VI - HYDROLOGIC FORECASTS

6-01 General. There are no official hydrologic forecasts made by the U.S. Army Crops of Engineers or the National Weather Service (NWS) for San Antonio Dam. The water quality of San Antonio Creek is not predicted by any agency at this time.

a. Role of Corps of Engineers. Although no formal hydrologic forecasts are made for San Antonio Dam, the Corps of Engineers does carefully monitor conditions at the dam and makes a general forecast of inflow to the dam for floodflow regulation as needed. Any significant change in hydrologic conditions at the dam will prompt the LAD to notify pertinent agencies (see pl. 9-02), and coordinate with them when necessary.

The LAD has a Meteorologist on contract who prepares quantitative precipitation forecasts (QPF), when significant rain is forecasted in any region of the district. The San Antonio Dam watershed is a subbasin of the larger Santa Ana River watershed. Plate 6-01 shows the entire Santa Ana watershed and the eight zones which are used to model the precipitation of the watershed. The San Antonio Dam watershed is part of the Zone 3. The LAD Meteorologist lists QPF's for Zone 3 using the abbreviations SA03. The QPF assists in estimating the severity of the upcoming event, and in scheduling personnel to man the affected LAD facilities.

The LAD maintains historical data regarding the operation of San Antonio Dam. These data, while not of use in real-time, are important to studies of historical storms and floods that aid in the development and refinement of computerized rainfall-runoff forecasts models.

b. Role of Other Agencies. No other agency currently prepares forecasts of inflow to San Antonio Dam. The LAD does receive real-time weather reports and forecasts from the NWS. This is accomplished primarily by means of weather facsimile pictures and text forecasts received at the LAD office. Historical precipitation and streamflow data are also available from the LACDPW, OCEMA, NWS, USGS, and others.

6-02 Flood Condition Forecasts. San Antonio Dam and its watershed are included within the Santa Ana River Real-Time Water Control System (SARRT). The SARRT water control system uses several generalized computer programs developed by the U.S. Army Corps of Engineers Hydrologic Engineering Center (HEC) in combination with calibrated data sets describing the subbasins of the Santa Ana River watershed.

Using the SARRT water control system, inflow flood hydrographs for San Antonio Dam can be generated. These forecast inflow flood hydrographs are based on real-time telemetry data and QPF's prepared by the LAD Meteorologist.

a. Requirements. The SARRT water control system uses the HEC program HEC1F to perform streamflow forecasting. The SARRT water control system requires from less than a minute up to several minutes to calculate a streamflow forecast for San Antonio Dam. The difference in computation time is due to whether one uses the SARK water control system to only calculate

the streamflow forecast or if one uses the SARRT water control system to complete an entire water control simulation over the entire Santa Ana watershed.

Plate 6-02 shows a schematic of the entire SARRT water control system HEC1F model. San Antonio Dam (SNTO) is located at the headwaters of San Antonio Creek which receives inflow from a single subbasin (M). The first control point for the subbasin is San Antonio Dam, control point 8. Several precipitation gages as well as the LAD Meteorologist's QPF are used by HEC1F to determine a subbasin hydrograph.

All reservoir storage at San Antonio Dam is allocated to flood control. (See pl. 7-01, Exhibit B). Note that releases for water conservation may be made below elevation 2,176 feet when projected reservoir inflows indicate rapid evacuation of this storage space is not needed to achieve flood control objectives.

b. Methods. Calculations of a forecast hydrograph for San Antonio Reservoir is a two step process. The first step is to run HEC1F in order to optimize the six runoff parameters which describe the San Antonio Canyon subbasin. HEC1F optimizes the pre-determined subbasin runoff parameters by "comparing" the observed hydrograph with the computed hydrograph. The six runoff parameters for the San Antonio Canyon subbasin are listed in table 6-01.

Table 6-01. Initial Runoff Parameters for the San Antonio Canyon Subbasin.

Time to Peak of the Unit Hydrograph	TP	4.12	hr.
Coefficient for Snyder's Method	CP	0.60	--
Starting Loss Rate	STRTL	1.28	in.
Constant Loss Rate	CNSTL	0.49	in./hr.
Base Flow at Time of Forecast	BFFCST	from current date	cfs
Recession Constant	RTIOR	1.005	--

The second step is the blending of the observed hydrograph with the calculated hydrograph. This is accomplished by running HEC1F using the F-Model data set. The blending procedure produces a smooth transition between the observed hydrograph and the computed hydrograph. Plate 6-03 illustrates the blending procedure. The observed hydrograph is used up to the time of forecast. Blending occurs over the subsequent six time ordinates. At the end of the sixth time ordinate the calculated hydrograph becomes the forecast hydrograph. Thirty minute time intervals are used by the SARRT water control system.

6-03 Conservation Purpose Forecasts. Hydrologic forecasts for water conservation are not routinely prepared by the LAD, however the Reservoir Operation Center will assess such factors as a major storm occurring at the

end of the flood season, local forecasts of more precipitation to come, reservoir elevation and need for water conservation in determining a decision to store water to be spread at 600 to 900 cfs for water conservation purposes.

6-04 Long Range Forecasts. Long range forecasts (in excess of 72 hours) are normally not prepared for San Antonio Dam and Reservoir. The reservoir regulation schedule will, in general, empty the reservoir quickly (less than 24 hours). Emptying of the reservoir is facilitated by the average downstream channel capacity of 8,000 cfs.