

Exhibit A

Standing Instructions To The Project Operator
For Water Control

Alamo Dam and Lake
Bill Williams River Basin

Lower Colorado River System

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

February 2002

EXHIBIT A
STANDING INSTRUCTIONS TO THE PROJECT OPERATOR
FOR WATER CONTROL
ALAMO DAM

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 ER 1110-2-240. The exhibit pertains to the duties and responsibilities of the Project Operator, in connection with the operation of Alamo 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. This 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, a chart required for normal and emergency flood control operation of Alamo Dam is included. This chart is shown on Plate A-01.

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 "Instructions for Reservoir Operations Center Personnel" (the "Orange Book") and the "Operation and Maintenance Manual for Alamo Dam". Any deviation from the Standing instructions will require the approval of the District Commander.

(2) The authorized purposes of Alamo Dam and Lake are flood control, water conservation, recreation, and fish and wildlife conservation.

(3) Reservoir operations at Alamo Dam and other Corps of Engineers facilities are conducted by the Reservoir Regulation Unit of the Reservoir Regulation Section of the Los Angeles District. Plate A-02 is an organizational chart depicting the chain of command for the reservoir operation decisions.

(4) Alamo Dam is located on the Bill Williams River, 39 miles upstream from its confluence with the Colorado River at Lake Havasu. The dam is on the border of the La Paz and Mohave Counties, Arizona, about 2.5 miles downstream from the Alamo Crossing (Refer to Plate 2-01 in the Water Control Manual). Main access is from the town of Wenden, on U.S. Highway 60, approximately 36 miles south of the reservoir. The geographic coordinates of the dam are 34°13'55"N latitude and 113°36'29"W longitude.

Alamo Dam is a zoned earthfill embankment structure with a detached spillway located in the right abutment. The outlet works, located near the left abutment of the dam, consist of a concrete-lined tunnel 12 feet in diameter, and 3 pairs of slide gates installed in tandem.

(5) Major constraints and issues concerning operation of Alamo Dam are 1) downstream streambed crossing inundation, and 2) hydrogen-sulfide in the outlet works gate chamber.

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

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1.02 Role of the project Operator.

(1) Normal Conditions (Dependent Day-to-Day Instructions).

The Project Operator (dam tender) will be directed 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 ensure 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 pre-established schedule.

(2) Emergency Conditions (Flood or Drought).

The Project Operator will be directed 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 instruction from the ROC.
- 3) Notify the ROC when a gate change will be required according to Plate A-01, Alamo Dam Reservoir Regulation Schedule.
- 4) Notify the ROC if unable to set the gates as instructed.
- 5) Follow the Water Control Diagram provided in Plate A-01 in this exhibit during any period of extended communication (longer than 24 hours) disruption. During short-term communication (less than 24 hours) disruptions, follow the most recent instructions

from the ROC. Make every possible effort to re-establish communications with the ROC before undertaking any independent action.

6) Assist engineers dispatched by the ROC during flood emergencies in every way possible.

7) Maintain routine records such as water surface elevation, outflow gate heights, precipitation amounts, gate openings, and a daily log on prescribed forms.

8) Notify local authorities and interested agencies of anticipated releases from the reservoir when instructed to do so by the ROC or if communications are interrupted.

9) Obtain hydrologic and hydraulic data from other agencies upon request of the ROC.

2. DATA COLLECTION AND REPORTING.

2.01 Normal Conditions.

During normal operations, the following items are recorded by the Project Operator on a daily basis: reservoir water surface elevation (both staff and tape readings), the gage height from USGS Gage No. 09426000 (both staff and tape readings), incremental precipitation, the hook gage reading (used to compute reservoir evaporation), gate settings, flow through the 18-inch low flow valve, and current, minimum and maximum daily evaporation pan temperatures.

The Project Operator maintains the record of measurements and logs all radio and telephone communication on the following forms: Flood Control Basin Operation Report (SPL 19) prepared by each Project Operator; Rainfall Record (SPL 31) from manual glass readings of glass tube rain gages; and Record of Calls (SPL 188) for both radio and telephone communications. Examples of these forms are shown on Figures A-1, A-2, and A-3, respectively.

2.02 Emergency Conditions.

During flood operations the Project Operator should follow instructions, as issued by the ROC. Measurements of the reservoir water surface and USGS gage readings may be required at a specified time interval.

When reporting to the ROC, the Project Operator should clearly describe any wave action on the reservoir water surface, and any silt and debris situation at the downstream gage. 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.

2.03 Regional Hydrometeorological Conditions.

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

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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 may not independently implement any gate change, even if the change will have no effect on the reservoir operation. The Project Operator may request gate-setting changes (e.g. for purposes of maintenance), however, they need to be approved in advance by the ROC.

3.02 Emergency Conditions.

During 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 by 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.

(4) If communications are disrupted between the ROC and the Project Operator, the Project Operator must follow the procedures in step 5) of Section 1.02(2) within this Exhibit.

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, without attempting to answer such inquiries.

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 or telephone 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 procedures covered by this water control manual must be approved in advance by the Division Engineer, South Pacific Division, U.S. Army Corps of Engineers.

The Project Operator should immediately alert the ROC whenever a requested gate change cannot be fully implemented due to mechanical or physical problems. The ROC will evaluate the problem and provide further instructions to the Project Operator.

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3.05 Communication Outage.

The ROC maintains close contact with the Project Operator at Alamo Dam. During flood periods, communication between the Project Operator and ROC may break down. The project Operator should try to re-establish communication through the radio network or by any other means available.

If the Project Operator is unsuccessful in re-establishing communications with the ROC, the Project Operator should not make any changes in gate settings for 24 hours, should the communication outage last that length of time, or longer.

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 spillway flow, the Project Operator should make the necessary notifications, if possible. The emergency evacuation notification list is contained in the “Instructions for Reservoir Operations Center Personnel” (the “Orange Book”). The notifications should include:

- (1) description of the type and extent of existing or impending emergency.
- (2) advisement for evacuation from the flood plain.
- (3) information on the time of initial release of hazardous amounts of water.
- (4) the reservoir water surface elevation
- (5) the project Operator’s name and telephone number.

Upon completing the above notifications, attempt to re-establish communications with the ROC. Document all notifications made, and refer to the “Orange Book” for more information on additional emergency notifications. The Project Operator should be not leave the dam unless his/her safety is in jeopardy. The Project Operator’s safety is presumed to be in jeopardy if the reservoir water surface elevation rises above 1259.6 feet.

RAINFALL RECORD

STATION					<input type="checkbox"/> HOURLY <input type="checkbox"/> DAILY	DATE	
HR	DAY	TIME OF READING	GAGE READING	STORM TOTAL	SEASON TOTAL	OBSERVER	REMARK (SNOW, TEMP, ETC.)
0000	1						
0100	2						
0200	3						
0300	4						
0400	5						
0500	6						
0600	7						
0700	8						
0800	9						
0900	10						
1000	11						
1100	12						
1200	13						
1300	14						
1400	15						
1500	16						
1600	17						
1700	18						
1800	19						
1900	20						
2000	21						
2100	22						
2200	23						
2300	24						
2400	25						
	26						
	27						
	28						
	29						
	30						
	31						
TOTAL							

Release Schedule

Lake Water Surface Elevation (ft, NGVD)	Spillway Discharge (cfs)	Use Non-Spillway Flow Transfer Option		
		Outlet Works Discharge (cfs)	Total Discharge (cfs)	Recommended Gate Setting (ft)
1250 - 1265 ¹	15,625 - 56,000	9,198	24,604 - 65,198	6.8
1244.3 - 1250	7,000 - 15,625	8,979	15,899 - 24,604	6.8
1244.3	7,000	8,874	15,899	6.8
1244	6,650	8,869	15,519	6.8
1243	5,400	8,850	14,250	6.8
1242	4,350	8,832	13,182	6.8
1241	3,300	8,814	12,114	6.8
1240	2,500	8,795	11,295	6.8
1239	1,700	8,779	10,479	6.8
1238	1,200	8,763	9,963	6.8
1237	700	8,747	9,447	6.8
1236	350	8,731	9,081	6.8
1235 (Spillway crest)	0	8,715	8,715	6.8
		Discharge (cfs)		Recommended Gate Setting (ft)
1148.4 ² - 1235		7,000		6.80 - 5.0 (3 gates)
1132 - 1148.4		6,621 ³ - 7,000		6.80 (3 gates)
1131 - 1132		6,000		5.75 (3 gates)
1130 - 1131		5,000		4.65 (3 gates)
1129 - 1130		4,000		3.65 (3 gates)
1128 - 1129		3,000		2.70 (3 gates)
1127 - 1128		2,000		1.75 (3 gates)
1126 - 1127		1,000		1.30 (2 gates)
1125 - 1126		Transition up to 1,000 cfs		0 - 1.3 (2 gates)
1100 - 1125 ⁴	40 cfs	25 cfs	40 cfs	50 cfs
1070 - 1100 ⁴	15 cfs	10 cfs	25 cfs	25 cfs
990 - 1070	10 cfs	10 cfs	10 cfs	10 cfs

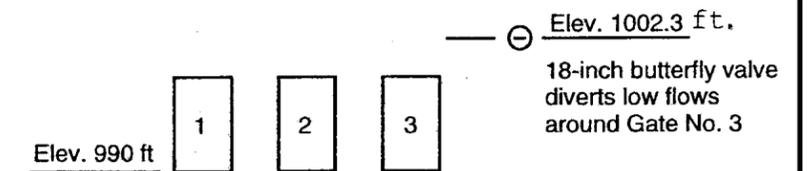
Oct 1 Nov 1 Feb 1 May 1 Oct 1

Season of Year applies to riparian base flows only (shaded area).^{4,5}

Maximum Rate of Release Increase

Release Range (cfs)	Rate of Increase (cfs/hr)
0 - 500	250
500 - 1,000	500
1,000 - 3,000	1,000
3,000 - 7,000	2,000

OUTLET WORKS DIAGRAM
(Looking Downstream)



All outlet gates 5.5 ft W x 8.5 ft H

When service gates are in use, butterfly valve is closed

Notes:

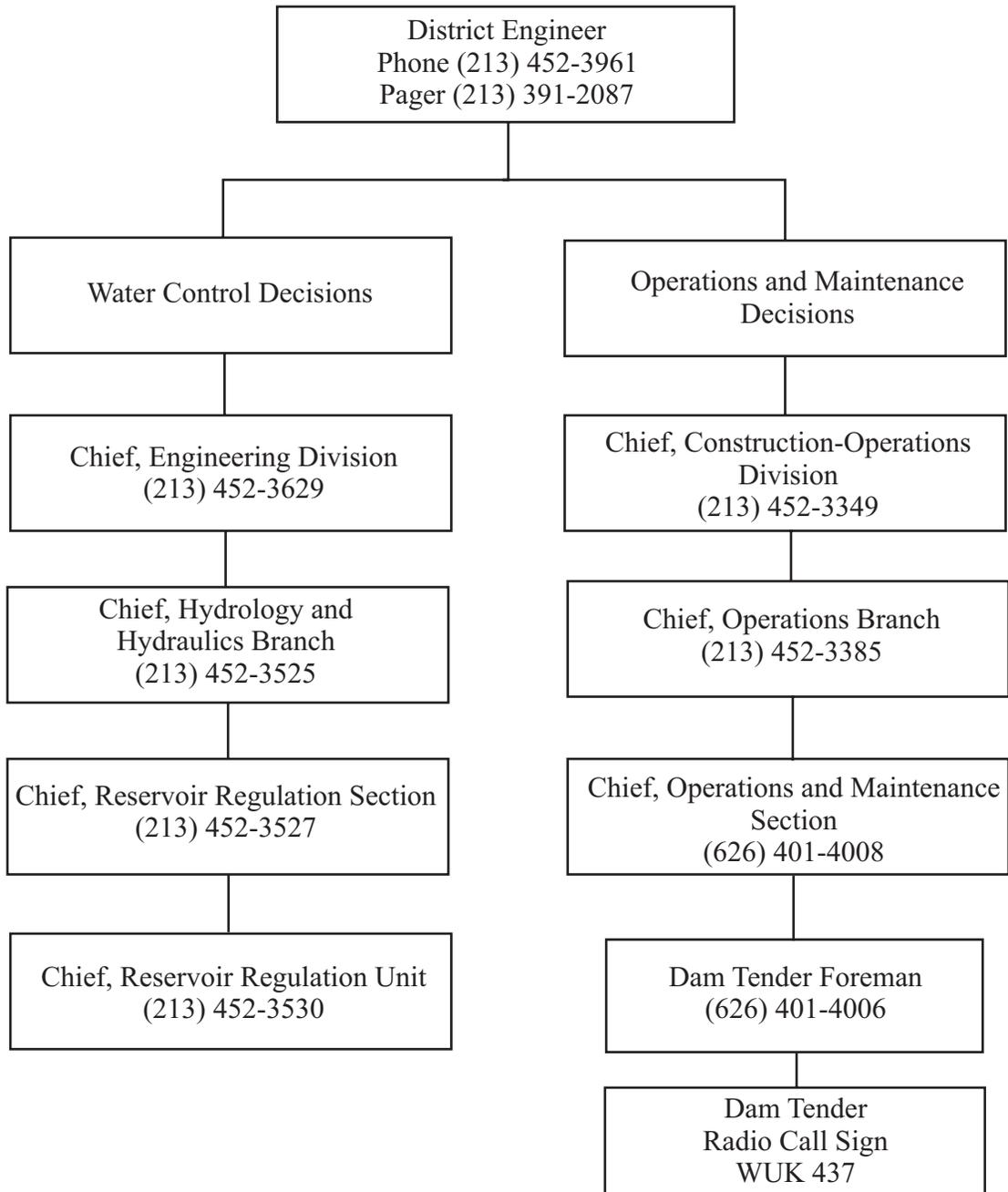
1. Top of dam.
2. Minimum elevation at which 7,000 cfs can be released (3 gates at 6.80 feet opening).
3. Maximum outflow at elevation 1132 feet (3 gates at 6.80 feet opening).
4. Riparian release shown in shaded area that are above 10 cfs are maximum. Smaller releases can be made with agreement by the Bill Williams River National Wildlife Refuge Manager.
5. Riparian releases could be temporarily interrupted to allow inspection and/or maintenance. Compensatory releases should be made to maintain the scheduled daily average release rate. Coordination with the resource agencies and other interested parties should be made.

General Notes:

1. Project Operator is to maintain the last gate settings provided by the Reservoir Operations Center (ROC) for a period of 24 hours following loss of communication with the ROC. If Project Operator is unable to reestablish communication with the ROC for 24 hours, then the Project Operator shall use this reservoir operation schedule for project gate settings.
2. When reservoir water surface exceeds elevation 1259.6 feet, Project Operators are to leave dam for their safety.

ALAMO DAM AND LAKE BILL WILLIAMS RIVER, COLORADO RIVER BASIN, ARIZONA WATER CONTROL MANUAL
RESERVOIR OPERATION SCHEDULE (DURING LOSS OF COMMUNICATION BETWEEN ROC AND DAMTENDER)
U.S. ARMY CORPS OF ENGINEERS LOS ANGELES DISTRICT

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



ALAMO DAM AND LAKE
BILL WILLIAMS RIVER, COLORADO RIVER BASIN, ARIZONA
WATER CONTROL MANUAL

**CHAIN OF COMMAND FOR
RESERVOIR OPERATION
DECISIONS**

U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT