STANDING INSTRUCTIONS TO THE PROJECT OPERATOR

FOR WATER CONTROL

TROPICANA DETENTION BASIN

Las Vegas Wash and Tributaries
Clark County, Nevada

Los Angeles District

U.S. Army Corps of Engineers

May 2000

Tropicana Detention Basin
Las Vegas Wash and Tributaries
(Tropicana and Flamingo Washes)
Nevada

Pertinent Data[1]

Completion Date	June 1998
Stream System	Blue Diamond Wash
Drainage Area	172.12 mi^2
Dam	
Embankment (earthfill)	
Crest elevation[2]	2,290.03 ft
Crest length	2,779.92 ft
Crest width	19.69 ft
Maximum height above streambed	38.66 ft
Maximum height above downstream fill	9.84 ft
Spillway (over entire dam embankment)	
Crest elevation	2,290.03 ft
Crest length	2,779.92 ft
Maximum height above downstream fill	9.84 ft
Elevation of maximum water surface	2,291.29 ft
Design discharge	12,996 ft^3/s
Outlet Works	
Width of conduit	9.84 ft
Height of box culvert (range)	8.69 to 6.89 ft
Length of box culvert	1001.80 ft
Bulkhead constrictor plate width	4.20 ft
Bulkhead constrictor plate height	3.94 ft
Height of open conduit (range)	7.22 to 6.00 ft
Length of open conduit	245.99 ft
Intake elevation	2,251.60 ft
Dike (auxiliary dam)	
Embankment (earthfill)	
Crest elevation (excluding spillway)	2,282.64 ft
Crest length	1,472.77 ft
Crest width	19.69 ft
Maximum height above streambed	28.97 ft
Spillway (over entire dike embankment)	
Crest elevation	2,280.18 ft
Crest length	705.38 ft
Design discharge	6,203 ft^3/s
Outlet works (ungated)	
Diameter of (two) outlet conduits	3.94 ft
Length of each conduit	146.42 ft
Intake elevation	2,254.19 ft
Reservoir (both bays combined)	
Area at dam spillway crest	52.74 acres
Gross capacity at dam spillway crest	824.48 ac-ft
Storage allocation below dam spillway crest	
Flood control	824.48 ac-ft
Sedimentation	0 ac-ft
100-year flood (reservoir design flood)	
Inflow volume (24-hour)	1,669.0 ac-ft
Peak inflow	6,700 ft^3/s
Peak outflow	497 ft^3/s
Peak elevation	2,289.67 ft
Drawdown time	4.5 days
Probable maximum flood (spillway design flood)	
Inflow volume (24-hour)	1,732.0 ac-ft
Peak inflow	13,985 ft^3/s
Peak outflow	12,986 ft^3/s
Peak elevation	2,291.34 ft
Spillway flow duration	6 hours

1. All SI-to-English conversions based on Federal Standard 376B.
2. All elevations based on NAVD88 datum.

Tropicana Detention Basin
Las Vegas Wash and Tributaries
(Tropicana and Flamingo Washes)
Nevada

Pertinent Data
(Metric Units)

Completion Date	June 1998
Stream System	Blue Diamond Wash
Drainage Area	445.8km^2
Dam	
Embankment (earthfill)	
Crest elevation[1]	698.000 m
Crest length	847.321 m
Crest width	6.000 m
Maximum height above streambed	11.785 m
Maximum height above downstream fill	3.000 m
Spillway (over entire dam embankment)	
Crest elevation	698.000 m
Crest length	847.321 m
Maximum height above downstream fill	3.000 m
Elevation of maximum water surface	698.385 m
Design discharge	368 m^3/s
Outlet Works	
Width of conduit	3.000 m
Height of box culvert (range)	2.650 to 2.100 m
Length of box culvert	305.349 m
Bulkhead constrictor plate width	1.28 m
Bulkhead constrictor plate height	1.20 m
Height of open conduit (range)	2.200 to 1.830 m
Length of open conduit	74.978 m
Intake elevation	686.287 m
Dike (auxiliary dam)	
Embankment (earthfill)	
Crest elevation (excluding spillway)	695.750 m
Crest length	448.900 m
Crest width	6.000 m
Maximum height above streambed	8.829 m
Spillway (over entire dike embankment)	
Crest elevation	695.000 m
Crest length	215.000 m
Design discharge	175.65 m^3/s
Outlet works (ungated)	
Diameter of (two) outlet conduits	1.200 m
Length of each conduit	44.63 m
Intake elevation	687.077 m
Reservoir (both bays combined)	
Area at dam spillway crest	213,440 m^2
Gross capacity at dam spillway crest	1,017,000 m^3
Storage allocation below dam spillway crest	
Flood control	1,017,000 m^3
Sedimentation	0 m^3
100-year flood (reservoir design flood)	
Inflow volume (24-hour)	2,058,695 m^3
Peak inflow	189.72 m^3/s
Peak outflow	14.07 m^3/s
Peak elevation	697.89 m
Drawdown time	4.5 days
Probable maximum flood (spillway design flood)	
Inflow volume (24-hour)	2,136,405 m^3
Peak inflow	396 m^3/s
Peak outflow	368 m^3/s
Peak elevation	698.40 m
Spillway flow duration	6 hours

1. All elevations based on NAVD88 datum.

Metric to English Conversion Constants
(Based on Federal Standard 376B -- Revised 27 January 1993)

From	Divide By	To Obtain
meters (m)	0.3048	feet (ft)
kilometers	1.609	miles (mi)
square meters (m^2)	4046.9	acres (ac)
square kilometers (km^2)	2.589988	square miles (mi^2)
cubic meters (m^3)	1233.5	acre-feet (ac-ft)
cubic meters per second (m^3/s)	0.028317	cubic feet per second (ft^3/s)

Tropicana Detention Basin - 15 May 1998

Standing Instructions to the Project Operator
for Water Control
Tropicana Detention Basin

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STANDING INSTRUCTIONS TO THE PROJECT OPERATOR FOR WATER CONTROL TROPICANA DETENTION BASIN

I. BACKGROUND AND RESPONSIBILITIES

A. General Information

1. Purpose of Document. This document is prepared in compliance with Paragraph 9-2 of EM 1110-2-3600 (Management of Water Control Systems) and ER 1110-2-240 (Water Control Management). A copy of these Standing Instructions to the Project Operator is to be kept at the headquarters of the Clark County Regional Flood Control District. Any deviation from the authorized purpose of Tropicana Detention Basin will require approval of the Commander, South Pacific Division, Corps of Engineers.

2. Project Purpose and Authorization. Tropicana Wash, along with Flamingo Wash, is part of the Las Vegas Wash and Tributaries drainage system. The system is designed to provide for 100-year computed probability flood event protection, under future conditions, to the central and southwest areas of the Las Vegas community. The design discharge, however, is approximately equivalent to a 70-year expected probability event. In October 1982, a feasibility study to analyze and recommend solutions to the Las Vegas Wash flood problems was authorized by a Senate Resolution. Further authorization was provided with the Water Resources Development Act of 1986, Title IV, Section 401(c). The Las Vegas Wash (Tropicana-Flamingo) Project was formally authorized by the Water Resources Development Act of 1992. The project is in compliance with all environmental requirements and regulations, as determined by the Final Supplemental Environmental Assessment (EA), dated November 1993, and the signed Finding of No Significant Impact (FONSI), dated June 1996. The EA and FONSI are based on the operation of the project, as designed.

3. Project Location and Description. Tropicana Detention Basin is located on Tropicana Wash approximately 2.5 miles (4 kilometers) southwest of downtown Las Vegas, Nevada (reference plate 1). The detention basin outlet works conduit and the Tropicana Outlet Channel extend approximately 1.9 miles (3 kilometers) northeasterly from the detention basin to join Tropicana Wash just upstream from the Interstate Highway 15 crossing near downtown (reference plate 2). The 172.12 square-mile (445.8 square-kilometer) drainage area of the detention

basin and upstream diversion channels extends westerly from the basin across an alluvial cone into rugged terrain, including mountains.

The main feature of the project is a 2,779.92 foot (847.321 meter) long earthfill embankment revetted with soil cement and roller compacted concrete. The embankment crest is at elevation 2290.03 feet, NAVD88 (698 meters). The crest is 38.66 feet (11.785 meters) above the streambed and is 9.84 feet (3 meters) above the downstream fill. An emergency spillway is provided over the entire length of the embankment. The detention basin storage capacity is 824.48 acre-feet (1,017,000 m^3). Other pertinent information is presented in the "Pertinent Data" sheet at the beginning of this document. Plates 3 through 16 show in detail the various features of the project.

The detention basin, itself, is divided into two bays (north and south) separated by a dike (photo 1). The dike is 1,472.77 feet (448.900 meters) long and has a crest elevation of 2,282.64 feet (695.75 meters), NAVD88. The dike ranges from 0 to a maximum height of 28.97 feet (8.829 meters) above the streambed. The dike has a crest width of 19.69 feet (6.000 meters). The west 705.38 feet (215.000 meters) of the dike functions as a spillway; the entire dike functions as a maintenance road. The elevation of the dike in the spillway crest segment is 2,280.18 feet (695.000 meters), NAVD88.

The purpose of dividing the basin is to provide small storage areas in which water depth will rise rapidly from inflow, thereby resulting in rapid attainment of near maximum outflow. Inflow enters the north bay and, if a sufficiently large flood were to occur, inflow will also overtop the dike spillway and enter the south bay. The accumulated inflow into the south bay subsequently returns to the north bay through a 4.92-foot (1.500-meter) diameter conduit in the dike (photo 2). The conduit is 146.42 feet (44.630 meters) long, with a flap gate that prevent a north-to-south bay flow through the conduit. The maximum capacity of the conduit is 561 cfs (15.89 cms), which occurs when the south bay pool elevation is at spillway crest and there is no tailwater in the north bay. However, under flood conditions, the north bay will fill first, causing a tailwater to be present throughout the flood event. During the flood recession the average difference between the north and south pool elevations is 0.50 feet (0.152 meters), resulting in a south-to-north pool discharge of 77 cfs (2.19 cms) through the conduit. Except for spillway flow, the entire basin outflow is through the outlet works, that are located in the north bay portion of the basin (photo 3). The outlet works intake is protected by a trashrack, consisting of steel members and pipes. The trashrack will prevent large size debris from entering the intake structure and clogging the outlet conduit.

4. Project Operating Constraints. Since the dam's outlet works and emergency spillway are ungated facilities, there are no operating constraints at Tropicana Detention Basin, and there is no on-site damtender. The entire basin is allocated exclusively to flood control, as shown on plate 17. The detention basin's elevation-area and elevation-storage capacity curves are shown on plates 18 and 19, respectively. The elevation-area and elevation-capacity relationships are presented in tabular format in tables I-3 and I-4, respectively. The elevation-discharge capacity curves of the outlet works and the emergency spillway are shown on plates 20 and 21, respectively. The elevation-discharge capacity relationships for the outlet works and emergency spillway are presented in tabular format in tables I-5 and I-6, respectively. The project is designed to reduce the 100-year peak inflow of 6,700 cfs to 497 cfs (189.72 m^3/s to 14.07 m^3/s). The project's routing of the reservoir design flood, which is the 100-year flood event, is shown on plate 22. The probable maximum flood routing is shown on plate 23.

5. Project Operation and Maintenance. Operation and maintenance (O&M) activities for Tropicana Detention Basin are to be conducted by the Project Operator. Those sections in the Code of Federal Regulations, Title 33, Part 208.10 applicable to operation and maintenance of the project are in effect upon completion of project construction and transfer to the Project Operator for O&M. Applicable paragraphs from these sections include, but are not limited to, the following:

> "The State, political subdivision thereof, or other responsible local agency, which furnished assurance that it will maintain and operate flood control works in accordance with regulations prescribed by the Secretary of the Army, as required by law, shall appoint a permanent committee consisting of or headed by an official hereinafter called the 'Superintendent,' who shall be responsible for the development and maintenance of, and directly in charge of an organization responsible for the efficient operation and maintenance of all of the structures and facilities during flood periods and for continuous inspection and maintenance of the project works during periods of low water, all without cost to the United States."

> "Appropriate measures shall be taken by local authorities to insure that the activities of all local organizations operating public or private facilities connected with the protective works are coordinated with those of the Superintendent's organization during flood periods."

"The District Engineer or his authorized representatives shall have access at all times to all portions of the protective works."

"It shall be the duty of the Superintendent to submit a semiannual report to the District Engineer covering inspection, maintenance, and operation of the protective works."

In addition to those items specified therein, the Project Operator is responsible for the periodic removal of excess sediment accumulation after each major sediment-producing storm and on an annual basis. Since no additional storage volume is allocated for sediment, removal of sediment accumulations is essential to maintain the required flood control volume in the basin. In addition, particular care should be taken to remove sediment from around the interior dike flap gate to ensure the gate's operation during subsequent flood events.

B. Role of the Project Operator

1. Normal Conditions. The Project Operator is responsible for operation and maintenance during normal hydrometeorological conditions, when little or no runoff occurs, without daily instruction. The Los Angeles District, Corps of Engineers (Los Angeles District) should be contacted any time conditions are not normal and consultation or instructions regarding operation and maintenance is needed. Since Tropicana Detention Basin is an ungated facility, the Project Operator is not normally on site during normal conditions. Whenever the National Weather Service or the Clark County Regional Flood Control District predicts a major storm event with a large volume of storm runoff, an emergency condition exists and Clark County Public Works shall post a site monitor at the project.

2. Emergency Conditions. During emergency flood conditions, the Project Operator shall keep the Los Angeles District Reservoir Operations Center informed of the project status. Project status information includes the following: (1) current basin water surface elevation, outflow (both outlet works and spillway), and inflow; (2) incremental and cumulative watershed precipitation; and (3) any unusual or critical conditions, such as, but not limited to, debris clogging the outlet works intake structure, boils near the downstream toe, or embankment sloughing. In addition, the Clark County Department of Public Works is to have a person on site to monitor for any of these conditions.

3. Initial Filling of Detention Basin. During the first significant flood event, the Project Operator shall monitor and/or report on the condition of any seepage in the toe drains; wave run-up on the embankment; hydrostatic boils near the downstream toe; and any embankment sloughing. Each of the above activities are described in the following paragraphs:

(1) Seepage in the toe drains is normally expected to occur if significant impoundments remain in the detention basin for 10 or more hours and does not indicate an adverse condition with the embankment. Monitoring these conditions should consist of observing for a cloudy condition in the seepage water, indicating possible internal embankment erosion. If seepage commences within a shorter duration after initial impoundment and the seepage is cloudy in nature, internal erosion might be occurring. Should this be the case, the seepage should be reduced or eliminated by covering the seepage ingress and egress points with filter blankets, gravel, and/or rock. This situation should be reported as described in the Emergency Action Plan for Tropicana Detention Basin, Clark County, Nevada, U.S. Army Corps of Engineers, Los Angeles District.

(2) Wave run-up on the embankment resulting from waves 2 feet or greater in height, should be monitored closely for embankment surface erosion or sloughing. If either of these two conditions is apparent, they should be reported as described in the Emergency Action Plan for Tropicana Detention Basin, Clark County, Nevada.

(3) Any hydrostatic boils that occur near the downstream toe indicate an internal erosion condition that may or may not be associated with the embankment drainage system. The water emitting from the boil should be observed as to the type of condition (either clear or cloudy). In addition, sandbags should be placed around the boil to reduce or eliminate the seepage flow. The condition should be reported as described in Section 4 of the Emergency Action Plan for Tropicana Detention Basin, Clark County, Nevada.

(4) Any embankment sloughing, caused by either wave run-up (reference paragraph (2) above) or by the receding basin water surface elevation after the peak of the flood event, should be reported as described in Section 4 of the Emergency Action Plan for Tropicana Detention Basin, Clark County, Nevada. In addition, gravel and/or rock should be placed in the sloughed area to stabilize the area.

C. Chain of Command for Reservoir Operations.

The chains of command for reservoir operations, along with respective telephone numbers, are shown in tables I-1 and I-2. Table I-1, which is the Army Corps of Engineers chain of command

is used for reference primarily during emergency operating conditions. Table I-2, which is the Clark County Chain of command, is used for reference for both normal and emergency operating conditions.

II. DATA COLLECTION AND REPORTING

The Project Operator has one precipitation gage located at the detention basin (photo 4) and additional precipitation gages in the surrounding vicinity. There are water level (basin water surface elevation) gages within the two bays of the detention basin and a stage (water level) gage in the channel immediately downstream from the outlet works. Both precipitation and water level gages record in real time. Within the basin are staff gages and supplemental range lines for measuring sediment deposition. The location of all gages is shown on plate 24. The Project Operator shall obtain data from the National Weather Service on regional hydrometeorological conditions.

At the end of each water year (September 30), the Project Operator shall provide Los Angeles District with the year's reservoir water surface elevation, inflow and outflow data. This data will be used by Los Angeles District to determine the flood benefits of the project for each year and is used in other reports that Los Angeles District prepares annually. The data can be provided at the same time as the December submission of the semi-annual operation and maintenance report, described in the Operation, Maintenance, and Repair Manual, Las Vegas Wash & Tributaries (Tropicana and Flamingo Washes), Las Vegas, Nevada. The December submission is due on or before 1 December. The submission can be made using Corps of Engineers forms SPL 403, SPL 403A, SPL 403B, a narrative report, or a reporting agency form. The time interval of the data can range from 15 minutes, for intense storm events, to annual maximum/minimum values, for years of negligible storm activity. Data whose time interval is daily or more frequent should be transmitted in electronic format as well as using the afore-mentioned forms.

The Project Operator is responsible for maintaining the official record of all project data mentioned herein.

III. WATER CONTROL ACTION AND REPORTING

A. Normal Conditions.

The Tropicana Detention Basin outlet works are ungated and the project is, therefore, a self-regulating facility. There are no additional water control actions required for the Project Operator to undertake.

B. Emergency Conditions.

During emergency conditions, the Project operator shall keep the Los Angeles District appraised, as appropriate.

C. Inquiries.

All significant inquiries received by the Project Operator from citizens, constituents or interest groups regarding the status of a project in an emergency situation must be answered with the best available information. The Project Operator should consult with Los Angeles District if sensitive information is requested, especially during emergency situations.

D. Water Control Problems.

The Los Angeles District must be contacted immediately in the event that an operational malfunction, erosion, or other incidents that could impact the project integrity or water control capability.

E. Communication Outages.

Should communication outages occur during an emergency situation, the Project Operator shall continue to monitor the situation and make every effort to contact the District Engineer at the earliest possible opportunity, and report the situation as described in Section III (B) above. The Project Operator is to document all attempts to contact the District Engineer. If the structure is in danger of failing due to overtopping, internal erosion, or other cause, the Project Operator shall leave the site for his/her safety.

IV. REFERENCES

The following reference documents apply to the Standing Instructions. Copies of these documents are to be kept on file by the Project Operator.

Design Memorandum, Tropicana Detention Basin and Outlet Channel, Department of the Army, Los Angeles District, Corps of Engineers, Los Angeles, California, July 1996

Operation, Maintenance, and Repair Manual, Las Vegas Wash & Tributaries (Tropicana and Flamingo Washes), Las Vegas, Nevada U.S. Army Corps of Engineers, Los Angeles District, March 1997.

Emergency Action Plan for Tropicana Detention Basin, U.S. Army Corps of Engineers, Los Angeles District, February 1999.

Management of Water Control Systems (EM 1110-2-3600), U.S. Army Corps of Engineers, 30 November 1987.

V. UPDATING

Clark County Regional Flood Control District is responsible for updating table I-2, as necessary. The table is to be updated at least annually, in October-November. Other parts of the Standing Instructions shall be updated by the Corps of Engineers in response to any project modifications or changes in the project operating plan.