

11416100 BOWMAN SPAULDING CN A JORDAN C SIPHON CA

Updated 01/03/2017 by A Vander Meer.

LOCATION.--Lat 39°20'32", long 120°38'26" referenced to North American Datum of 1927, in SW ¼ NW ¼ sec.169, T.17N., R12E., Nevada County, CA, Hydrologic Unit 18020125, at outlet of Jordan Creek Siphon, 0.6 mi downstream from Fuller Lake, and 3.5 mi northeast of Emigrant Gap.

ROAD LOG.--Begin at Junction of I-80 and Hwy 20 and take Hwy 20 toward Nevada City. Cross Drum Canal in 3.8 mi. Turn right on Bowman Lake Road (paved) in 0.5 mi.

Continue 3.6 mi, then turn right on small dirt road just before Fuller Lake. Pass through locked gate.

Drive 0.1 mi up to canal bank and turn right. You will pass a PG&E house before the canal.

Park between gage house (YB13) and measuring bridge.

Main gage is about 1 mi further downstream at the end of the siphon. Follow RB road along canal for ½ mi then cross canal to left. Stay left at first junction, continue another ½ mi to steep hill on left. Need 4-wheel drive to get up the steep hill to the gage house at the downstream end of the siphon.

Water-stage recorder in concrete block shelter at outlet of siphon.

ESTABLISHMENT AND HISTORY.--July 5, 1927 by Nevada Irrigation District. Records published by USGS since October 1964. Gage was operated by PG&E from the 1980's through the end of WY2016. NID resumed operation on Oct 1, 2016.

GAGE.--Campbell Scientific CR1000 with 15 minute recording interval hooked via SDI12 communication to two Sutron 56-0540 shaft encoders, one for each stilling well. The gage is set up to record the difference in pressure in the venturi section with High and Low pressure taps into separate stilling wells. The difference between the stilling wells plus 1 foot is the gage height for the site, so the read does not go negative during operation.

The difference between the wells was a mechanical subtraction with pulleys and cables, but as of WY2010, each well is monitored by a shaft encoder and the difference is computed electronically with the data logger. The electronic difference is not subject to the backwater effects that occur when the header box downstream is full and spilling, causing the mechanical configuration to exceed its range and cease to register the pressure differential.

The outside gage is an enamel plate in one section. There is a manometer setup which is comprised of two glass tubes in front of the plate. By reading both simultaneously, the pressure drop in the venturi can be computed by subtracting one value from the other and adding 1. The outside gage is in the structure to the left of the recorder and stilling wells. There are float tape pointers for each well which indicate the read for each well, which should match the manometer read on the wall. There are no staff gages in the 18 in steel pipe wells.

Auxiliary gage YB13 is about ½ mi upstream in a concrete block building on the right bank of the canal. This structure replaced a wooden structure when the canal was re-gunited in July 2002. The inside staff is an enamel plate; limits 0 to 6.7 ft. The outside staff is in the

left bank of the canal near the building; limits 0 to 6.7 ft. Equipment in the building includes a float operated Design Analysis H350 logger with a 15 minute record.

Elevation of gage is 5,440 ft., from topographic map.

CONTROL.--The venturi (constriction) section is the control at all discharges. At low flows, the gage is sensitive where small changes in gage height are relatively large changes in flow. At the auxiliary gage YB13, the control is the channel and the Zion tunnel entrance. This control is subject to change as rocks fall into the canal. At times, there is backwater when the power plant downstream adjusts its power output or when there is significant debris blocking the rack at the Zion tunnel entrance. There is a backwater rating table kept at YB-13 for these instances.

DISCHARGE MEASUREMENTS.--All measurements except for flows of 70 cfs or less are made from the measuring bridge 130 ft. downstream of YB13. The measuring bridge is marked at one foot intervals on the upstream railing. Use the bridge board and 50c weight stored in the YB13 gage house. Tape down from the top of the I-Beam to the water surface on the upstream side of the measuring bridge. Subtract this reading from the standard cross section that was surveyed on 7/18/2002 when the canal was dewatered.

The canal is a rounded steep sided gunite channel. The velocities vary across the channel due to the slight curvature upstream. Measurements are usually good off of the bridge.

INDIRECT MEASUREMENT SITE.--None needed.

FLOODS.--Not applicable.

POINT OF ZERO FLOW.--0.00 difference will be the flow.

WINTER FLOW.--No ice effect should occur.

REGULATION AND DIVERSIONS.--Flow is regulated by Fuller and Bowman Lakes.

ACCURACY.--Excellent.

COOPERATION.--Nevada Irrigation District operates the gage.

JUSTIFICATION.--Required under FERC license 2310 to measure total trans-basin flow in the canal below all inflow.

MAP.--Blue Canyon, 7 1/2 minute.

REFERENCE MARKS.--Not applicable since the rating is based on the differential of the stilling wells at the venturi section.

QUALITY ASSURANCE PLAN.--Make 4-6 discharge measurements per year, covering the full range of flow. Read all staffs and recorders during each visit and document. Check to make sure each well is registering the correct stage by comparing the read, tape pointer, and monometer. These are minimum quality assurance procedures. More may need to be done if unusual events occur.

LAND OWNERSHIP.--Land is owned or controlled by Nevada Irrigation District.