

EXHIBIT A

**STANDING INSTRUCTIONS TO THE PROJECT OPERATOR
FOR WATER CONTROL**

PRADO DAM

SANTA ANA RIVER

RIVERSIDE COUNTY, CALIFORNIA

Los Angeles District Office

U.S. Army Corps of Engineers

September 1991

STANDING INSTRUCTIONS TO THE PROJECT OPERATOR
FOR WATER CONTROL

PRADO DAM WATER CONTROL MANUAL

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A-01	Prado Dam Reservoir Regulation Schedule
A-02	SPL Form 31: Rainfall Record and SPL Form 188: Record of Calls

I - BACKGROUND AND RESPONSIBILITIES

1-01 General Information.

a. General. 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 ER 1110-2-240. This exhibit outlines the duties and responsibilities of the Project Operator in connection with the operation of Prado Dam and the reporting of required hydrologic data.

Operational instructions to the project operator are outlined with specific emphasis on flood emergencies when communication 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. Plate A-01 is the Reservoir Regulation Schedule for Prado Dam. Regulation for both Normal Communication and No-Communication situations are outlined.

The project operator is required to have these standing instructions and the following two manuals available at the dam site: 1) the current year's Orange Book - "Instructions for Reservoir Operations Center Personnel"; and 2) the "Operation and Maintenance Manual for Prado Dam". Any deviation from the standing instructions will require the approval of the District Commander.

b. Project Purpose. The primary purpose of Prado Dam and Reservoir is flood control. Other uses and benefits of the dam and reservoir, such as water conservation, are secondary. Prado Dam regulates flows on the Santa Ana River, and is designed to provide protection from floods for the metropolitan areas of Orange County.

c. Reservoir Regulation. Regulation of Prado Dam and other Corps of Engineers facilities within the watershed is conducted from the Reservoir Operations Center which is staffed by water control managers from the Reservoir Regulation Section of the LAD. Table 9-1 is an organizational chart depicting the chain of command for reservoir regulation decisions.

d. Project Location. Prado Dam is located on the lower Santa Ana River, approximately 30.5 miles upstream of the Pacific Ocean. The dam is in Riverside County, California approximately 2 miles west of the City of Corona. Portions of the flood control basin are in Riverside County and San Bernardino County. The Santa

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Ana River watershed has an area of 2,450 sq-mi of which 92% of the watershed (i.e., 2,255 sq-mi) is located upstream of Prado Dam (as shown on Plate 2-01).

e. Project Description. Prado Dam consists of an earth-filled embankment, with a reinforced concrete spillway and gated outlet works. The general plan and elevation of the dam are shown on plates 2-02 and 2-03.

Prado Dam has six gated outlets with an invert elevation at 460-ft and a broad-crested ogee spillway with a crest at elevation 543-ft. The discharge rating curves for the gated outlets and the spillway are shown on plates 2-06a-d and 2-07, respectively. The spillway general plan and profile is shown on plate 2-05.

The reservoir capacity below the spillway crest is 196,235 ac-ft, which is fully available for flood control. The area and gross capacity relationships of the Prado Flood Control Basin are shown on plates 2-08 and 2-09.

f. Downstream Channel Constraints. Local runoff can significantly contribute to flows in the Santa Ana River between Prado Dam and the Pacific Ocean during a storm event. The reservoir releases should take into account these uncontrolled local runoff flows together with the downstream channel capacity. The downstream Santa Ana River channel capacity varies along the length of the channel, as shown on plate 4-21a-b. Considering the local runoff and channel capacity along the Santa Ana River, the maximum controlled release is limited to 5,000 cfs when spillway flow does not occur.

When flows exceed 2,500 cfs, the Green River Golf Course and Featherly Park are adversely affected. Also, scour and bank erosion problems exist in the Santa Ana River Channel when large flows exceed 2,500 cfs for extended periods of time.

See section 7-02 for detailed information on downstream constraints to the operation of Prado Dam.

g. Ownership. Prado 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.

a. Normal Conditions (dependent on day-to-day instruction). The Project Operator (dam tender) will be instructed by the ROC, as necessary, for water control

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actions under normal hydrometeorological conditions.

The Project Operator is responsible for the project works. This includes insuring 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.

b. Emergency Conditions (flood or drought). The Project Operator will be instructed by the ROC regarding water control actions during flood events and other emergency conditions.

The Project Operator's responsibilities include:

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 Plate A-01, Prado Dam Reservoir Regulation Schedule.
4. Notify the ROC if unable to set the gates as instructed.
5. Follow the No-Communication Reservoir Regulation Schedule (Plate A-01) when communication is lost between the project and the ROC for more than four hours.
6. Notify the ROC if any unusual or emergency situations arise or are observed with regard to the dam, reservoir area, or downstream channel.

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II - DATA COLLECTION AND REPORTING.

2-01 Normal Conditions. During normal operations, from 15 November to 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 to 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 Form 31 (Plate A-02; for manual glass readings of glass tube rain gauges); Record of Calls, SPL Form 188 (Plate A-02; both radio and telephone); and the Flood Control Basin Operation Report, SPL Form 19 (Plate 5-04).

2-02 Emergency Conditions. During flood operations or emergency operations, the Project Operator should follow instructions, as issued by the ROC. Measurements may be required at intervals as short as ten minutes from the staff gage, and other instruments as specified by the ROC personnel.

When reporting to the ROC, the Project Operator should clearly describe any silt and debris situation at the trash racks, gates and downstream gages. When instruments are not working, or are stuck in silt, the Project Operator should not report the erroneous reading, but should 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 cause 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 system fails, 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.

III - 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 should not implement any gate change, even if the change will have no effect on the reservoir operation without first obtaining approval from the ROC. 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 emergency conditions, the Project Operator will be instructed by the ROC regarding any necessary water control action. During flood conditions, the Project Operator will be instructed according to Plate A-01 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.

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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 (call sign WUK 4ROC) via radio, whenever the requested gate change cannot be fully implemented due to mechanical or physical problems. For example, debris could prevent total gate closure. The ROC will evaluate the problem and provide further instructions to the Project Operator.

3-05 Communication Outage. The ROC maintains close contact with the Project Operator at Prado dam. During flood periods, communication between the Project Operator and ROC may be broken. The Project Operator should try to reestablish communication first by telephone at the project and then second through the Orange County Environmental Management Agency at (714) 567-6300. The project operator should not leave the immediate vicinity of the project.

During the rising stages of the flood, the Project Operator should allow a period of four (4) hours to reestablish communication with the ROC. If communication cannot be reestablished after four (4) hours the Project Operator should follow the No-Communication Reservoir Regulation Schedule as outlined on Plate A-01.

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 543-ft), the Project Operator should make the necessary notifications. The notification list for WSE's approaching 543-ft are given in the Prado Appendix of the "Instructions for Reservoir Operations Center Personnel" (i.e., the "Orange Book").

The notifications should include: (a) description of the type and extent of existing or impending emergency; (b) advisement for evacuation from the flood plain;

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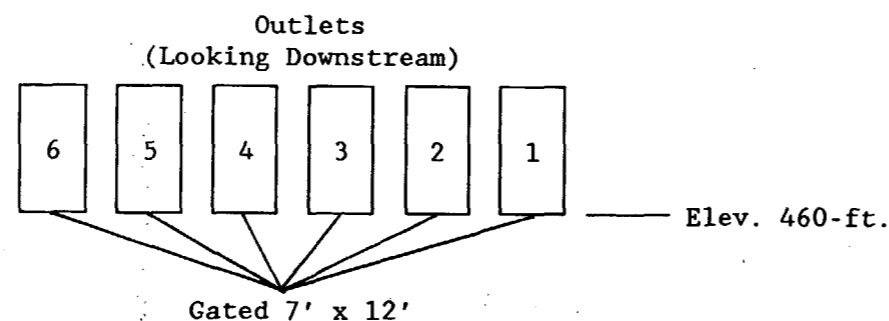
(c) information on the estimated time of initial release of hazardous amounts of water; (d) the depth of water behind the dam; and (e) the Project Operator's name and telephone number.

Upon completing the above notifications, attempt to reestablish communications with the ROC. Document all notifications made on SPL Form 188 (Plate A-02), 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.

RESERVOIR REGULATION SCHEDULE
PRADO DAM

(RISING AND FALLING STAGES)

NORMAL COMMUNICATION Between the ROC and Dam Tender		NO COMMUNICATION Between the ROC and Dam Tender								
Desired Discharge Range (cfs)	Recommended Gate Settings	Reservoir Water Surface Elevation (ft)	Recommended Gate Settings (ft)						Computed Discharge Range (cfs)	Downstream Gage Height (Rating #20) (ft)
			#1	#2	#3	#4	#5	#6		
0 - 500	Gate settings are determined by Water Control Manager at the ROC. RESCAL and/or Gate Rating Curves are used to prepare the gate settings.	460.0 - 490.0	0.0	0.0	1.0	1.0	0.0	0.0	0 - 540	1.60 - 3.87
200 - 2,500		490.0 - 494.0	0.0	0.0	1.0	0.9	0.0	0.0	513 - 547	3.82 - 3.88
2,500 - 5,000 Water Control Manager determines the actual release rate.		494.0 - 497.0	0.0	1.3	1.4	1.4	1.3	0.0	1,515 - 1,582	4.87 - 4.92
		497.0 - 500.0	1.4	1.3	1.4	1.4	1.3	1.4	2,400 - 2,504	5.40 - 5.46
		500.0 - 504.0	1.6	1.6	1.6	1.6	1.5	1.6	2,861 - 3,009	5.63 - 5.69
		504.0 - 508.0	1.6	2.0	1.8	1.8	2.0	1.6	3,370 - 3,527	5.85 - 5.91
		508.0 - 512.0	2.2	2.0	1.8	1.8	2.0	2.2	3,869 - 4,052	6.04 - 6.11
		512.0 - 516.0	2.2	2.2	2.1	2.1	2.2	2.2	4,360 - 4,531	6.22 - 6.28
		516.0 - 520.0	2.2	2.9	2.1	2.1	2.9	2.2	4,960 - 5,139	6.42 - 6.47
		5,000 Use the NO COMMUNICATION schedule located to the right.	520.0 - 525.0	2.0	2.9	2.0	2.0	2.9	2.0	4,942 - 5,155
525.0 - 533.0	2.0		2.0	2.0	2.0	2.9	2.0	4,860 - 5,150	6.39 - 6.48	
533.0 - 543.0	2.0		2.0	2.0	2.0	2.0	2.0	4,830 - 5,150	6.39 - 6.48	
SPILLWAY FLOWS	2.0		0.5	2.0	2.0	0.5	2.0	3,896 - 5,806	6.05 - 6.67	
543.0 - 543.6	0.0		0.5	2.0	2.0	0.5	0.0	4,086 - 5,355	6.12 - 6.54	
544.0 - 544.3	0.0		0.0	2.0	2.0	0.0	0.0	4,884 - 5,187	6.39 - 6.49	
> 5,000		544.3 - ABOVE	0.0	0.0	0.0	0.0	0.0	4,960 - ABOVE	6.40 - +	



DAM TENDER INSTRUCTIONS

1. **NORMAL COMMUNICATION** between the ROC and Dam Tender.
 - a. The Reservoir Operations Center will provide gate settings to the dam tender in accordance with the NORMAL COMMUNICATION schedule.
 - b. Notify the Reservoir Operations Center if unable to set the gates as instructed.
2. **NO COMMUNICATION** between the ROC and Dam Tender.
 - a. Try to reestablish communication through the Orange County Environmental Management Agency's (OCEMA) Storm Operations Center via telephone at (714) 567-6300.
 - b. Attempt to reestablish communication with the District Office for a period of four (4) hours. If after four (4) hours, communication cannot be reestablished, follow the "NO-COMMUNICATION" schedule.
 - c. When making gate changes, make sure that the "Gate Change Restrictions" as described in the following table are not exceeded.

Maximum Permissible Rate of Release Change at Prado Dam

Current Release (cfs)	Maximum rate of Change per 1/2 hour (cfs)
0 - 300	100
300 - 1,000	250
1,000 - 2,500	400
2,500 - 5,000	625

PRADO DAM
SANTA ANA RIVER, CALIFORNIA
WATER CONTROL MANUAL

PRADO DAM
RESERVOIR REGULATION
SCHEDULE

U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

