

STANDING INSTRUCTIONS TO THE DAM OPERATOR

CARBON CANYON DAM

CARBON CANYON CREEK

San Gabriel River Basin

Exhibit A
to the
Water Control Manual for
Carbon Canyon Dam

U.S. Army Corps of Engineers
Los Angeles District

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STANDING INSTRUCTIONS TO THE DAM OPERATOR

CARBON CANYON DAM

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STANDING INSTRUCTIONS TO THE PROJECT OPERATOR
FOR WATER CONTROL

CARBON CANYON DAM

A-I. BACKGROUND AND RESPONSIBILITIES.

1-01 General Information.

This exhibit is prepared in accordance with instruction contained in EM 1110-2-3600, paragraph 9-2 (Standing Instructions to the Project Operator for Water Control), and ER 1110-2-240, and pertains to duties and responsibilities of project operators (dam tenders) associated with the operation of Carbon Canyon Dam.

Operational instructions to dam tenders are outlined with specific emphasis on flood emergencies when communication between the dam tender and the Reservoir Operations Center (ROC) have been disrupted. This exhibit is designed to be used as an operational guide for the dam tender to use in implementing the Carbon Canyon Regulation Schedule (found at the end of this exhibit). Associated plates are contained in the main body of the water control manual.

The dam tender is required to have available at the damsite this water control manual and exhibit, and the current version of other manuals that complement these standing instructions. These manuals are: (a) "Instructions for Reservoir Operations Center Personnel" (the "Orange Book"); (b) "Operation and Maintenance Manual for Carbon Canyon Dam"; and (c) "Carbon Canyon Dam Emergency Plan." Any deviation from standing instructions will require approval of the District Commander.

The primary purpose of Carbon Canyon Dam is to regulate flood flows down Carbon Canyon Creek, thereby minimizing flood damage in the flood plain downstream of the dam. The protected areas include the cities of Brea, Fullerton, Placentia, and Anaheim, as well as portions of the coast plain in Orange County.

Table 9-01 is an organizational chart depicting the chain of command for reservoir regulation decisions.

Gate operation instructions to the dam are issued by ROC. Dam tenders are part of the Operations Branch, Construction-Operations Division.

Carbon Canyon Dam is located on Carbon Canyon Creek near the northern edge of Orange County, as seen on plate 1-1. The dam is situated approximately 12 miles north of the city of Santa Ana and 4 miles east of the city of Brea. Carbon Canyon Dam consists of an earthfill embankment with outlet works and a detached spillway. A general plan of Carbon Canyon Dam is shown plate 2-3.

Carbon Canyon Dam is owned, operated, and maintained by the U.S. Army Corps of Engineers, Los Angeles District, which has complete regulatory responsibility. Carbon Canyon Dam is operated for local flood control on Carbon Canyon Creek.

1-02 Role of the Project Operator.

a. Normal (Non-Food) Conditions. The dam tender will be instructed by ROC, as necessary, for water control actions under normal conditions. The dam tender will verify that all equipment at the project is in good operating condition; test- gates and electrical facilities in the control house and inspect all structures and equipment according to schedule; and refer to the Operation and Maintenance Manual for instructions on actual operation procedures for all equipment.

b. Emergency Conditions. The dam tender will be pre-sent at the dam during periods of significant runoff, as instructed by the Operations Branch: operate the dam in accordance with instructions from ROC; and follow the Reservoir Regulation Schedule provided in this exhibit during periods of communication disruption.

A-II. DATA COLLECTION AND REPORTING.

2-01 Normal (Non-Flood) Conditions.

During normal conditions, measurements are made daily at 0800 hours local time by the dam tender to determine reservoir staff reading (water surface elevation), float well or manometer gauge "tape" reading, incremental precipitation since last report, total accumulated precipitation for the season, the settings of each outlet gate, and the times of these measurements. This information will be logged on the appropriate forms and reported by radio to ROC, radio call sign WUK 4ROC, as requested.

The dam tender will also maintain records, including water surface elevations, downstream gauge heights, precipitation amounts, outlet gate settings, and log all radio and telephone communications on forms prescribed below.

a. The Record of Calls Form (SPL-188). This form is used each time a message is transmitted or received by radio or telephone. The purpose of every call will be noted, whether for radio check, reservoir report, etc.

b. Flood Control Basin Operation Report Form (SPL-19). The dam tender should log all of the information on this form each time a water surface elevation measurement is taken or a gate change has been completed.

c. Rainfall Record Form (SPL-31). This form should be filled in each time a rainfall measurement is taken from a glass tube rainfall gauge.

d. Record of Data from Digital Recorders (SPD-648). This forms is used to tabulate water surface, downstream gauge height, and precipitation data from digital recorders.

All of these forms should be submitted monthly to the Water Control Data Unit CESPL-ED-HR (Baseyard) of ROC for archival storage. A copy of each of these forms is included in the Carbon Canyon Dam Water Control Manual in figures 9-01, 9-02, 9-04, and 9-06.

2-02 Emergency Conditions.

During flood events, the dam tender should follow instructions as issued by ROC on measurement type and frequency. Due to the speed with which events may occur at Carbon Canyon Dam, measurements at fifteen minute intervals are often necessary. When reporting to ROC, the dam tender should clearly describe the silt and debris situation at the rack bars, gates, and downstream gauge. When instruments are not working or are stuck in the silt, the dam tender 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 flows to be deceptively perched above the invert, or cause a loss of contact with the staff board, the dam operator should report a descriptive

message identifying on the radio the limitations, and quantifying the estimated reservoir depth. If the radio system, including the dam tender's mobile unit, malfunctions, ROC will contact the dam tender via telephone. It is especially important to maintain all records generated above during emergency conditions.

2-03 Regional Hydrometeorological Conditions.

The dam tender will be informed by ROC of regional hydro-meteorological conditions that could impact Carbon Canyon Dam.

A-III. WATER CONTROL ACTION AND REPORTING.

3-01 Normal (Non-Flood) Conditions.

Except during times of emergency when fast action is critical, ROC must approve all gate changes. ROC will originate the request for a gate change, and will provide settings for each gate whenever a gate change is necessary. Generally, gates will be set according to the instructions given in this exhibit. The dam tender should implement gate changes immediately following. The dam should implement gate changes immediately following acknowledgment of instructions. Delaying a gate change may have serious impacts on affected activities. If other concurrent activities cause a delay in implementation of a gate change, the dam tender should notify ROC by calling radio call sign WUK 4ROC and request guidance.

Once a gate change is completed, the dam operator should radio back to ROC on WUK 4ROC to report the time the change was completed, the staff and tape readings, the downstream gauge height, and the current settings of both gates.

The two vertical lift gates are hydraulically operated from the control house. The dam operator should refer to the O&M Manual for instructions on actual operating procedures.

3-02 Emergency Conditions.

During flood events and other emergency conditions, water control actions and reporting are vital to the successful operation of the dam.

If flooding conditions or some other emergency occurs at the dam, the dam tender should notify ROC as soon as possible with a description of the conditions.

During an emergency condition, such as a hazardous chemical spill or potential drowning where immediate action is necessary, the dam tender should make the appropriate gate changes and report in to ROC as soon as possible.

During a flood event, ROC will initiate gate changes, as is done during normal (non-flood) conditions. The dam tender will implement the gate change and report back the same information as during normal (non-flood) conditions.

ROC will keep the dam tender apprised of regulation objectives and critical regulation constraints whenever possible. This will afford the dam tender a greater opportunity to recognize and identify potential problems in the field. ROC may also provide additional water surface elevation criteria, instructing the dam tender to alert them via radio channel WUK 4ROC when the reservoir pool reaches the indicated level. Such an action would normally be conducted during periods of intense storm runoff, and would require the dam tender to remain at the control house.

3-03 Inquiries.

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

3-04 Water Control Problems.

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 operation instructions issued by ROC may be required, because of equipment failures, accidents, or other emergencies requiring immediate action. Under these situations, the dam tender should contact ROC via radio for instructions. When communications are broken and the situation demands immediate action, the dam tender may proceed independently. ROC should be notified of such actions as soon as possible. All other emergency deviations from normal procedure should be approved in advance by 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 dam tender should immediately alert ROC via radio channel WUK 4ROC whenever the requested gate change cannot be fully implemented due to mechanical or other physical problems. For example, debris will occasionally prevent total gate closure. ROC will evaluate the problem and provide further instructions to the dam tender.

3-05 Communication Outage.

Coordination of flood control regulation is under the direction of ROC. During flood periods, close contact will be maintained between operating personnel at Carbon Canyon Dam and ROC. If communication is broken between the dam tender and ROC, initially continue releases in accordance with the last instructions from ROC, and make every attempt to re-establish communications. If this effort is unsuccessful for one hour, the dam operator will follow Instruction 2 of the Reservoir Regulation Schedule in this exhibit.

Emergency notifications are normally made by ROC. However, if the dam tender loses communications with ROC, and an emergency notification situation arises, such as an imminent dam failure or uncontrolled spillway flow (water surface elevation above 475 feet NGVD), the dam tender should make the necessary notifications.

The parties listed below are to be immediately notified upon declaration of an uncontrolled emergency:

Orange County Communications Center	(714) 834-2127
Placentia Police Department	(714) 993-8151
Fullerton Police Department	(714) 738-6719
California Office of Emergency Services, Sacramento	(916) 791-4305

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

Upon completing above notifications, attempt to re-establish communications with 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 dam tender should not leave the dam unless his or her safety is in jeopardy.

Carbon Canyon Dam Reservoir Regulation Schedule
(For rising and falling stages)

DAM OPERATOR INSTRUCTIONS

Step No.	When reservoir water surface is between elevations		Gate setting for gates as indicated		Computed discharge	Downstream gauge height***
			No. 1	No. 2		
	Feet above mean sea level		Feet of opening	Feet of opening	Cubic feet per second	Feet
<u>Follow steps 1A to 1D during rising stages</u>						
1A.....	403 - 419		0.5*	0	0 - 50	2.00 - 2.71
1B.....	419 - 420		.3	.3	70 - 75	2.80 - 2.82
1C.....	420 - 421		.6	.6	140 - 145	3.08 - 3.11
1D.....	421 - 425		.9	.9	230 - 250	3.58 - 3.68
<u>Follow step 2 during falling stages</u>						
2.....	403 - 425		.9	.9	0 - 250	2.00 - 3.68
<u>Follow steps 3 to 13 during rising or falling stages</u>						
3.....	425 - 426		1.4	1.4	375 - 380	4.29 - 4.32
4.....	426 - 431		1.9	1.9	500 - 570	4.87 - 5.18
5.....	431 - 455		2.4	2.4	719 - 1,000	5.83 - 7.00
6.....	455 - 465		2.2	2.2	900 - 1,000	6.59 - 7.00
7.....	465 - 475**		2.0	2.0	900 - 1,000	6.59 - 7.00
8.....	475 - 475.3		1.8	1.8	900 - 1,000	6.59 - 7.00
9.....	475.3 - 475.8		1.7	1.7	900 - 1,000	6.59 - 7.00
10.....	475.8 - 476.1		1.5	1.5	900 - 1,000	6.59 - 7.00
11.....	476.1 - 476.3		1.2	1.2	900 - 1,000	6.59 - 7.00
12.....	476.3 - 476.5		0.9	0.9	900 - 1,000	6.59 - 7.00
13.....	476.5 - 476.6		0.7	0.7	900 - 1,000	6.59 - 7.00
14.....	476.6 - 476.8		0.5	0.5	900 - 1,000	6.59 - 7.00
15.....	476.8 - 477.0		0.2	0.2	900 - 1,000	6.59 - 7.00
16.....	477.0 and above		0	0	Spillway flow only	

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 Regulation Section if unable to set the gates as instructed.
2. Communication with the District Office is not available.
 - a. Try to reestablish communications through the Los Angeles County Flood Control District (WUK 4470) or by telephone.
 - 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 the gate regulation schedule.

(ii) Falling Stages. Maintain current downstream gauge height until communication is reestablished.
 - c. If one of the gates cannot be operated, adjust the remaining gate gradually 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 one gate that is functioning so that the gate opening is equal to the sum of the openings shown in the schedule.

OUTLETS
(Looking Downstream)

Elevation 403



Each outlet 5'W x 6.5'H

* During normal standby either gate No. 1 or No. 2 will be opened to 0.5' to pass low flows (the other gate closed).
 ** Spillway crest elevation 475. Above this elevation, computed discharge = gated discharge + spillway discharge.
 *** Derived from U.S.G.S. rating No. 6 (extrapolated above 855 cfs).