SUNSET FRS
FCD GAGE# 46007

STATION DESCRIPTION

LOCATION - The gage is in the town of Wickenburg, approximately 1/2 mile west of downtown. From US 60 turn south on Mariposa Road (Jones Ford) to the wash. The dam is to the left. Latitude N 33° 57' 50", Longitude W 112° 44' 33". Located in the SW1/4 NE1/4 S11 T7N R5W in the Wickenburg 7.5-minute quadrangle.

ESTABLISHMENT - The gage was installed on February 12, 1989.

DRAINAGE AREA - 0.85 mi^2

GAGE - The gage is a pressure transducer type instrument, located at 0.90 feet gage height, or 2,114.05 feet NAVD88, levels of April 24, 2024.

There are several staff gages at this location.

A staff plate is located on the upstream face of the outlet structure. It displays in feet gage height.

There are 6 staff gages located on the upstream side of the dam in the pool and can be viewed from the top of dam or from upstream where safe. The gages are in five-foot lengths and are subdivided into one-foot increments. The gages display in feet gage height.

There are two staff gages in the spillway, located on the left and right vertical walls near the lip of the spillway. Both display depth in the spillway only.

ZERO GAGE HEIGHT - Zero gage height is based on the invert of the gated inlet inside the enclosure. Elevation 2,113.150 feet NAVD88, levels of April 24, 2024.

HISTORY – According to the design, the invert of gated inlet was at 2,111.25 feet M.S.L. A 1992 survey by Cruff and Donaldson used the Wickenburg ADMS reference elevations which gave an elevation of 2,111.46 feet M.S.L. as the gated invert elevation.

There have been three datums used at this site regarding the ALERT stage gage. The original SCS MSL datum, the Wickenburg ADMS MSL datum, and NAVD88 datum. The gage elevation was found at elevation 2,112.50 feet M.S.L. (SCS datum) and 1.14 feet gage height on January 15, 1990. A survey from February 21, 1992, found the PT gage at 2,112.60 feet M.S.L. (ADMS datum) which is also equivalent to 1.14 feet gage height. After the 1992 survey, the invert of inlet at the outlet was changed from 2,111.25 feet

MSL in SCS datum to 2,111.46 feet MSL when referenced to the Wickenburg ADMS. On January 28, 1994, the PT elevation was changed to 0.70 feet gage height or 2,112.20 feet MSL (ADMS datum.) Through extensive research of the station folder using photos and previous surveys, it was found that the PT gage elevation has remained at the same elevation since January 28, 1994. Reviewing subsequent impoundment data and photos from 1997 and survey data from 2002, 2012, and 2024 and using elevation conversions and comparisons, confirm that the sensor elevation has not changed since 1994.

There had been an SCS staff gage on the outlet tower but has since been removed. It displayed directly in MSL with the foot elevation read at the bottom of the number rather than at the top of the number. An FCDMC staff plate was installed on the outlet tower to the left of the SCS staff gage. Photographic evidence shows that it was installed between July 1995 and August 1996. The foot marks were aligned with the foot marks on the SCS staff gage and therefore the 0.00 foot on the staff plate was not tied to the invert of the inlet. The 0.00 on the staff plate was equivalent to 2,112.00 on the SCS staff gage (and datum), but equivalent to 2,112.21 feet MSL (ADMS datum.) Subsequently staff gages were installed on the upstream face of the dam (date unknown) and were tied to the FCDMC staff plate. All subsequent surveys were based, incorrectly, that the staff gage zero was set to the invert of inlet. During a 2023 survey by Wood-Patel, it was found that the staff gages were not tied to the invert of the inlet, and other elevations (spillway, ungated outlets, top of dam) were incorrect. The gage record was checked and revised as needed back to 1994. The incorrect 5-foot staff gages and the staff plate were removed and replaced in May 2024 to have their zero point be equal to the invert of inlet, which has elevation of 2,113.15 feet NAVD88, levels of April 24, 2024.

New staff gages have been installed as of June 13, 2024, and all are tied to the invert of the inlet being 0.00 feet.

REFERENCE MARKS -

NOTE: Many references from earlier surveys were not found during the 2012 or 2024 surveys and have not been included in this update. Only existing references are included.

SNST-13 is an FCDMC brass cap located at station 13+00 on top of the dam, left of the spillway. It is at elevation is 29.927 feet gage height, or 2,143.077 feet NAVD88, levels of April 24, 2024.

SNST-12 is an FCDMC brass cap located at station 14+00 on top of the dam, left of the spillway. It is at elevation is 29.906 feet gage height and 2,143.056 feet NAVD88, levels of April 24, 2024.

SNST-11 is an FCDMC brass cap located at station 14+85 on top of the dam at the entry gate on the north. It is at elevation 29.992 feet gage height and 2,143.142 feet NAVD88, levels of April 24, 2024.

RP-1 is a white paint spot on the northeast corner of the gate-control-wheel base, located to the left of the spillway. It is at elevation 32.166 feet gage height and 2,145.316 feet NAVD88, levels of April 24, 2024.

RP-2 is the lowest south bolt securing the wood board to which the staff plate is attached on the upstream face of the outlet structure. It is at elevation 2.460 feet gage height and 2,115.610 feet NAVD88, levels of April 24, 2024.

RP-3 is a smaller bolt to the right of RP-2 on the upstream face of the outlet structure. It is at elevation 2.696 feet gage height and 2,115.846 feet NAVD88, levels of April 24, 2024.

RP-4 is the lowest south bolt of the bracket securing the transducer conduit and the screw drive conduit for the principal inlet. It is at elevation 11.188 feet gage height and 2,124.338 feet NAVD88, levels of April 24, 2024.

RP-5 is a chiseled 'X' near the center of the upstream lip of the concrete emergency spillway. It is at elevation 19.777 feet gage height, and 2,132.927 feet NAVD88, levels of April 24, 2024.

RP-6 is a chiseled 'X' on a concrete sill at the top of the left wall of the spillway. It is at elevation 30.194 feet gage height and 2,143.344 feet NAVD88, levels of April 24, 2024.

CHANNEL AND CONTROL - The principal outlet for the dam is a 30-inch diameter, 184-foot-long culvert. The emergency spillway for the dam is a concrete spillway located in in the dam to the right of the principal outlet structure.

PRINCIPAL OUTLET / EMERGENCY SPILLWAY

The principal outlet is a 30-inch diameter culvert pipe. The culvert invert elevation at the inlet is at -6.40 feet gage height and 2,106.750 feet NAVD88. The culvert invert elevation at the outlet is -7.15 feet gage height or 2,106.000 feet NAVD88, both levels of January 27, 1992. There are three intakes to the tower. The lower orifice is gated and is at elevation 0.000 feet gage height and 2,113.150 feet NAVD88. It is typically closed. A small, 9" by 9" orifice is at elevation 8.870 feet gage height and 2,122.020 feet NAVD88, levels of April 24, 2024. The upper ungated intake for the tower is near the top of the tower at elevation 19.75 feet gage height and 2,132.900 feet NAVD88, levels of April 24, 2024.

The emergency spillway crest minimum elevation is 19.710 feet gage height and 2,132.86 feet NAVD88, levels of April 24, 2024. The spillway is 40 feet wide and 10.5 feet high.

Top of dam elevation varies but is defined as 29.620 feet gage height and 2,142.770 feet NAVD88.

RATING -

The current discharge rating is number 4 developed using several methods to more accurately calculate flow through the orifice and the top weir. The rating was developed in April 2017. The principal spillway portion of the discharge was updated based on the 2017 study while the emergency spillway discharge stayed consistent with the 2013 Wickenburg ADMS.

The current capacity rating is rating #2 from the Wickenburg ADMS DTM study. The previous rating was from the Wickenburg ADMS HEC-1 input. Rating #2 is applied to all the gage record.

DISCHARGE MEASUREMENTS - The principal outlet is an underground culvert running to the Hassayampa River. Flows through the emergency spillway are too dangerous to attempt a direct measurement.

POINT OF ZERO FLOW – The gated outlet is at 0.000 feet gage height and is opened upon need. If the gate is closed, the small uncontrolled flow into the outlet begins at 8.87 feet gage height. Spillway flows begin at 19.75 feet gage height.

FLOODS / SIGNIFICANT IMPOUNDMENTS – The largest impoundment on record occurred on July 18, 2015, with a peak stage of 16.78 feet gage height, and 64.3 acre-feet and 74.8 percent full. The second-largest impoundment occurred on September 26, 1997, at 12.27 feet, 34 acre-feet, or 39.5 percent full.

REGULATION - The dam is a regulation of natural flows in Sunset Wash.

DIVERSIONS - None known.

ACCURACY - Good

JUSTIFICATION - Monitor impoundment behind Sunset dam for flood warning to the town of Wickenburg and for dam safety considerations.

UPDATE - June 19, 2024
DE Gardner