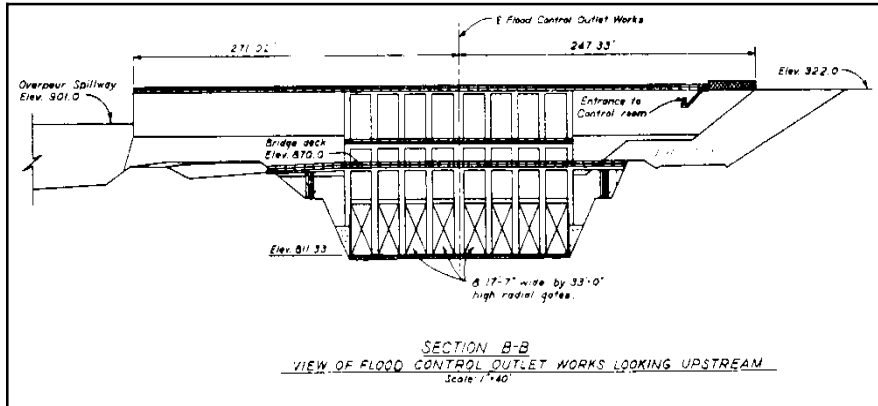


Figure 3 Sectional view looking upstream at main spillway with a small portion of the overpour spillway to the left. ACE Reservoir Regulation Manual, 1970

Oroville Dam includes two spillway facilities, the main spillway (controlled by gates) and an ungated “overpour” spillway, consisting of a 1,730 ft

long spillway lip (ogee crest) at elevation 901 feet, with no spillway below. Maximum surcharge operations envision 16 feet of water depth over the ungated spillway, plus additional freeboard space.<sup>3</sup>

### Description of Oroville Facility Flood-Control Operations:

Flood operations of the Oroville Facilities are operated under a contract between the licensee, Department of Water Resources (DWR), and the U.S. Army Corps of Engineers (ACE) “in accordance with rules and regulations prescribed by the Secretary of the Army pursuant to the provisions of Section 7 of the Flood Control Act of 1944.”<sup>4</sup> Federal participation in financing a portion of project costs of the Oroville Facilities was authorized by the Flood Control Act of 1958.”<sup>5</sup>

<sup>3</sup> *Oroville Dam and Reservoir, Feather River, California, Report on Reservoir Regulation for Flood Control*, August 1970, Department of the Army, Sacramento District, Corps of Engineers, Sacramento, California (*Reservoir Regulation Manual*), pp. 19 & chart 16, page 12 of 12. Design freeboard is 5 feet.

<sup>4</sup> *Reservoir Regulation Manual*, p. 2.

<sup>5</sup> *Civil Works Projects Maps*, U.S. Army Engineer District, Sacramento, 1978, p. 19.

When the Orville Facilities were licensed and when the ACE Oroville Dam Reservoir Regulation Manual was promulgated, Marysville Dam (federally authorized in 1966)<sup>6</sup> was expected to be constructed and operational in the near future. Marysville Dam, located on the Yuba River system, was envisioned to be capable of regulating peak flows (resulting from inflows smaller than the standard project flood) entering the

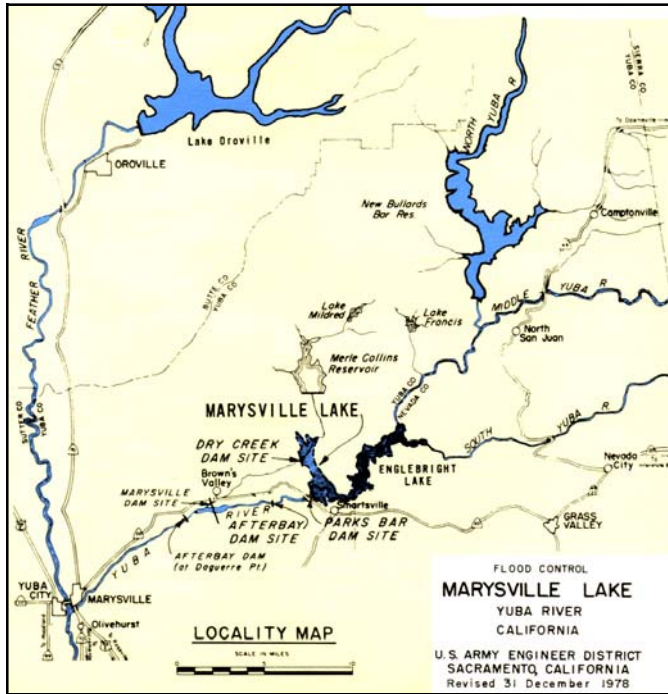


Figure 4 Civil Works Projects Maps, ACE, Sacramento District, 1978

Feather River from the Yuba River to 120,000 cfs.

In consideration of the anticipated circumstances of the time, the ACE Oroville Dam Reservoir Regulation Manual (Reservoir Regulation Manual) prescribes two set of rules embodied in its flood-control diagrams: an operation *with* Marysville Dam, and an “interim” or “present conditions” operation *without* Marysville Dam. Flood operations *with* Marysville Dam (if constructed) feature a 750,000 acre feet flood pool and regulated flood-control diagram (FCD) releases of up to 150,000 cfs from the gated spillway joined by additional and rising flows over the ungated “emergency” spillway when reservoir levels rise above elevation 901 feet. The

<sup>6</sup> “Marysville Dam was authorized by the Flood Control Act of November 7, 1966 . . . as amended by the Water Resources Development Act of October 22, 1976 . . . The authorized (as amended) plan of improvement provides for construction of (a) two dams, one a 357-foot-high concrete structure with earthfill abutments on [the] Yuba River and the other a 317-foot-high earthfill dam on Dry Creek, which together would create a reservoir of about 890,000 acre-feet . . .” *Civil Works Maps* p. 33.

combined spillway flows are governed by the Emergency Spillway Release Diagram (ESRD).<sup>7</sup> Rising ESRD flows create an increasing risk of releases breaking through downstream project levees—and ultimately overwhelming downstream levees.

“Interim” or “present conditions” *without* Marysville Dam flood operations—when reservoir levels rise above 901 feet—feature regulated “objective” releases of 150,000 cfs until 10 feet of surcharge above the ungated spillway lip is achieved (regulation provided by reducing flows in the main gated spillway and using water levels above the ungated spillway to make up for the reduced release) and ESRD flows in excess of objective releases over elevation 911.<sup>8</sup> “Interim” FCD operations add 161,000 acre feet to the *with* Marysville Dam 750,000 acre feet maximum dedicated flood pool—creating an available flood pool of over 900,000 acre feet.<sup>9</sup>

Consistent with the goal of confining Feather River flows within the leveed channel, flood operations of dams with flood regulation responsibilities on the Feather and Yuba Rivers such as Oroville and New Bullards Bar Dams (and the unconstructed Marysville Dam) also are expected to regulate outflows so that a maximum flow of 300,000 cfs below the Feather Yuba River confluence is not exceeded.<sup>10</sup>

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<sup>7</sup> ESRD flows are ultimately designed to protect the dam, rather than maintain downstream flows within the leveed channel. ESRD flows are determined by reservoir inflow and reservoir elevation, and exceed 150,000 cfs. *Technical Memorandum on Controlled Surcharge of Lake Oroville For Additional Flood Control*, (YCWA Technical Memo) Yuba County Water Agency, August 2002, pp. II 3.

<sup>8</sup> YCWA Technical Memo, pp. II 3-4.

<sup>9</sup> *Reservoir Regulation Manual*, Chart 16, p. 12 of 12. The YCWA Technical Memo characterizes this storage as “approximately 150,000” acre feet, or about 20% of the usable flood space at Oroville Dam. p. II-5.

<sup>10</sup> “Feather River flows should not exceed 150,000 cfs at Oroville, nor 180,000 cfs and 300,000 cfs above and below the mouth of Yuba River, respectively.” The 1972 ACE New Bullards Bar Reservoir Regulation Manual speaks of coordinated operations to meet this target, but also assumes that Marysville



The state of California withdrew its support for Marysville Dam in the late 1970s, and the project has been inactive since that time. According to the Work Group, “it is highly unlikely to be built in the future.”<sup>11</sup>

### STATEMENT OF ISSUES

Consistent with the facts, law, regulations, and guidelines discussed in the motion, intervenors request the Commission to take the following actions:

1) Pursuant to the Commission’s Rules of Practice and Procedure, 18CFR 385.214, and the above “Description of the Intervenors,” grant Friends of the River, Sierra Club, and the South Yuba River Citizen’s League intervenor status in this proceeding.

2) Consistent with the Commission’s responsibilities under §7(a) of the Wild & Scenic Rivers Act, §10(a) & §15(2) of the Federal Power Act, the Commission’s *Engineering Guidelines*, and the Commission’s regulations (18CFR 4.51(g)(2)) requiring relicensing applicants to “demonstrate that existing structures are safe and adequate to fulfill their stated functions,” issue a licensing order requiring the licensee to armor or otherwise reconstruct the ungated spillway and to make any other needed modifications so that the licensee can safely and confidently conduct required surcharge operations consistent with the Corps of Engineers Oroville Dam Reservoir Regulation Manual.

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Dam will also be available to regulate flows to downstream channel capacities. Oroville and New Bullards Bar Reservoir Regulation manuals, pages 28 and 21 to 23 respectively.

<sup>11</sup> Letter to Rick Ramirez, Manager, Oroville Facilities Relicensing Program, from the Yuba Feather Workgroup, February 19, 2003. In addition, the *YCWA Technical Memo* also notes that the construction of Marysville Dam is “unlikely as long a spring-run salmon and steelhead [trout] in the Yuba River are listed as endangered species.” p. 1-4.

3) Consistent with the Commission's *Engineering Guidelines* and its Dam Safety Regulations (Subchapter B, Part 12 of the Commission's Regulations), issue the above order in the event the licensing action is delayed and annual licenses become necessary for continued operation of the Oroville Facilities.

3) Consistent with the Commission's responsibilities under §10(a) of the Federal Power Act, direct the licensee to work with the U.S. Army Corps of Engineers and other interested parties to identify and implement operational changes to the Corps of Engineers Reservoir Regulation Manual to improve the plan of floodwater-management operations at Oroville Dam—including surcharge, as well as forecast and coordinated, flood operations. The Commission should establish deadlines for the licensee to complete these actions.

### **BASIS FOR THE MOTION**

#### **Introduction and Summary:**

In spite of the expectations at the time of the original licensing, the ACE *without* Marysville Dam “interim” flood operation rules at Oroville Dam have been the official controlling rules for Oroville Facilities flood operations since the dam began operations. These flood operation rules will be the controlling rules for the term of the new license for Project 2100 and for the foreseeable future.

However, the unarmored ungated-spillway design approved under the original license was based on the erroneous assumption that Marysville Dam would be completed in the then near future and the ungated spillway would soon be relegated exclusively to emergency (ESRD) purposes. Until that time, under the “interim” flood-operations rules, the ungated spillway was also *temporarily* an operational spillway intended to be used (in combination with the main

spillway) to restrict outflows to the dam's objective release and, to the extent possible, not exceed downstream channel-flow objectives. The *temporary* nature of this assumption has proven to be unwarranted.

In FERC *Engineering Guidelines*, operational spillways correspond to service or auxiliary spillways. The lack of a spillway for the ungated spillway in the circumstances prevailing at Oroville Dam does not meet FERC's *Engineering Guidelines* for service or auxiliary spillways.

Because Oroville Dam is currently undergoing relicensing and the Dam is not in conformity with the Commission's *Engineering Guidelines*, it is the duty of the Commission to establish procedures to bring the Dam into conformity (consistent with federal law, including the National Wild & Scenic Rivers and Federal Power Acts) as part of its relicensing review.

Intervenors have repeatedly urged the licensee to resolve—in the licensing proceeding—the issue of the nonconformity of the physical facilities of Oroville Dam and controlling ACE flood-operations rules with FERC's *Engineering Guidelines*.<sup>12</sup> These requests

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<sup>12</sup> Oroville spillway deficiencies, their impact on flood management operations, and the need for the licensee to address these issues have been discussed at nearly every Yuba Feather Work Group meeting for several years. The licensee is a member of the Work Group, and is always in attendance. Written communications on this issue from the intervenors to, or made available to, the licensee date back to August 23, 2001 (“Comments on the Notice of Preparation, Yuba River Flood Protection Program”). After Work Group meetings with the relicensing staff of the licensee in July and August 2002 (where the Department's position that ungated-spillway competence and flood operations would not be a subject of the relicensing emerged), the Work Group objected by letter to the licensee on February 19, 2003. When the licensee wrote back to the Work Group concluding that the Work Group spillway-design and other flood-management issues would not be addressed in the relicensing, the Work Group responded in a January 21, 2004 letter by stating that it was “leaving it to individual members to respond as they wished.” In its June 7, 2004 comments on the Alternative Licensing Proceeding Initial Settlement Offer, intervenor Friends of the River noted, “As we have repeatedly urged for several years, the Department needs to accept that these issues [conformity with FERC *Engineering Guidelines* and associated flood-control operational issues] are properly a significant part of the Commission's and licensee's obligations under the Federal Power Act to the public.”

appeared to be accepted by the licensee in its scoping and issue identification reports.<sup>13</sup> However, the licensee ultimately formed the notion that this issue was not appropriate for the relicensing proceeding before the Commission. (“[T]he process for relicensing our Oroville Facilities by the Federal Energy Regulatory Commission is not the proper forum for resolving regional flood management issues.”) They reached this conclusion because “Congress granted exclusive jurisdiction on Oroville flood-control operations to the Secretary of the Army.”<sup>14</sup> Setting aside the legal merits or relevance of these conclusions, DWR’s statements do not respond to the issues and requests raised by intervenors.

Because of the position of the licensee that the actions requested by the intervenors were not properly part of the relicensing of Oroville Dam, these issues were not able to be discussed or resolved (and project modifications designed) within the Alternative Licensing Proceeding (ALP) or the licensee’s application for the Oroville Facilities license. When the licensee’s intentions became apparent, the movants advised the licensee that these issues would have to be addressed by the Commission outside of the ALP using traditional venues afforded affected parties in the Commission’s licensing proceedings.

This was not our preference, but decisions by the licensee require us to bring these issues to this proceeding, and we do so here.

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<sup>13</sup> A brief history of engagement by parties on this issue, as well as the licensee’s response is documented in a June 30, 2004 letter to Rick Ramirez, Program Manager, Oroville Facilities Relicensing Program from Stuart Somach, Special Flood Control Counsel to Sutter County.

<sup>14</sup> Both quotes from letter from the Department of Water Resources to John Clerici, Yuba Feather Work Group, May 28, 2004.

## Relicensing Issues Properly Before the Commission:

A number of issues are properly before the Commission in this relicensing:

### Damage to Project Lands and Facilities Caused by Operational Releases:

Yuba County Water Agency's August 2002 *Technical Memorandum on Lake Oroville*

*Surcharge* discusses the damage that could occur to Project 2100 lands and facilities from use of the ungated spillway:

The discharge area below the emergency spillway is not armored and extensive erosion would take place if the emergency spillway were used. The spillway road and possibly high voltage transmission towers would be impacted. (p. II-1) Because the area downstream from the emergency spillway crest is an unlined hillside, significant erosion of the hillside would occur. (p. II-5) "The hillside between the emergency spillway and the Feather River would be subject to severe erosion when water flows over the spillway. Depending on the rate of flow, the erodable area . . . could range from 50 to 70 acres. The amount of soil, rock, and debris that would fall into the Feather River could be very large, depending on the depth of erosion. There could be damages to downstream structures, including the Thermalito Diversion Dam and Powerplant, Fish Barrier Dam, and highway bridges. If there is river channel blockage below the spillway, there could be impacts on operation of Hyatt Powerplant. (p. IV-3)



**Figure 5. 1986 main service spillway operations.** Note the ungated spillway to the left, and transmission line towers and road downstream. ACE required design-outflow surcharge operations call for an operational regulated release that could deliver up to this flow over the hillside, reducing and eventually shutting down flows in the service spillway. DWR

The *YCWA Technical Memo* did not express any judgement on whether a single operational use or multiple operational uses (with failure to repair any preceding or cumulative damage) of the ungated spillway could result in a loss of crest control of Oroville Dam. A loss of crest control could not only cause additional damage to project lands and facilities but also cause damages and threaten lives in the protected floodplain

downstream.

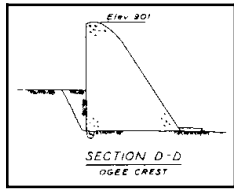


Figure 6 Ogee Crest Section.  
See figure 8 for section D-D location. ACE 1970

Both issues are properly before the Commission in this licensing proceeding. While a determination of the potential for meaningful loss of crest control is a traditional dam-safety issue for which the Commission can acquire geotechnical data on which to base its licensing order, the

consequences of an ungated-spillway design that results in significant damages under operational use conditions have important policy and operational implications which go to the heart of the Commission's §10 authority and responsibilities. An exploration of these implications follows:

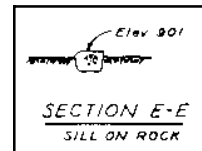


Figure 7 Ogee Crest Section  
See figure 8 for section E-E location. ACE 1970

Operator Willingness to Make Flood-Control-Diagram (FCD) Operational Releases at the Licensed Facility that Causes Damages to Project Lands and Facilities:

Given the understandable desire to avoid damage to project lands and facilities, it is not clear that Oroville Dam operators are prepared to conduct ACE FCD surcharge operations that maintain releases within the design objective release during the lower ten feet of ungated-spillway operations. Reports of operational experience support this concern. In main service spillway operations during the 1997 New Year's Day flood, Oroville Dam operators increased releases to 160,000 cfs from the 150,000 cfs objective release and notified the City of Oroville to be prepared to make evacuations to evacuate portions of the City because passthrough releases might be expected soon.<sup>15</sup> Based on their assessment of the condition of

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<sup>15</sup> According to the licensee, "In 1997, it [was] believed that Oroville storage was almost to a point where 300,000 cfs of inflow was going to pass through the reservoir. DWR was making plans to evacuate the power plant. The 300,000 cfs would have topped the levees and put 10 feet of water into the town of Oroville." *Oroville Facilities Relicensing, Engineering and Operations Work Group — Issue Sheet Development*, revised May 21, 2001. (EE56)

levees protecting their communities, local authorities called for evacuation of significant areas in downstream Sutter and Yuba Counties along the Feather River, with approximately 100,000 people evacuated.

Since reservoir storage peaked 200,000 acre feet below the gross pool, 13.8 ft below the ungated-spillway crest,<sup>16</sup> it seems unlikely that operators would have 1) decided to *exceed* the FCD objective release (in an apparent effort to delay, prevent, or reduce potential levee-overwhelming unregulated releases) when the downstream floodway was near design capacity—in a floodway that had been determined to be not reliably capable of withstanding its design flow several years earlier<sup>17</sup>— and 2) reached the conclusion that ESRD flows (eventually potentially leading to a full passthrough release exceeding 250,000 cfs) were imminent if they also expected that 150,000 acre feet of surcharge storage was *also* available to regulate releases to within the objective release.<sup>18</sup>

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<sup>16</sup> YCWA *Technical Memo*, p. II-8. *Sacramento and San Joaquin River Basins, California, Post-Flood Assessment*, March 1999. p. 5-41. U.S. Army Corps of Engineers, Sacramento District, March 1999. The Assessment was a production of the Sacramento and San Joaquin River Basins, Comprehensive Study of the ACE Sacramento District and the Reclamation Board of the State of California.

<sup>17</sup> The 1997 New Year's Day Flood resulted in major levee breaches along the Feather River (between Marysville and the Bear River) and along the Sutter Bypass. Both breaks occurred at or near design stage, and the Feather River break probably occurred above the channel design flow. The levee break along the Feather River at these flows was foreseeable. In 1990, the ACE made a determination that levee foundation problems meant that this portion of the Feather River floodway could only reliably accommodate 268,000 cfs, rather than the 300,000 cfs design flow. (ACE, *Sacramento River Flood Control System Evaluation, Phase II – Marysville/Yuba City Area, EA/Initial Study*, April 1993, p. 6) This new floodway-competence assessment was not reflected in ACE or licensee Oroville Dam operation plans or actual operations—nor in FEMA floodplain maps, although the ACE published a map of the estimated 1% annual risk flooded area (*Phase II Report*, p. 5) .

<sup>18</sup> The impression that Oroville Dam operators were not (and perhaps are not) prepared to operate to a 900,000 acre foot flood-control reservation to limit releases to the objective release from Oroville Dam is reinforced by the official reports of the 1997 flood operations of the licensee. The ACE/DWR Division of Flood Management “Information Report” submitted to the Assembly Water, Parks and

As noted in more detail in footnote eighteen, the impression that Oroville Dam operators did not intend to operate the dam according the ACE Reservoir Regulation Manual is reinforced by the official reports of the 1997 flood operations, which describe only a 750,000 acre foot flood reservation as available to constrain Dam outflows to the objective release.

Ensuring that Commission-licensed facilities are sufficient to meet their intended purposes is an important part of the Commission's responsibilities. This is reflected in the Commission's regulations regarding relicensing filings. 18CFR 4.51(g)(2) requires a relicensing application to "demonstrate that existing structures are safe and adequate to fulfill their stated functions."

More broadly, the Commission's regulations are part of its overall §10 authority and responsibilities. The relevant part is easily summarized:

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Wildlife Committee hearings on the January 1997 floods portrays a 750,000 acre foot flood reservation at Oroville Dam. (March 11, 1997). The *Final Report, Governor's Flood Emergency Action Team*, May 1997 portrays a flood-control space of 750,000 acre feet for Oroville Dam. (Appendix figure B-3). Additionally, the 1999 ACE/Reclamation Board, State of California *Post-Flood Assessment* states, "The flood management reservation of 750,000 acre-feet is used to reduce flows downstream from the dam to the objective release of 150,000 cfs and to reduce flows below the confluence with the Yuba River, in conjunction with flood management flows from New Bullards Bar Dam, to 300,000 cfs." (p. 3-23)

Subsequently, a state/federal review of the controlling flood-operations requirements for Oroville Dam occurred in a meeting that included the licensee and the ACE on January 12, 2001. In a letter from Joseph Countryman, MBK Engineers, to Michael Bonner, Program Manager, Yuba Feather Flood Protection Program, Department of Water Resources, the subject of the meeting was summarized: "The primary issue was how the dam should be operated when a flood is large enough to potentially cause the reservoir to surcharge above elevation 901 feet. It was pointed out that the flood control manual for Oroville reservoir depicted such an event on Chart 32 . . . This chart shows that under "Present Conditions" (no Marysville Reservoir) the downstream objective flows are maintained by allowing the reservoir to rise above the emergency spillway crest (elevation 901 feet) to a maximum storage of 3,719,000 acre-feet (elevation 910.7 feet). In addition, Paragraph 28 (Page 25) of the flood control manual states: "*During the interim period until storage is provided on the Yuba River, control is achieved by use of maximum surcharge at Oroville Dam . . .* The surcharge storage available between 901 feet and elevation 910 feet amounts to 144,000 acre-feet of flood space and is about 19% of the designated flood space below elevation 901 feet. Mr. Paul Pugner, Chief, Water Control Bran[ch] at the [Sacramento District of the] Corps, has confirmed that the reservoir should be operated to surcharge above elevation 901 for flood management until additional reservoir flood control space can be constructed on the Yuba River."



[T]he project adopted . . . shall be such as in the judgement of the Commission will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of . . . and for other beneficial public uses, including . . . flood control . . . [and] if necessary in order to secure such plan the Commission shall have authority to require the modification of any project and of the plans and specifications of the project works before approval. (§10(a)(1))

The Commission is not alone in highlighting the importance of ensuring that facilities (and operating procedures) properly support the floodwater-management operations of a multipurpose dam. The National Research Council “Committee on Flood Control Alternatives in the American River Basin” examined the 1986 failure of Bureau of Reclamation operators of the nearby federal Folsom Dam to make flood releases consistent “with the . . . USACE flood control diagram in force at the time.” They concluded “[p]rocedures need to be adopted to ensure that flood releases are made as required by operating regulations if intended flood risk reduction is to be achieved.”<sup>19</sup>

Similarly, given the large populations living behind levees in deep flood basins of the Feather, Sacramento, and American Rivers downstream, the Commission and the licensee have a duty to ensure that the licensed facilities of this major upstream high-hazard<sup>20</sup> dam are consistent

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<sup>19</sup> *Flood Risk Management and the American River Basin*, National Academy Press, 1995, p. 43-48. In the case of Folsom Dam, it was never determined why operators failed to make required flood releases—an action that eventually surcharged the reservoir and resulted in releases from the dam that exceeded the dam’s objective release. However, a 1995 Flood Management Report prepared by the U.S. Bureau of Reclamation in response to 1992 Congressional legislation directing the Bureau to make prompt (and even anticipatory) releases established an apparently new priority to make flood releases instead of trying to avoid damage to property in the downstream floodway. Additionally, the 1986 and 1997 Folsom Dam flood-release operations did result in millions of dollars of damage to the spillway and dam outlet works. Subsequent repairs to the outlet works featured anticavitation features that should result in less damage from future flood operations. In 1996, 1999, and 2004, Congress authorized additional modifications to the Folsom dam to make it safer to surcharge the reservoir, as well as to increase its outlet- and flood-storage capacity—and forecast-based release operations again in 1999.

<sup>20</sup> Because of the major consequences to human life and property that could result from a “failure or incorrect operation” of Oroville Dam, (FERC’s *Engineering Guidelines*, 1-2.2, April, 1991), Oroville

with the flood-operations requirements adopted by the Army Corps of Engineers for Oroville Dam if the dam is to have its intended floodwater-management benefits. The potential consequences of not meeting this duty for a large urban area (either from abandoning operational use of surcharge space or from a meaningful loss of crest control at the dam) have been vividly illustrated by the recent flooding of deep floodplains in New Orleans.

FERC Engineering Guidelines:

The Commission has developed specific guidance for its staff and licensees in its *Engineering Guidelines* regarding the competence and expected use of spillways licensed by the Commission.<sup>21</sup>

Oroville Dam’s ungated spillway is referred to in licensee and ACE Reservoir Regulation Manual documentation as an “emergency spillway.”<sup>22</sup> This reflects the *with* Marysville Dam uses contemplated for this spillway by the original license and 1970 ACE FCD. In these circumstances, the ungated spillway could generally meet current FERC *Engineering Guidelines* expectations for the design of “emergency spillways”:

Emergency spillways may be used to obtain a high degree of hydrologic safety with minimal additional cost. Because of their infrequent use it is acceptable for them to

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Dam would be properly characterized by the Commission as a high hazard dam.

<sup>21</sup> *Engineering Guidelines*, Preface, FERC, April 1991. “These engineering guidelines have been prepared by the Office of Energy Projects (OEP) to provide guidance to the [FERC] technical [s]taff in the processing of applications for license and in the evaluation of dams under Part 12 [Safety of Water Power Projects and Projects Works] of the Commission’s regulations. The Guidelines will also be used to evaluate proposed modifications or additions to existing projects under the jurisdiction of [the Commission] . . . These guidelines . . . provide licensees . . . with general guidance when presenting any studies presented to the Commission under Parts 4 [including Application for License for Major Project—Existing Dam] and 12 of the Regulations.

<sup>22</sup> The *Reservoir Regulation Manual* also refers to the ungated spillway as the “overpour spillway,” a more engineering-based, rather than function-based, characterization.

sustain *significant* damage when used and they may be designed with lower structural standards than used for auxiliary spillways.

An emergency spillway may be advisable to accommodate flows resulting from misoperation or malfunction of other spillways and outlet works . . . The design of an emergency spillway should be subject to the following limitations:

- The structural integrity of the dam should not be jeopardized by spillway operation.
- Large conservation storage volumes should not be lost as a result of degradation of crest during operation.
- the effects of a downstream flood resulting from uncontrolled release of reservoir storage should not be greater than the flood caused by the IDF without the dam. (p. 2-19) (*emphasis added*)<sup>23</sup>

However, in the absence of Marysville Dam, the ACE Oroville Dam FCD calls for *operational* use of the ungated spillway. This is achieved by manipulating main spillway gates in order to make combined spillway releases equal to the regulated objective releases when reservoir levels are at 901 to 911—and water is freely flowing over the ungated spillway.

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<sup>23</sup> Oroville Dam’s “with Marysville Dam” ungated “spillway” meets these engineering criteria for an emergency spillway pretty well: 1) spillwayless design reduced costs of accommodating the 590,000 cfs combined spillway design outflow, 2) significant damage may occur when the spillway is used, 3) *with* Marysville Dam, the then standard project flood could be routed through the main spillway (and in some circumstances, within downstream levees), so there was an arguable presumption that no flows would ever reach the ungated spillway—reducing any concern about the significant damages that could result from use of the ungated spillway, 4) levee-breaking flows of up to 260,000 cfs (well over the 150,000 cfs objective release) can be released from the main spillway without any use of the ungated spillway, allowing the *with* Marysville Dam ESRD to reduce the intensity of “emergency” spillway use, 5) no control structures susceptible to misoperation or malfunction are present on the ungated spillway, 6) the spillway lip is not on the dam, reducing the chance that loss of spillway crest control will damage the actual structure of the dam, 7) hillside geologic structure *may* prevent a loss of crest control that would jeopardize the conservation pool—seasonally 750,000 acre feet below gross pool, 9) Since levee-breaking releases would occur during a FERC IDF event, a non-catastrophic loss of crest control during the IDF would not make things much worse for the levee-protected deep-floodplain communities downstream (except for cities close to the dam such as Oroville).

Operational (as opposed to “emergency”) spillways would ordinarily be characterized in the Commission’s *Engineering Guidelines* as service or auxiliary spillways. With the operational uses called for under the current ACE FCD, the lower ten feet of the ungated spillway at Oroville Dam is best characterized as an auxiliary spillway. As described in the *Engineering Guidelines*, “Auxiliary spillways are usually designed for infrequent use, and it is acceptable to sustain *limited* damage during passage of the IDF,” which under the *Engineering Guidelines* in the case of Oroville Dam should be the Probable Maximum Flood (*emphasis added*). Presumably, under the *Engineering Guidelines*, damages from operational releases to auxiliary spillways associated with the much smaller reservoir-and-floodway design flood should be even more limited.<sup>24</sup>

As noted earlier in the Commission’s *Engineering Guidelines*, emergency spillways are contrasted with auxiliary spillways by the acceptability and lack of adverse consequences of sustaining *significant* damage when used, permitting them to possess lower structural standards than for auxiliary spillways. Service spillways are contrasted with auxiliary spillways by the requirement that they “should exhibit excellent performance characteristics for frequent and sustained flows such as *up to the 1% chance* flood event.” (*emphasis added*) Since under current ACE FCD rules, the lower 10 feet of Oroville Dam’s ungated spillway is needed to acceptably regulate the Feather River standard project flood (the largest reasonably foreseeable flood)<sup>25</sup> but,

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<sup>24</sup> *Engineering Guidelines*, pp. 2-11 & 2-19, October 1993. The hypothetical IDF(PMF) flood is so large that flood control systems are not designed to accommodate it within downstream floodways. (See next footnote.)

<sup>25</sup> *ACE Oroville Dam Reservoir Regulation Manual*, “Standard Project Flood Routings,” Chart 32. Standard Project Flood (SPF) estimates are based on a methodology developed by the ACE to establish a reasonable “worst-case” flood-magnitude estimate the purposes of sizing a floodwater-management project for an urbanized area. *ACE Engineering Manual, 1110-2-141, SPF*

by some estimates, probably not needed to pass the current estimated 1% annual chance flood flow,<sup>26</sup> an auxiliary spillway design probably best matches the nature and the consequences of use of this portion of Oroville Dam's ungated spillway. (An argument could also be made for a service spillway type design if downstream release constraints can be envisioned that result in an annual risk of usage of this spillway of greater than 1%.) For FERC spillway-design licensing and dam-safety purposes under current ACE rules, the ungated spillway does not meet the expected character or use for an emergency spillway.

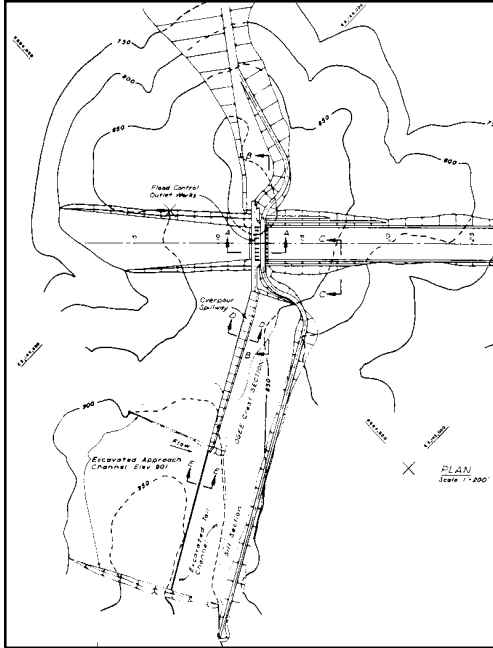
Obviously, a major issue in this relicensing is that the ungated spillway presently has the physical characteristics and consequences of use of an emergency spillway, but the required uses of an auxiliary spillway, imposing on the Commission the duty of requiring modification to the spillway.

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*Determination, SPF Methodologies, 1 March 1965.*

Probable Maximum Flood (PMF) estimates are made for the very different purpose of sizing dam outlet works for dam safety, where all estimates error on the side of overestimating potential flood magnitudes. According to the 1985 National Research Council *Safety of Dams, Flood and Earthquake Criteria* (p. 321), the PMF estimate has often been arbitrarily assigned a return period of 10,000 to 1,000,000 years at the upper and lower confidence limits of flood frequency analysis. While flood magnitudes approaching standard project floods in large West Coast watersheds have actually happened, these watersheds have not experienced flood magnitudes even close to PMFs since record keeping began. (Personal communication with U.S. Bureau of Reclamation Seismotectonics and Geophysics Section staff.) An alternative methodology of generating SPFs (rather than transpositioning historic regional record storms) is to use a PMF to SPF ratio of 2 to 1. *ACE SPF Engineering Manual*.

<sup>26</sup> *Yuba County Technical Memo*, II-3. However, the magnitude of the 1% modeled flow changes as data accumulate. 1% event flood-magnitude estimates have risen considerably during the last two decades and could again. *Improving American River Flood Frequency Analyses*, Committee on American River Flood Frequencies, National Research Council, National Academy Press, 1999, pp.73-76 & 97-100. In addition, because dam outflows may be reduced because of downstream flow targets and the effects of coordinated (or non-coordinated) operations with other dams that affect Feather River stages and flows, it is not possible to simply characterize the flow frequency of the Oroville Dam-and-floodway design flood.



**Figure 8. Lookdown View.** Main spillway gate above (with spillway extending to the right downslope). Ungated spillway below without any downslope spillway. See spillway sections used in figures 6 & 7. ACE, 1970

As noted earlier, the Commission has ample reasons to require spillway designs that limit damages associated with less frequent but still reasonably foreseeable releases—not just out of engineering preference associated with the Commission’s dam-safety program but to ensure that dam operators do not undertake actions to avoid use of auxiliary spillways when regulations and conditions call for their use. As noted earlier, operational experience and official reports on Oroville Dam’s flood operation capabilities appears to confirm the wisdom of the Commission’s

*Engineering Guidelines* on this subject. And for the licensee, the prospect of using (or avoiding the use) of an unarmored ungated spillway should not be just statistical abstraction: only eight years ago it believed that major ESRD releases were but hours away—and the licensee made over a day of releases from the main spillway in excess of the design release, avoiding combined-spillway releases, but experiencing major levee breaks downstream.

Choice of Proceedings:

Since the Commission’s *Engineering Guidelines* are intended to provide general guidance in both “the processing of applications for license and in the evaluation of dams under Part 12 [Dam Safety] of the Commission’s regulations,”<sup>27</sup> the Commission has a choice of choosing

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<sup>27</sup> *Engineering Guidelines*, Preface.

whether to achieve conformity in a licensing order or under a separate proceeding within its dam-safety program.

Since the license has just been accepted for filing and Commission regulations require that the filing “demonstrate that existing structures are safe and adequate to fulfill their stated functions,” the relicensing proceeding is a timely and appropriate proceeding to bring the licensed facility into conformity. However, if the licensing order is delayed (as it has been in some proceedings) and a series of annual licenses is contemplated, the importance of this issue would then warrant the assignment of its resolution to the most expeditious Commission decision-making proceeding—since a facility modification order could also be issued under the Commission’s dam-safety program.

Statutory Considerations Affecting Choice of Spillway Modifications:

One design approach to making the physical modifications necessary to achieve a larger flood pool at Oroville Dam is in violation of Federal law. If gates are installed on the ungated spillway, flood operations higher than 901 feet could be conducted using the main spillway. However, these gates would provide the physical facilities to impound Oroville Reservoir into the Bald Rock Canyon Wild River Zone of the Feather River wild and scenic river corridor.<sup>28</sup> The installation of such gates would require permission from the Federal Energy Regulatory

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<sup>28</sup> The Middle Fork Feather River is an original (October 2, 1968) component of the federal wild & scenic river system, included in §3(a)(3) of the Act. “*The Bald Rock Canyon Wild River Zone*, extends from Lake Oroville (900 foot elevation) upstream for a distance of about 5.4 miles through Bald Rock Canyon to the junction with an unnamed drainage on the east side of the river approximately 0.7 miles south of Milsap Bar Campground.” *Classification Analysis, River Plan, Middle Fork of the Feather, Plumas National Forest, California*, June 8, 1978.

Commission and perhaps the Army Corps of Engineers. According to Section 7(a) of the Federal Wild and Scenic Rivers Act:

The Federal Power Commission shall not license the construction of any *dam*, water conduit, *reservoir*, powerhouse, transmission line, or *other project works* under the Federal Power Act....., *on or directly affecting any river...designated in Section 3 of this Act as a component of the national wild and scenic river system....and no Department or agency of the United States shall assist by loan, grant, license, or otherwise in the construction of any water resources project that would have a direct and adverse effect on the values for which the river was designated. (Emphasis added)*

Thus, the Commission and the Corps of Engineers have no authority to permit this type of facility modification. The installation of gates on top of the now ungated “emergency” spillway (which currently defines the terminus of the wild & scenic river upstream at the elevation of the existing gross pool of Oroville Reservoir), coupled with the existing operational gates, would permit Dam operators to impound a reservoir on the existing upstream wild and scenic river corridor.

Law and policy on this matter is clear. Federal agencies with responsibility for administering the National Wild and Scenic River system have defined the “terminus of a [wild & scenic river] corridor at the [elevation] contour which coincides with the high-water mark at the normal maximum pool of the reservoir as the boundary point.”<sup>29</sup> The normal maximum (or gross) pool is the point at which the dam is no longer physically capable of impounding water. This is an important characterization, since dams that lack the physical facilities to impound water above this point may continue to “operate” such spillways, which may experience high

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<sup>29</sup> Memo from Wallace McCray, Sierra National Forest Wild and Scenic River Project Manager, to Beth Norcross, staff of the Senate Energy and Natural Resources Committee, June 5, 1987.



river flows that *flow* over the top of the dam and reservoir (i.e., the dam’s ungated spillways) without violating the federal Wilderness or Wild and Scenic Rivers Acts.<sup>30</sup> Following that reasoning, the construction of a spillway *below* a 1,730 foot long spillway lip does not *impound* a reservoir that would invade a wild and scenic river.

We commend the licensee for not proposing to undertake the construction of such facilities. We believe that the licensee made this decision in part because a variety of engineering reasons, including a preference to avoid any of the mechanical or operational problems associated with gates on spillways that also serve as an emergency spillway (consistent with concerns discussed in *Engineering Guidelines*, 2-12). Also, in a personal conversation between one of the representatives of the movants and then Department of Water Resources Director Tom Hannigan, he stated that the Department would not pursue facility modifications that would require amendments to the federal Wild and Scenic Rivers Act as part of relicensing Oroville Dam.

#### ACE Oroville Dam Reservoir Regulation Manual

The major part of the Oroville Dam Reservoir Regulation Manual FCD and flood-operations direction is devoted to describing the “*with*” Marysville Dam flood operation.

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<sup>30</sup> There are four large dams (Oroville, Don Pedro, Exchequer, and O’Shaughnessy) in California which create reservoirs that provide the terminus for protected Federal Wild and Scenic Rivers and/or wilderness areas. In each circumstance, surcharge events or operations may invade the protected area with *flowing* water, but the dams are not capable of *impounding* reservoirs above their ungated spillways. The agencies responsible for administering these protected lands and waters have taken the position that these facilities (and “operations”) do not violate the Wild & Scenic Rivers or Wilderness Acts. (Statement of Friends of the River, Hearing on HR 2431, Before the Subcommittee on National Parks and Public Lands, Committee on Interior and Insular Affairs of the House of Representatives, October, 29, 1991.)

These are circumstances that plainly never developed and are not likely to develop in the foreseeable future. In addition, the Work Group has noted the following:

“there is general agreement that the current flood control regulation manual for surcharge operations could be optimized and improved. . . . Currently contemplated revisions to the flood control manual include: 1) updating the focus . . . to reflect current (including the absence of Marysville Reservoir) re-regulating facilities on the main stem of the Yuba River, 2) possible addition of new features and refinement of the flood manual operations being examined in YCWA’s Forecast Coordinated Operations Study.<sup>31</sup>

Since the Work Group sent this letter, the licensee has begun analysis and review of potential inclusion or update of forecast-based and coordinated operations provisions of the Oroville Dam Reservoir Regulation Manual. We commend the licensee for that decision and program. However, it is unclear when or whether the licensee intends to complete its work or whether the licensee intends to make recommendations to the ACE to update the surcharge operations provisions of the Manual. Neither it is clear whether or how the ACE will respond to proposals to update its Reservoir Regulation Manuals.<sup>32</sup>

We believe that it in order to carry out the Commission’s flood-control responsibilities under §10(a)(1) and §10(a)(2)(A)(i) and §10(a)(2)(B) the Commission should direct the licensee to work with the Army Corps of Engineers and other interested parties such as the Work Group to develop revisions to the ACE Oroville Dam reservoir regulation manual concerning

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<sup>31</sup> Letter to Rick Ramirez, Manager, Oroville Facilities Relicensing Program, from the Yuba Feather Workgroup, February 19, 2003.

<sup>32</sup> As noted in Sutter County’s June 30, 2004 letter to Rick Ramirez, “[a]t the November, 2002 meeting of the Engineering and Operations workgroup, DWR did commit to asking the [ACE] to revise the operations manual for Oroville Dam based on changed conditions.” However, the County noted that “this had not been done.”

surcharge, forecast, and coordinated<sup>33</sup> operations as outlined in the Work Group’s letter. We do understand the Commission may not have the unquestioned authority to direct the ACE to achieve any specified performance deadline or outcome, but Commission direction to its licensee and encouragement to the Army Corps of Engineers, along with the Commission’s ongoing interest in a positive outcome of this process, could significantly increase the chance of a positive and expeditious outcome to the modernization of the Oroville Dam Reservoir Regulation Manual.<sup>34</sup> After all, Commission and licensee involvement could hardly make this process go slower. As noted in footnote 33 below, thirty-three years ago an important ACE publication announced that such efforts were underway and more efforts planned in the near future.

The Commission should make it clear that the purpose of updating the Oroville Dam Reservoir Regulation Manual is not to seek permission from the Corps to modify the dam and spillway to accomplish the uses already required by the ACE. Under the Federal Power Act, the

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<sup>33</sup> The 1972 ACE New Bullards Bar *Reservoir Regulation Manual* notes that “[c]urrent studies in connection with the authorized Marysville Reservoir have the objective of defining coordinated operation of New Bullards Bar and Marysville Reservoirs to achieve flood control objectives on [the] Yuba River and assist in meeting the objectives on [the] Feather River below the mouth of the Yuba River. Future studies will include coordinated system operation studies of [the] Feather River system, including Oroville Reservoir and related features, New Bullards Bar Reservoir, the authorized Marysville Reservoir, and other related flood control features to meet flood control objectives on [the] Feather River, including any related effects on Sacramento River stages and flows.” p. 30. Coordinated operations updates to flood control manuals were also a “potential system-wide measure” of the 2002 ACE/Reclamation Board *Comprehensive Study Interim Report*, p. 78. These studies and execution of manual updates have not been completed. It is not clear that any definitive studies aimed at producing a revision to the reservoir regulation manuals have even been undertaken.

<sup>34</sup> Sutter County has “again” (with requests dating back to 1997) requested that the ACE revise “the water control plan for Oroville Dam and Reservoir to account for changed conditions since 1970 and the non-existence of Marysville Dam.” *Letter to Lt. Colonel Mark Connely*, July 16, 2004.

Commission, not the ACE, has the authority and duty to its licensees to approve and require such modifications in these circumstances. Indeed, §10(b) of the Federal Power Act makes it clear that “no substantial alteration or addition not in compliance with the approved plans shall be made to any dam or other project works . . . without prior approval by the Commission. That is why we seek Commission action on the requested facility modifications in this proceeding.

### **CONCLUSION**

This motion for intervention is being submitted well before the end of the filing period to provide Commission staff and the licensee with an early presentation of this licensing issue. It is our hope that such filing will lead to a more expeditious understanding of and resolution to the matters presented in our motion. We are, of course, prepared to supplement this motion or the record in this proceeding to achieve just such an understanding and resolution of these matters.



**Figure 9. 1986 Oroville Dam main-service-spillway flood operations**

DWR

ACE required regulated design-release operational-surcharge operations would divert up to this entire flow over the ungated spillway and onto the hillside to the left of the main-service spillway. In spite of believing during the 1997 New Years Day flood that it was in hours of needing to use this unarmored "spillway without a spillway," DWR proposes to relicense Oroville Dam without constructing an auxiliary spillway to ensure such flows do not mobilize the hillside. Intervenors (in part) seek an action by the Federal Energy Regulatory Commission to require such an auxiliary spillway.

Respectfully submitted,

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## **CERTIFICATE OF SERVICE**

I hereby certify that I have this day served the foregoing documents upon each person designated on the official service list compiled by the Secretary in this proceeding.

Dated this 17th day of October 2005.

/s/

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