

STANDING INSTRUCTIONS TO THE PROJECT OPERATOR
FOR WATER CONTROL

BREA DAM

BREA CREEK

FULLERTON, CALIFORNIA

Exhibit A

to the

Water Control Manual

for

Brea Dam

Los Angeles District Office
U.S. Army Corps of Engineers

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STANDING INSTRUCTIONS TO THE PROJECT OPERATOR FOR WATER CONTROL

BREA DAM WATER CONTROL MANUAL

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1. BACKGROUND AND RESPONSIBILITIES

1.01 General Information.

(1) This exhibit is prepared in accordance with instructions contained in EM 1110-2-3600, paragraph 9-2, (Standing Instructions to Project Operators for Water Control), and EP 1110-2-240 and pertains to duties and responsibilities of the Project Operator in connection with the operation of Brea Dam and the reporting of required hydrologic data.

Operational instructions to the project operator are outlined with specific emphasis on flood emergencies when communication facilities between the project operator and the Reservoir Operation Center (ROC) have been disrupted. The exhibit is designed to be used independently as a flood control guide or in conjunction with the rest of the water control manual. To facilitate independent use of this exhibit, charts required for normal and emergency flood control operation of Brea Dam are included. They are designated as Charts A-1 and A-3.

The project operator is required to have available at the dam site, this exhibit and other manuals that complement these standing instructions. These manuals are: The current year's Orange Book - "Instructions for Reservoir Operations Center Personnel"; and the "Operation and Maintenance Manual for Brea Dam". Any deviation from the standing instructions will require the approval of the District Commander.

(2) The purpose of Brea Dam and Brea Reservoir is for flood control. Other uses and benefits of the dam and reservoir, such as recreation, are secondary. Brea Dam regulates flows on Brea Creek, and is designed to provide protection from floods for the City of Fullerton and the adjacent, highly developed, coastal plain area.

(3) Reservoir operations at Brea Dam and other Corps of Engineers facilities are conducted by the Reservoir Regulation Unit of the Reservoir Regulation Section of the Los Angeles District. Table 1-01 is an organizational chart depicting the chain of command for the reservoir operation decisions.

(4) Brea Dam is located across Brea Creek, about 6 miles above the confluence of Brea Creek and Coyote Creek. The dam, which lies within the city limits of Fullerton, is about 1/2 mile north of the intersection of Harbor Boulevard and Brea Boulevard, and about 20 miles southeast of the civic center of Los Angeles. The local project area is shown on plate 2-01.

Brea Dam consists of an earth filled embankment, with a reinforced concrete spillway and controlled outlet works. The general plan and elevation of the Dam is shown on plates 2-07 and 2-08.

(5) The physical constraints of Brea Dam are two ungated outlets at elevation 251.0 feet and the spillway crest which is at elevation 279.0 feet; flows through the ungated outlet and overtopping the spillway cannot be controlled by gate operations. The table and curves of discharge versus elevation for gated and ungated outlets are shown on plates 2-04 and 2-05. The spillway general plan and profile is shown on plate 2-06. The spillway's rating

table and curve are shown on plates 2-07 and 2-08.

The reservoir capacity below the spillway crest is 4008.5 acre-ft, which is used totally for flood control. The area and gross capacity of Brea Dam is shown on plate 2-13.

Local runoff contributes a significant flow into Brea Creek between Brea Dam and its confluence with Coyote Creek during a storm event. The reservoir releases should take into account these uncontrolled local runoff flows together with the channel capacity. The downstream Brea channel capacity varies along the length of the channel, as shown on plate 4-01. Considering the local runoff and channel capacity along Brea Creek, maximum reservoir releases are limited to 1500 cfs when spillway flow does not occur.

The trash rack occasionally becomes clogged from excess trash and debris accumulation. During the February 1986 storm, 8 feet of debris was built up, as shown in Photo 3-01. Periodic maintenance of the trash rack is required, especially after major inflows in the reservoir.

The minor constraints in the downstream channel include the following: (i) Heavy vegetation grows inside the earthen channel near Hillcrest Park, which causes a reduction in the channel capacity (see Photo 4-2); (ii) A Channel grade break at Basque Avenue, which causes backwater effect upstream, has caused debris and sedimentation accumulation at this location (see Photo 3-02); (iii) The unlined channel reach (near Hillcrest Park, between Dale Street and Stanton Avenue, and downstream from Western Avenue to the confluence with Coyote Creek) is highly susceptible to bank erosion. These sites should be monitored by channel patrols during major flows.

(6) Brea Dam is owned, operated, and maintained by the U.S. Army Corps of Engineers, Los Angeles District, which has complete regulatory responsibility.

1.02 Role of the Project Operator.

(1) Normal Conditions (dependent on day-to-day instruction).

The Project Operator (dam tender) will be instructed by the Reservoir Operations Center (ROC), as necessary, for water control actions under normal hydrometeorological conditions.

The Project Operator is responsible for the project works to insure that all the equipment is in good operating condition, and that the gates and electrical facilities in the control house are periodically inspected and tested according to the preestablished schedule.

(2) Emergency Conditions (flood or drought).

The Project Operator will be instructed by the ROC for water control actions during flood events and other emergency conditions.

The Project Operator responsibilities are:

- (1) Be present at the Dam when rainfall or runoff occurs, as instructed by the Operations Branch.
- (2) Operate the gates in accordance with instructions from the ROC.
- (3) Notify the ROC when a gate change will be required according to Chart A-1, Brea Dam Outlet Gate Operation Schedule.
- (4) Notify the ROC if unable to set the gates as instructed.
- (5) Follow the Water Control Diagram provided in Charts A-1 and A-2 in this exhibit during periods of communication disruption.

2. DATA COLLECTION AND REPORTING.

2.01 Normal Conditions.

During normal operations, from 15 November and 15 April, measurements are made daily by the Project Operator to determine the water surface elevation (staff and "tape" reading), downstream stage, incremental precipitation since last report, total accumulated precipitation, the setting of each outlet gate and the times of these measurements. For normal conditions, between 15 April and 15 November, measurements are made once a week (every Monday morning).

The Project Operator maintains the record of measurements and logs all radio and telephone communication on the following forms: Rainfall Record, SPL 31 (from manual glass readings of glass tube rain gauges), (see fig. 5-01); Record of Calls, SPL 188 (both radio and telephone, (see fig. 5-02); Flood Control Basin Operation Report, SPL 19 (prepared by each Project Operator), (See fig. 5-03); and the Record of Data from Digital Recorder, SPL 648, (see fig. A-01).

2.02 Emergency Conditions.

During flood operations or emergency operations, the Project Operator should follow instructions, as issued by the ROC. These measurements may require the staff, gauge, and instruments readings at a specified interval.

When reporting to the ROC, the Project Operator should clearly describe the silt and debris situation at the trash racks, gates and downstream gauges. When instruments are not working, or are stuck in silt, the Project Operator should not report the erroneous reading, but should rather state the instrument or staff problem. Care should be taken to avoid issuing misleading reports due to siltation at the reservoir staff boards. When debris or silt causes the flow to be deceptively perched above the invert, or cause a loss of contact with the staff board, the Project Operator should report a descriptive message identifying the limitations, and quantifying the estimated reservoir depth.

If the radio systems fail, the Project Operator should try to reestablish communication via telephone.

2.03 Regional Hydrometeorological Conditions.

The Project Operator will be informed by the ROC of regional hydrometeorological conditions that may impact the project.

3. WATER CONTROL ACTION AND REPORTING.

3.01 Normal Conditions.

During normal hydrometeorological conditions, the Project Operator will be instructed by the ROC for the appropriate water control action. The Project Operator should:

- (1) Establish communication with the ROC.
- (2) Implement instructions.
- (3) Notify the ROC on the status of the water control action.

The Project Operator cannot implement a gate change regardless if the change will have no effect on the reservoir operation. Gate setting changes may be requested by the Project Operator for maintenance, etc., but they will have to be approved by the ROC.

3.02 Emergency Conditions.

During the emergency conditions, the Project Operator will be instructed by the ROC to take the necessary water control action. During flood conditions, the Project Operator will be instructed according to Chart A-1 and will be required to notify the ROC for upcoming gate changes. The Project Operator should:

- (1) Establish communication with the ROC.
- (2) Implement the instructions.
- (3) Notify the ROC on the status of the water control action.

3.03 Inquiries.

All significant inquiries received by the Project Operator from citizens, constituents or interested groups regarding water control procedures or actions must be referred directly to the ROC.

3.04 Water Control Problems.

The ROC must be contacted immediately by the most rapid means available in the event that an operational malfunction, erosion, or other incident occurs that could impact project integrity in general or water control capability, in particular.

Emergency departures from the regulation instructions issued by the ROC may be required, because of water control equipment failures, accidents, or other emergencies requiring immediate action. Under these situations, the Project Operator should contact the ROC via radio for instructions. When communications are broken, or the situation demands immediate action, the Project Operator may proceed independently. The ROC should be notified of such action

as soon as possible. All other non-emergency deviations from normal procedure should be approved in advance by the ROC. The District Engineer, Los Angeles District, U.S. Army Corps of Engineers, may make temporary modifications to the water control regulations. Permanent changes are subject to approval by the Division Engineer, South Pacific Division, U.S. Army Corps of Engineers.

The Project Operator should immediately alert the ROC via radio channel WUK 4ROC, whenever the requested gate change cannot be fully implemented due to mechanical or physical problems. For example, debris occasionally prevents total gate closure. The ROC will evaluate the problem and provide further instructions to the Project Operator.

3.05 Communication Outage.

The ROC maintains a close contact with the Project Operator at Brea Dam. During flood periods, communication between the Project Operator and ROC may be broken. The Project Operator should try to reestablish communication through the Los Angeles County Flood Control District (WUK 4470).

During the rising stages of the flood, the Project Operator should allow a period of one hour to reestablish communication with the ROC. If after one hour of attempting to reestablish communication, the Project Operator should operate the dam according to observed precipitation and reservoir water surface elevation, utilizing Chart A-1. A summary of the Project Operator instruction is shown on Chart A-2.

Emergency notifications are normally made by the ROC. However, if the Project Operator loses communication with the ROC and an emergency notification situation arises, such as an imminent dam failure or uncontrolled spillway flow (water surface elevation above 279.0 feet), the Project Operator should make the necessary notifications. The emergency evacuation notification list is shown in table 5-01.

The notifications should include: (a) description of the type and extent of existing or impending emergency; (b) advisement for evacuation from the flood plain; (c) information on the time of initial release of hazardous amounts of water; (d) the depth of water behind the dam; and (e) the Project Operator's name and telephone number.

Upon completing the above notifications, attempt to reestablish communications with the ROC. Document all notifications made, and refer to the Orange Book (Instructions for Reservoir Operations Center Personnel) for more information on additional emergency notifications. The Project Operator should not leave the dam unless his safety is in jeopardy.

Chart A-1. Brea Dam Reservoir Regulation Schedule.

Brea Reservoir W.S. Elevation (ft., NGVD)	Precipitation at Brea Dam Station (Inches) During Preceding 30-Minute Period													
	0-0.2		0.2-0.24		0.24-0.29		0.29-0.34		0.34-0.40		0.40-0.50		0.50+	
	Gate* Opening (feet)	Release (cfs)	Gate* Opening (feet)	Release (cfs)	Gate* Opening (feet)	Release (cfs)	Gate* Opening (feet)	Release (cfs)	Gate* Opening (feet)	Release (cfs)	Gate* Opening (feet)	Release (cfs)	Gate* Opening (feet)	Release (cfs)
208	3.5	0	3.5	0	3.5	0	3.5	0	3.5	0	3.5	0	3.5	0
213	4.0	310	4.0	310	4.0	310	4.0	310	4.0	310	4.0	310	4.0	310
213-	4.0	310	4.0	310	4.0	310	4.0	310	4.0	310	4.0	310	4.0	310
215	6.3	500	6.3	500	6.3	500	6.3	500	6.3	500	6.3	500	6.3	500
215-	6.3	500	6.3	500	6.3	500	6.3	500	6.3	500	6.3	500	6.3	500
235	5.0	1,500	5.0	1,500	4.6	1,400	4.6	1,400	4.6	1,400	4.6	1,400	4.6	1,400
235-	4.8	1,450	4.6	1,400	4.6	1,400	4.3	1,300	4.3	1,300	4.3	1,300	3.9	1,200
240	4.3	1,450	4.2	1,400	4.2	1,400	3.8	1,300	3.8	1,300	3.8	1,300	3.5	1,200
240-	4.2	1,400	3.8	1,300	3.8	1,300	3.4	1,150	2.9	1,000	2.9	1,000	2.6	900
245	3.8	1,400	3.5	1,300	3.5	1,300	3.1	1,150	2.6	1,000	2.6	1,000	2.3	900
245-	3.8	1,400	3.5	1,300	2.9	1,100	2.9	1,100	2.6	1,000	2.5	950	2.3	900
251	3.5	1,400	3.2	1,300	2.7	1,100	2.7	1,100	2.4	1,000	2.3	950	2.1	900
251-	3.5	1,400	2.9	1,200	2.7	1,100	2.1	900	2.1	900	2.0	850	1.9	800
257	2.4	1,400	1.9	1,200	1.6	1,100	1.2	900	1.2	900	1.1	850	0.9	800
257-	2.4	1,400	1.9	1,200	1.5	1,050	0.9	800	0.9	800	0.9	800	0.9	800
265	2.0	1,400	1.6	1,200	1.3	1,050	0.8	800	0.8	800	0.8	800	0.8	800
265-	1.8	1,300	1.6	1,200	1.0	900	0.8	800	0.8	800	0.8	800	0.8	800
279	1.3	1,300	1.1	1,200	0.5	900	0.4	800	0.4	800	0.4	800	0.4	800
279+	0	578+	0	578+	0	578+	0	578+	0	578+	0	578+	0	578+

Note: Above schedule is based on rainfall loss rate of 0.2 in./hr. For a different loss rate, adjust the observed precipitation during preceding 30-minute period from the relation:

* Both Gates

$$P_a = P_o + 0.10 - \text{Loss Rate (in./hr.)} / 2 \quad (\text{minimum value of } P_a = 0)$$

and use the above table utilizing P_a instead of P_o (P_a = adjusted precipitation during preceding 30-minute period; P_o = observed precipitation during preceding 30-minute period)

Chart A-2. Project Operator Instructions.

1. Communication with the District Office is Available.

- a. Notify the Reservoir Operations Center when a gate change will be required according to the schedule.
- b. Notify the Reservoir Operations Center if unable to set the gates as instructed.

2. Communication with the District Office is not Available.

- a. Try to reestablish communication through the Los Angeles County Flood Control District (WUK 4470).
- b. (i) Rising Stages. Allow a period of one hour to pass to reestablish communication with the District Office. If after one hour communication is not reestablished follow Chart A-1, utilizing observed precipitation and reservoir elevation.

(ii) Falling Stages. Maintain current downstream gauge height until communication is reestablished.
- c. If one or more of the gates cannot be operated, adjust the remaining gates gradually and uniformly until the downstream gauge height agrees with scheduled values. Keep a close check on gauge height and change the gate opening as often as required. If the downstream gauge height is not obtainable, adjust the gates that are functioning so that the sum of the gate openings will equal the sum of the openings shown in the schedule

OUTLETS
(Looking Downstream)

Ungated Elev. 251.0'
3' x 2.5'

1 2 Elev. 208'
Gated
5' x 8'