Annual Surveillance Report
January 2017 through December 2017
Rattlesnake Canyon Dam

DSOD Dam No. 1029-003
Irvine, CA
November 26, 2018

Prepared By:

GENTERRA Consultants, Inc.
15375 Barranca Pkwy, Bldg L
Irvine, CA 92618
www.genterra.com
Tel: (949) 753-8766
Fax: (949) 753-8887

GENTERRA CONSULTANTS, INC.

Prepared For:

Irvine Ranch Water District
Field Operations Department
P. O. Box 57000
Irvine, CA 92619-7000

Irvine Ranch WATER DISTRICT

GENTERRA
CONSULTANTS, INC.
ENGINEERING & GEOTECHNICAL SERVICES

ANNUAL SURVEILLANCE REPORT
JANUARY 2017 THROUGH DECEMBER 2017
FOR
RATTLESNAKE CANYON DAM
DSOD DAM NO. 1029-003
IRVINE, CALIFORNIA

Submitted To:

Irvine Water District
Field Operations Department
P. O. Box 57000
Irvine, CA 92619-7000

Prepared By:

GENTERRA Consultants, Inc.
15375 Barranca Pkwy., Bldg. L
Irvine, California 92618

Project No. 397A-IRW

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ENGINEERING & GEOTECHNICAL SERVICES

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Project No. 397A-IRW

Irvine Ranch Water District
P. O. Box 57000
Irvine, CA 92619-7000

Attention: Mr. Jeff Smyth

Subject: Rattlesnake Canyon Dam, DSOD Dam No. 1029-003,
Annual Surveillance Report from January 2017 through December 2017

Dear Mr. Smyth:

GENTERRA Consultants, Inc. (GENTERRA) is pleased to submit this Annual Surveillance Report for Rattlesnake Canyon Dam covering the period from January 2017 through December 2017. This report is part of the scope of work described in our proposal dated October 14, 2015, and as authorized by the Irvine Ranch Water District (District) in Purchase Order No. 527854 dated December 22, 2015.

We appreciate this opportunity to provide the District with our services during this annual surveillance program. Please contact either of the undersigned with any questions.

Sincerely,
GENTERRA CONSULTANTS, INC.

Douglas A. Harriman, P.E.
Principal Engineer
P.E. 55620

Joseph J. Kulikowski, P.E., G.E.
President and Senior Principal Engineer
P.E. 17478, G.E. 491

Enclosure

ANNUAL SURVEILLANCE REPORT
JANUARY 2017 THROUGH DECEMBER 2017
RATTLESNAKE CANYON DAM, DSOD DAM NO. 1029-003

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

TABLES

FIGURES

TABLE OF CONTENTS (Continued)

ANNUAL SURVEILLANCE REPORT
JANUARY 2017 THROUGH DECEMBER 2017
RATTLESNAKE CANYON DAM, DSOD DAM NO. 1029-003

SECTION 1: INTRODUCTION AND BACKGROUND

1.1 GENERAL

This report presents the results of the dam safety monitoring and surveillance program for Rattlesnake Canyon Dam conducted by the Irvine Ranch Water District (District) and GENTERRA Consultants, Inc. (GENTERRA) for the 12-month period from January 2017 through December 2017. It includes a compilation of the field measurements, observations, and conclusions related to the general condition and safety of the dam. In addition, recommendations are provided for continued operation, surveillance, and monitoring of the dam. This report is submitted as part of the jurisdictional requirements of the State of California, Department of Water Resources, Division of Safety of Dams (DSOD).

Table 1 provides details of each piezometer, observation well, and seepage flow point. Tables 2 through 7 present field measurements of piezometer water levels, reservoir water surface elevations, seepage flow rates, and net horizontal and net vertical movement based on survey data collected at Rattlesnake Canyon Dam. Graphs illustrating piezometer water levels and seepage flow rates, each with corresponding reservoir water surface elevations are provided for the two-year period (January 2016 through December 2017), as well as for the 10-year period (January 2008 through December 2017). The 10-year plots are included to show longer-term trends, to facilitate evaluation of the performance of the dam and reservoir, and to more easily identify any adverse trends or significant deviations in the data. Tables and graphs are also presented to show the results of horizontal and vertical movement surveys from 1985 through 2017. The dam was not surveyed during 2017.

1.2 DAM AND RESERVOIR

Rattlesnake Canyon Dam is a homogeneous earthfill embankment dam with a chimney drain. It is located on Rattlesnake Canyon Wash in Irvine, California. The dam was completed in 1960. The vertical datum used for this project is the National Geodetic Vertical Datum of 1929 (NGVD 29).

Modifications to the dam have occurred over the years. The current configuration of the dam consists of the following: the height of the dam is 79 feet with a crest length of 980 feet and a crest width of 15 feet. The crest of the dam is at Elevation 418.0 feet. Asphalt Concrete (AC) covers the crest of the dam.

The upstream face of the dam has a slope gradient of 3H:1V (Horizontal:Vertical) and a 16-foot-wide bench at approximate Elevation 385.0 feet. The upper portion of the upstream slope is lined with two-inch-thick AC for erosion protection extending from the crest of the dam to the inside edge of the bench (i.e. not including the bench).

The downstream face of the dam has a slope gradient of 2.5H:1V and also has a 16-foot-wide bench at approximate Elevation 385.0 feet. The downstream slope is covered with grass.

The dam is reported as being founded on alluvium which overlies the bedrock. An upstream blanket and several seepage drains along the downstream toe of the dam were installed to help control seepage.

The reservoir has a drainage area of about two square miles. Per the document titled "*Dams within the Jurisdiction of the State of California*" (DSOD, 2000) the reservoir has a maximum storage capacity of 1,480 acre-feet. Due to concerns about stability of the dam under seismic loading conditions, the maximum reservoir level is currently restricted by the DSOD to Elevation 406.0 feet, which is 6.0 feet below the spillway crest.

1.3 SPILLWAY

Located on the right abutment, the spillway consists of an AC lined approach section, an ungated ogee weir, and a side channel. The open concrete trapezoidal channel has a 15-foot-wide bottom with 1H:1V side slopes. The channel conveys the water to a stilling basin that transitions to a smaller open concrete trapezoidal channel which then flows to Rattlesnake Canyon Wash. The spillway crest is at Elevation 412.0 feet, which provides six feet of freeboard.

1.4 OUTLET WORKS

The outlet works, located near the left abutment, consist of an inclined intake pipe supported on the upstream face of the dam with four intake valves (identified as "Main," "Middle," "Top," and "Bottom") at various elevations. The inlet gates are manually operated from the controls located at the upstream edge of the crest of the dam. The intake pipe connects to a 24-inch-diameter steel outlet pipe near the upstream toe. The outlet pipe extends approximately 460 feet under the left portion of the dam to a 24-inch-diameter gate valve located in the Outlet Meter Vault near the downstream toe of the dam. Adjacent to the access road and approximately 15 feet downstream of the Outlet Meter Vault is the Outlet Valve Vault where the 24-inch-diameter line has a 24-inch-diameter butterfly valve to serve as an emergency blowoff valve (Figure 1).

SECTION 2: FIELD MEASUREMENTS

2.1 GENERAL

There are 16 piezometers, eight seepage subdrains, and seven survey monuments being monitored at Rattlesnake Canyon Dam. Benchmark BM-4 was removed in August 2016 due to the construction and will be replaced. Readings were discontinued on Observation Well OW-3 in August 2016 due to the construction, but the District plans to resume readings of this piezometer once the construction is complete.

District personnel measure the water levels in the piezometer, observation wells, and reservoir, and seepage flow rates from the eight subdrains monthly and immediately following significant seismic events. The survey monuments are surveyed annually by a licensed surveyor under contract with the District. Precipitation is measured at an on-site rain gage.

Figure 1 is a Site and Instrumentation Plan showing the layout of the dam and appurtenances, as well as the locations of the piezometers, seepage collection subdrains, and survey monuments. Figure 2 shows Section A-A, which is located at the maximum section of the dam. As used in this report, the left and right designations are as viewed looking downstream.

During the 12-month review period, the reservoir water surface elevation varied from a minimum elevation of 375.0 feet to a maximum elevation of 402.4 feet (about 15 feet below the dam crest). The reservoir elevations that were read on the same dates as the instrumentation are shown in Table 2.

2.2 PIEZOMETERS

A piezometer is a small-diameter well used mainly to measure water levels. It is typically installed as a casing in a vertical borehole and has a discrete perforated zone near its bottom to enable monitoring of changes in groundwater levels within that zone. More than one piezometer can be installed within a single, larger-diameter outer well casing. These groups of piezometers are often referred to as multi-stage or nested piezometers. The tip of each piezometer is generally placed at its own discrete depth range within the outer well casing. The outer well casing is perforated along the vertical zones corresponding to the depths of the piezometer tips.

There are 16 piezometers currently being monitored at Rattlesnake Canyon Dam (P-1A, P-2, P-3A, P-30A/B, P-35A/B/C, P-52, P-61, P-62, P-63, P-64, P-65, P-66, and P-67). There are three nested piezometers, Piezometers P-1A/B, P-30A/B and P-35A/B/C, each having two or three piezometers in them, designated as A, B, or C.

Table 1 lists information about each piezometer, observation well, and flow drain, and indicates whether they are operational or abandoned. The location of each piezometer and observation well is shown on Figure 1. On Section A-A' (Figure 2), for the selected piezometers, the maximum

historical water levels since 1986 are shown along with the maximum and minimum piezometer water levels recorded during the 12-month review period (January 2017 through December 2017).

Table 2 provides the reservoir water surface elevation and piezometer water levels for the 10-year period from January 2008 through December 2017. Figures 3A through 3E are graphical plots of piezometer water levels and reservoir water surface elevations during the two-year period from January 2016 through December 2017. Figures 4A through 4E are graphical plots that cover a 10-year period from January 2008 through December 2017.

Presented below for each piezometer is a summary of the water level measurements during the 12-month review period and a discussion of the historical trends and any significant trends or changes that were noted in the reported measurements.

Piezometer P-1A is located on the crest of the dam, near the maximum section of the dam. The tip of Piezometer P-1A is located near the underlying bedrock below the dam, and measures water surface levels in the alluvium. The length of the piezometer was extended in January 2005 by about two feet. According to previous reports, the District attempted to clear this piezometer by performing jetting in both March and August of 2008. After the jetting was completed, the water surface elevations in P-1A eventually returned to a similar elevation as observed prior to the jetting. A reading taken on August 30, 2017 in P-1A shows a sudden increase in the water level, followed by water levels returning to below Elevation 356 feet. This single measurement is likely erroneous. The water levels observed in Piezometer P-1A during this 12-month review period were consistent with historical levels which is generally between 350 and 360 feet.

Piezometer P-2 is located on the crest of the dam, near the maximum section of the dam and has its tip located in the embankment fill. According to a previous report (AECOM, 2016), "dry" readings at depths ranging from 15.9 to 17.4 feet had occurred on numerous occasions during and after June 2005 while the piezometer as-built depth is 57.2 feet. The District jetted the piezometer in 2008 but did not succeed in unblocking it. In July 2015, the piezometer was jetted, vacuumed and filled with water to the top of the casing. During the period for about eight months after the maintenance cleaning, water level readings were shallower (ranging from 3.8 to 15.3 feet) than those measured prior to the cleaning. Since March 2016, the water level readings had returned to what was observed prior to the 2015 cleaning (depth ranging from about 15 to 17 feet). P-2 remained fairly consistent throughout the review period with water level elevations between 402.8 feet and 403.0 feet. Water levels recorded in P-2 have been higher than the water surface elevation of the reservoir throughout the review period. GENTERRA recommends bailing out this piezometer to further evaluate the condition of Piezometer P-2. GENTERRA also recommends the District should have the elevation of top of casing surveyed and should measure the depth to the bottom of piezometer periodically to verify that the casing is not blocked to its entire as-built depth, and to confirm the elevation of the bottom of the piezometer.

Piezometer P-3A is located on the downstream bench at Elevation 385 feet which has the tip in foundation bedrock. According to a URS report dated 2008, the District reported "dry" readings

with a depth ranging from 38 to 40 feet in and after May 2005, whereas the piezometer as-built depth is 87.1 feet. The District jetted the piezometer in March 2008 and was successful in unblocking it to a depth of 83.5 feet. In July 2015, the piezometer was jetted, vacuumed and filled with water to the top of the casing. The water levels observed in Piezometer P-3A during this 12-month review period were consistent with historical levels which is generally between 336 and 350 feet. It showed water levels that responded slightly to reservoir fluctuations.

Piezometer P-30A is located on the crest of the dam which has the tip in the embankment material. On May 31, 2006 P-30A was observed to be blocked at a depth of 3.3 feet whereas the piezometer as-built depth is 49.1 feet. The District jetted the piezometer in 2008 but did not succeed in unblocking the piezometer. In July 2015, the District confirmed that the standpipe is blocked at a shallow depth and no further attempt was made to unblock the piezometer. In April 2016, AECOM recommended Piezometer P-30A be abandoned due to long-term blockage. No reading was taken since May 2006. GENTERRA has recommended another attempt to clear the blockage in Piezometer P-30A before deciding to abandon it altogether. *(Please note that this was subsequently performed and will be addressed in the next annual report for 2018).*

Piezometer P-30B is located on the crest of the dam which has the tip in the embankment material at a greater depth than Piezometer P-30A. On May 31, 2006 P-30B was observed to be blocked at a depth of 47.2 feet whereas the piezometer as-built depth is 83.7 feet. The District jetted the piezometer in August 2008 and succeeded in unblocking the piezometer to a depth of 85.6 feet, which is two feet deeper than the as-built casing depth. In July 2015, the piezometer was jetted, vacuumed and filled with water to the top of the casing. The water levels observed in Piezometer P-30B during this 12-month review period were consistent with historical levels which is generally between Elevations 355 and 380 feet and responds somewhat to reservoir fluctuations. GENTERRA recommends the District should have the elevation of top of casing surveyed and should measure the depth to the bottom of piezometer periodically to verify that the casing is not blocked to its entire as-built depth, and to confirm the elevation of the bottom of the piezometer.

Piezometers P-35A, P-35B, and P-35C are located on the downstream bench at Elevation 385 feet. P-35A measures water levels in the embankment material downstream of and above the inclined chimney drain. The water levels did not fluctuate much throughout the 12-month review period and remained generally "dry" around Elevation 357.3 feet. Piezometers P-35B and P-35C are located in the sand drain and chimney drain respectively. Both showed minor fluctuations throughout the review period. Piezometer P-35B showed slight response to reservoir fluctuations. A reading taken on November 30, 2010 in Piezometer P-35C is about three feet below the bottom of the piezometer and is therefore considered as erroneous. The water levels observed in Piezometers P-35A, B, and C during this 12-month review period were within historical levels.

Piezometer P-52 is located on the crest of the dam which has the tip in the foundation bedrock near the right abutment. On August 30, 2005 and in some subsequent readings, P-52 was reported as "dry" at a depth of 34.8 feet whereas the piezometer as-built depth is 59.8 feet. The District jetted the piezometer in August 2008 and succeeded in unblocking the piezometer to a depth of 58.5 feet.

The water levels observed in Piezometer P-52 during this 12-month review period were consistent with historical levels which is generally between 361 and 397 feet and does respond to reservoir fluctuations.

Piezometer P-61 is located near the downstream toe of the dam at the contact with the left abutment, with the tip in the foundation bedrock. Piezometer P-61 was installed in late 2004 and readings began on January 18, 2005. During the 12-month review period, water levels were consistent with historical levels and generally responds to reservoir fluctuations.

Piezometer P-62 is located in the northern portion of the right abutment stability berm and has the tip in the foundation bedrock. Piezometer P-62 shows a correlation with the reservoir fluctuations. The water levels observed in Piezometer P-62 during this 12-month review period were generally consistent with historical levels.

Piezometer P-63 is located on the crest of the dam with the tip in the left abutment bedrock. In August 2008, the piezometer was observed to be blocked at a depth of 59 feet whereas the piezometer as-built depth is 87.08 feet. The District jetted the piezometer in late August 2008 to a depth of 79 feet. Based on Sheet 4 of the Right Abutment Stability Berm drawings by GENTERRA (as-built revisions dated May 2006), the piezometer polyvinyl chloride (PVC) casing is solid except for the bottom five feet, where it is slotted. Therefore, it is apparent that the jetting did not succeed in unblocking the piezometer to the level of the slotted section. On May 20, 2009, excess water was removed from the piezometer. Water levels in the piezometer had measured 21.5 feet before the operation to 48.7 feet afterward, and since then has gradually dropped to around 53 feet.

In July 2015, the District jetted, vacuumed and filled Piezometer P-63 with water to the top of the casing. The water level readings had not shown any response as a result of that maintenance cleaning. In April 2016, AECOM recommended that Piezometer P-63 be abandoned due to long-term blockage. The water levels observed in Piezometer P-63 during this 12-month review period were generally between 368 and 403 feet and do not respond to reservoir fluctuations. GENTERRA recommends a maintenance cleaning to further evaluate the condition of Piezometer P-63. *(Please note that this was subsequently performed and will be addressed in the next annual report for 2018).* GENTERRA also recommends the District should have the elevation of top of casing surveyed and should measure the depth to the bottom of piezometer periodically to verify that the casing is not blocked to its entire as-built depth, and to confirm the elevation of the bottom of the piezometer.

Piezometer P-64 is located on the downstream bench at Elevation 385 feet and has its tip in foundation alluvium. Piezometer P-64 was installed in late 2004 and readings began on January 18, 2005. During the 12-month review period, water levels were consistent with historical levels and generally responds to reservoir fluctuations.

Piezometer P-65 is located in the southern portion of the right abutment stability berm. Piezometer P-65 was installed in late 2004 and readings began on January 18, 2005. P-65 is located to the south of P-62, further from the reservoir, and it exhibited some correlation throughout the review period

with the reservoir water surface elevation fluctuations. The water levels observed in Piezometer P-65 during this 12-month review period were within historical levels.

Piezometer P-66 is located at the downstream toe of the dam with the tip in the foundation bedrock. Piezometer P-66 was installed in late 2004 and readings began on January 18, 2005. Piezometer P-66 showed some correlation with reservoir fluctuations and was generally consistent with historical levels.

Piezometer P-67 is located at the downstream toe of the dam. Piezometer P-67 was installed in late 2004 and readings began on January 18, 2005. Piezometer P-67 showed some correlation with reservoir fluctuations and was generally consistent with historical levels.

Observation Wells OW-1, OW-2 and OW-3 (formerly identified as OW97-3, OW97-2, and OW97-1, respectively) are located to the north of the spillway. OW-1 and OW-2 were removed in August 2016 due to grading on a residential development in the area where the wells were located. Readings were discontinued at OW-3 in August 2016 due to the construction, but the District plans to resume readings of this observation well once the construction is complete.

Based on GENTERRA's review of the piezometer data, there are no indications of any adverse conditions in the dam embankment, abutments, right abutment stability berm, or foundation. The District should have the elevations of tops of casings surveyed and should measure the depth to the bottom of each piezometer periodically to verify that the casings are not blocked to their as-built depth, and to confirm the elevation of the bottom of the piezometer. GENTERRA will continue to closely monitor the water levels in each piezometer.

2.3 SEEPAGE FLOWS

Several modifications to the seepage monitoring system have occurred over the years. Seepage flow rates from seven subdrains are currently being measured monthly at eight flow points by the District. Six subdrains (2, 3, 4, 5, 8 and 11) are monitored at six flow points (FP-2, FP-3, FP-4, FP-5, FP-8 and FP-11), which are assigned the same identification number as the drain. These six flow points are located in the Seepage Vault shown on Figure 1. The remaining two flow points, FP-1 North and FP-1 South (or FP-1N and FP-1S), are read in Manhole No. 1, which is located about 600 feet downstream of the Seepage Vault structure.

The previously existing Manholes 2, 3, and 4, and Flow Points FP-9 and FP-10 were removed as part of the alterations to the dam. A new Seepage Vault structure was constructed to replace the three manholes that were removed.

Flow Points FP-2, FP-3, and FP-4 convey flow from the chimney drain within the dam. Flow Point FP-5 conveys water from the Longitudinal Drain along the right portion of the downstream bench, as well as water from the Groin Drain along the right abutment contact. Flow Point FP-8 conveys

water from the toe drain (Subdrain 8). Flow Point FP-11 conveys water from Subdrain 11 in the downstream right abutment contact.

Prior to April 2008, the seepage flow rate measured from Flow Point FP-1 was sometimes recorded as a combined measurement of Flow Points FP-9 and FP-10, and no record was kept of the individual readings. Since April 2008, the measurements of Flow Points FP-9 and FP-10 have been recorded separately as Flow Points FP-1 South and FP-1 North, respectively. Flow Point FP-1 North measures the flow from the spillway stilling basin in Subdrain 10, and Flow Point FP-1 South represents the combined flow rate from the new Seepage Vault, which contains Subdrains 2, 3, 4, 5, 8, and now 11.

Seepage flow rates for the past 10 years at the subdrain flow points are listed in Table 3. Figures 5A, 5B, and 5C present graphs of the seepage flow rates for the 2-year period from January 2016 through December 2017, and the graphs in Figures 6A, 6B, and 6C cover a 10-year period from January 2008 through December 2017.

During this 12-month review period, the maximum discharge measured was 7.29 gallons per minute (gpm) in Flow Point FP-1 North, and the minimum discharge was 0 gpm in several flow points. There has been no sign of increased turbidity or suspended solids in the subdrain flows, thereby indicating that there has probably not been any internal erosion or piping of materials from the dam or the abutments. Based on GENTERRA's review of the subdrain data, the seepage flow rates appear to be consistent with historical flow rates and there are no indications of any adverse conditions.

2.4 MOVEMENT SURVEYS

A total of seven survey monuments (A, B, B-1, C, D, E, and E-1) are being surveyed at Rattlesnake Canyon Dam. All seven survey monuments and two benchmarks (BM-1 and BM-3) are located on the crest of the dam spanning from left abutment to right abutment (Figure 1).

There were originally four benchmarks, BM-1, BM-2, BM-3 and BM-4. Benchmarks BM-1 and BM-3 are located on the left abutment of the dam. Benchmarks BM-2 and BM-4 were both located on the right abutment of the dam, to the right of the spillway channel. Benchmark BM-2 was destroyed in 1996, and BM-4 was destroyed in 2016. Benchmarks BM-3 and BM-4 were being used as the left and right control points respectively to develop the control line for the horizontal surveys performed from 2003 through 2015. As a result of Benchmarks BM-2 and BM-4 both being destroyed, Survey Monument E-1 was used as the new control point on the right side of the dam to develop the control line. The District plans to establish a new benchmark on the right abutment once the construction for a residential development has been completed on the adjacent property so that a new control line can be established and horizontal movement of Surface Survey Monument E-1 can be measured.

Survey Monuments A, C, D, and E were initially read on October 19, 1985; for Survey Monument B-1 was on October 5, 1990; and for Survey Monuments B and E-1 on May 3, 2001. It should be noted that there is a data gap of about 26 years from the date the dam was constructed in 1960 to the initial survey beginning in 1985.

The survey monuments are surveyed annually by a licensed surveyor under contract with the District. Bush & Associates, Inc. performed the last survey of the survey monuments on July 25, 2016. No survey was performed during the year 2017.

Table 4 presents the horizontal movement of the survey monuments relative to their baseline measurements, whereas Table 5 presents the cumulative horizontal displacement of the survey monuments. Table 6 presents the elevations of the survey monuments, whereas Table 7 presents the cumulative vertical movement of the survey monuments. Tables 4 through 7 cover a date range from 1985 through 2017. Figures 7 and 8 are graphical plots of the cumulative horizontal displacement and cumulative vertical movement of survey monuments from 1985 through 2017, respectively. Since no survey was performed in 2017, there is no data entered for 2017 in the tables or graphs for horizontal or vertical movement.

No measurement was taken of Survey Monument E during the survey performed on April 28, 1999. According to the notes provided by the surveyor, Survey Monument E was paved over and disturbed during the time between the survey performed in 1998 and the survey performed in 2000. This is likely the cause of the downstream movement of 0.06 feet measured between 1998 and 2000 (Table 4). The displacement calculated for Survey Monument E, which was destroyed and reestablished, assumes that no displacement occurred between the last reading on the original monument (1998) and the first reading on the new monument (2000).

The data indicate that Survey Monuments B, B-1, C, D, E and E-1 show a gradual horizontal movement downstream from the baseline, with a maximum downstream movement of 0.125 feet recorded at Survey Monument E on April 21, 2014. The same maximum downstream movement of 0.125 feet was also recorded at Survey Monument B on July 25, 2016. The maximum horizontal movement of 0.10 feet upstream was recorded on August 19, 1987 at Survey Monument A. Comparison of the most recent survey data (2016) with the previous year's data indicate that the largest horizontal movement was 0.005 foot (0.06 inch) in both the downstream direction for Survey Monument B and upstream direction for Survey Monument A (Table 4). Survey Monuments B-1, C, D, E, and E-1 did not have any change in horizontal movement.

As illustrated on Figure 7, the cumulative horizontal displacement data indicate minor fluctuations in movement in both the upstream and downstream direction since 1985. As of 2016, the maximum cumulative horizontal displacement in the downstream direction was 0.10 foot (1.2 inches) at Survey Monument C (Table 5).

The data indicate a maximum settlement of 0.215 foot (2.58 inches) recorded at Survey Monument A on May 22, 2003. Comparison of the most recent survey data (2016) with the previous year's data

indicate that the largest vertical movement was an uplift of 0.01 foot (0.12 inch) at Survey Monuments D, E, and E-1 (Table 6), and a settlement of 0.005 foot (0.06 inch) at Survey Monument A.

As illustrated on Figure 8, the cumulative vertical movement data indicate that both uplift and settlement have occurred during the years from 1985 through 2016. As of 2016, the maximum cumulative uplift was 0.08 foot (0.96 inch) at Survey Monument E, and the maximum cumulative settlement was 0.160 foot (1.92 inches) at Survey Monument A (Table 7).

Based on GENTERRA's review of the survey data, the horizontal and vertical displacements of monuments appear to be consistent with historical surveys and there are no indications of any adverse conditions, as determined from data obtained through 2016.

SECTION 3: FIELD EVALUATIONS

3.1 FIELD EVALUATION OF APRIL 5, 2017

A field evaluation of Rattlesnake Canyon Dam and Reservoir was performed on April 5, 2017 by Nicholas M. Josten, P.E. and J. Will Kulikowski of GENTERRA; Bill Wesson and Mike Chandler of the District; and Brandon Cruz, P.E. of DSOD. The reservoir water surface was at an elevation of 391.6 feet at the time of the field evaluation. Photographs were taken and are in the project files at GENTERRA for comparison with previous and future field evaluations.

3.1.1 DAM

The upper portion of the upstream face of the dam is surfaced with asphalt concrete (AC) to approximate Elevation 385.0 feet. The AC appeared to be in satisfactory condition. The lower portion of the upstream slope is not lined and was not visible due to the reservoir level. No signs of settlement or instability of the upstream face of the dam were observed.

The crest of the dam is surfaced with AC and was in satisfactory condition. During the previous field evaluation dated May 26, 2016, minor surficial longitudinal cracks was observed in the AC along the downstream portion of the crest of the dam and did not appear to have changed in length or width. This minor cracking should continue to be monitored in the future and plans for patching and repair should be made if the cracking worsens. There were no signs of settlement or instability.

The downstream face of the dam is covered with vegetation and has one bench. The vegetation on the downstream slope of the dam was trimmed and was at a satisfactory height. There were no signs of settlement or instability observed on the downstream face of the dam. There were no signs of recent rodent activity along the downstream face of the dam. The rodent abatement program for the dam is ongoing and appears to be working satisfactorily.

The right abutment stability berm appears to be in good condition. No signs of settlement or instability were observed in the berm. There was no recent rodent activity observed. Erosion gullies were observed near the contact between the dam and the right abutment stability berm, close to the right, downstream groin of the dam, in the roadway located on the right side of the dam. One of the erosion gullies measured approximately 30 feet long, up to three feet deep, and up to two feet wide. The District should consider repairing this gully immediately. The most economical and short-term repair option is placing compacted fill in the erosion gullies located in the right downstream groin of the dam, and then placing a layer of crushed rock over the compacted fill to prevent future erosion from occurring in this area. The District should obtain appropriate earthwork recommendations from the District's Dam Safety Consultant before starting this repair.

3.1.2 SPILLWAY

The spillway (located on the right side of the dam) appeared to be in satisfactory condition. The amount of debris in the spillway channel that was noted during previous field evaluations was still present and had increased slightly. It is likely that this debris was the result of eroded material

falling from the adjacent new housing development construction. The District should consider removing the debris from the spillway channel.

A large amount of cat-tails was observed growing in the stilling basin. This is a recurring maintenance issue for the District, and the cat-tails can only be removed during certain periods of the year due to ecological restraints. The District plans to continue to clear the cat-tails from the stilling basin during the periods of the year when removal is allowed.

A minor amount of debris and vegetation was observed in the channel downstream of the stilling basin. The District should consider removing the sediment and vegetation from the channel so that is does not impact the performance of the spillway.

3.1.3 OUTLET WORKS

The outlet works is controlled by four upstream gates and two downstream valves. The controls for the inlet valves are located at the upstream edge of the crest of the dam and appeared to be in satisfactory condition. The upper intake was above the water surface and appeared to be in good condition. The 24-inch-diameter steel outlet pipe has a 24-inch-diameter butterfly blowoff valve located downstream of the dam at the Outlet Valve Vault which was observed during this evaluation.

DSOD recommends that the outlet and the emergency blow-off valves be exercised and documented in a log at least once per year to confirm operability. DSOD requires the valves be exercised once every three years in the presence of a DSOD representative.

On April 20, 2015, the following was observed in the presence of a DSOD representative: the "Main," "Top," and "Middle" upstream gates were fully cycled; the "Bottom" upstream gate was cycled about 10% due to poor water quality; the downstream gate valve on the main service line was fully cycled; and, the downstream blowoff valve was not operated since the blind flange was removed and there would be no way to control the flow coming out of the vault. The District had not routinely exercised the blowoff valve because there was no way of controlling the flow out of the vault containing the emergency blowoff valve. The District is planning to redesign the 24-inch-diameter butterfly blowoff valve and Outlet Valve Vault so that the blowoff valve can be operated for routine exercising of the valves.

Mr. Wesson of the District reported that the four upstream outlet gates and downstream blowoff valve were last exercised through a full cycle on June 12, 2016, however this was not done in the presence of a DSOD representative.

3.1.4 SEEPAGE

There are seven drains measured at eight seepage flow points. Six of the drains (2, 3, 4, 5, 8, and 11) are monitored by six seepage flow points located in the Seepage Vault shown on Figure 1. The remaining two seepage flow points, "1 North" and "1 South" are measured in Manhole No. 1, which is located about 600 feet downstream of the Seepage Vault. Seepage flow rates are measured

monthly by District personnel in the Seepage Vault and Manhole No. 1 located downstream of the dam.

During the field evaluation, the Seepage Vault structure was opened and appeared to be in satisfactory condition. The seepage flow rates in the Seepage Vault structure were not measured.

3.2 FIELD EVALUATION OF DECEMBER 21, 2017

A field evaluation of Rattlesnake Canyon Dam and Reservoir was performed on December 21, 2017 by Douglas A. Harriman, P.E. and J. Will Kulikowski of GENTERRA; and Mike Chandler of the District. The reservoir water surface was at an elevation of 380.4 feet at the time of the field evaluation. Photographs were taken and are in the project files at GENTERRA for comparison with previous and future field evaluations.

3.2.1 DAM

The upper portion of the upstream face of the dam is surfaced with asphalt concrete (AC) to approximate Elevation 385.0 feet. Previous field evaluations noted minor cracking on the upstream slope. During this field evaluation, small vegetation was observed growing through the cracks in some areas. The AC surface is gradually weathering in some areas. The minor cracking should continue to be monitored in the future and plans for patching and repair should be made if the cracking worsens. The lower portion of the upstream slope is not lined, and the visible portion appeared to be in good condition. No signs of settlement or instability of the upstream face of the dam were observed.

The crest of the dam is surfaced with AC and was in satisfactory condition. The minor surficial longitudinal cracks in the AC along the downstream portion of the crest of the dam did not appear to have changed in length or width since the previous field evaluation. There were no signs of settlement or instability.

The downstream face of the dam is covered with sparse vegetation and has one bench. The vegetation on the downstream slope of the dam was trimmed and was at a satisfactory height. There were no signs of settlement or instability observed on the downstream face of the dam. There were no signs of recent rodent activity along the downstream face of the dam. The rodent abatement program for the dam is ongoing and appears to be working satisfactorily.

The right abutment stability berm appeared to be in satisfactory condition. Previous field evaluation noted erosion gullies between the dam and right abutment stability berm in the roadway. During this field evaluation, it was observed that the area was repaired with compacted soil and gravel, and sand bags were added. No signs of settlement or instability were observed in the berm. There was no recent rodent activity observed.

3.2.2 SPILLWAY

The spillway (located on the right side of the dam) appeared to be in satisfactory condition. The amount of debris in the spillway channel that was noted during previous field evaluations was still present and had increased. It is likely that this debris was the result of eroded material falling from the adjacent new housing development construction. The District should consider removing the debris from the spillway channel.

The large amount of cat-tails that were previously observed in the stilling basin had been removed, but the stilling basin did contain some sediment and debris. Vegetation growth in the stilling basin is a recurring maintenance issue for the District, and the cat-tails can only be removed during certain periods of the year due to ecological restraints.

A minor amount of debris and vegetation was observed in the channel downstream of the stilling basin. The District should consider removing the sediment and vegetation from the channel so that is does not impact the performance of the spillway.

3.2.3 OUTLET WORKS

The outlet works is controlled by four upstream gates and two downstream valves. The controls for the inlet valves are located at the upstream edge of the crest of the dam and appeared to be in satisfactory condition. The upper two intakes were above the water surface and appeared to be in good condition. The 24-inch-diameter gate valve and butterfly blowoff valve were not observed during this field evaluation.

GENTERRA has been informed by the District that the four upstream outlet gates and the downstream gate valve were exercised on April 18, 2017, however the exercising was not done in the presence of a DSOD representative.

3.2.4 SEEPAGE

During this field evaluation, the Seepage Vault structure was opened and appeared to be in satisfactory condition. The seepage flow rates in the Seepage Vault structure were not measured.

SECTION 4: CONCLUSIONS AND RECOMMENDATIONS

4.1 CONCLUSIONS

4.1.1 Based on the available data, the dam appears to be performing satisfactorily.

4.1.2 Piezometer water levels are consistent with historical values and trends. Piezometers P-2, P-30A and P-63 are likely not providing reliable data and may be plugged. Also, some piezometers had dry readings that were above the bottom elevation of the piezometer, Piezometer P-30B had a new bottom elevation two feet deeper than the as-built casing depth, and Piezometer P-35C had a reading reported below the tip elevation.

4.1.3 Seepage flow rates are consistent with historical values and trends.

4.1.4 Horizontal and vertical movement appears to be normal and consistent with historical values and trends.

4.1.5 The District has been periodically removing the vegetation in the spillway channel near the bottom of the spillway, and in the stilling basin.

4.1.6 The four upstream outlet gates and the downstream gate valve were exercised on April 18, 2017, however not in the presence of a DSOD representative. The downstream blowoff valve was not exercised due to the pending redesign of the outlet pipe.

4.2 RECOMMENDATIONS

4.2.1 The District should continue to remove the sediment and vegetation in the spillway channel and stilling basin on a routine basis. During routine visits to the site, District personnel should continue to watch the spillway channel for any accumulation of debris. The District has notified the developer to remove debris from the spillway channel.

4.2.2 GENTERRA recommends a maintenance cleaning of Piezometers P-2, P-30A, and P-63 to further evaluate the condition of these piezometers. Measurements of the water level in the piezometer should be recorded before, during and after the bailing and the results should be evaluated to determine if the piezometer is plugged, if there is another problem with the piezometer, or if it should be abandoned. *Piezometers Nos. P-2, P-30A and P-63 were subsequently cleaned by GENTERRA in February 2018 as will be discussed in the next annual report.*

4.2.3 It is our understanding that the District is planning to adjust the vault for the emergency blow-off valve so that a regular schedule can be started for exercising the

valve to confirm it still operates. Since the emergency blow-off valve is a critical feature for dam safety, the District should expedite this process so that the emergency blow-off valve can be operated. We recommend that this repair be performed as soon as possible.

4.2.4 The District is planning to install a new benchmark on the right abutment of the dam so that a new control line can be established and horizontal movement of Survey Monument E-1 can be included in future surveys.

4.2.5 During the daily, weekly, and monthly operations at the dam, District personnel should always be observing the condition of the dam and appurtenances, looking for signs of distress or movement, increased seepage, or other unusual conditions, and verifying that the critical facilities are functional. Any unusual observations should be reported immediately to a District supervisor and the District's Dam Safety Consultant under contract at the time.

4.2.6 GENTERRA recommends a special evaluation of the dam immediately after any earthquake with a Magnitude of 4.5 or greater within a 50-mile radius of the dam, and/or any seismic event that would cause heavy furniture overturning in areas in the vicinity of the dam and reservoir.

SECTION 5: LIMITATIONS

This report represents the results of our surveillance program for Rattlesnake Canyon Dam, covering the period from January 2017 through December 2017. Professional services were provided to evaluate the performance of the existing dam based upon review of previous data, field inspections, instrumentation readings, and surveys.

The conclusions and professional opinions presented herein were developed by GENTERRA Consultants, Inc. for the Irvine Ranch Water District in accordance with generally accepted engineering principles and practices. We make no other warranty, either express or implied.

SECTION 6: REFERENCES

1. AECOM, 2016, *2015 Annual Surveillance Report for Rattlesnake Canyon Dam, DSOD Dam No. 1029-003, Orange County, California;* by AECOM; dated April 21, 2016.

2. AECOM, 2015, *2014 Annual Surveillance Report for Rattlesnake Canyon Dam, DSOD Dam No. 1029-003, Orange County, California;* by AECOM; dated May 22, 2015.

3. California Department of Water Resources, Division of Safety of Dams (DSOD), 2017, *Dams Within Jurisdiction of the State of California;* by DSOD; dated September 2017.

4. California Department of Water Resources, Division of Safety of Dams (DSOD), 2000, *Dams Within Jurisdiction of the State of California, Bulletin 17-00;* by DSOD; dated July 2000.

5. GENTERRA Consultants, Inc. (GENTERRA), 2012, *Annual Surveillance Report, January 2011 through December 2011 for Rattlesnake Canyon Dam and Reservoir, No. 1029-3, Irvine, California;* by GENTERRA; dated May 10, 2012.

6. GENTERRA, 2006, *Annual Surveillance Report, July 2004 through June 2005 for Rattlesnake Canyon Dam and Reservoir, Dam No. 1029-3, Irvine, California;* by GENTERRA; dated April 3, 2006.

7. GENTERRA, 2000, *Summary Report, Right Abutment Stability Analysis, Rattlesnake Canyon Dam, Irvine, California;* by GENTERRA; dated June 13, 2000.

8. GENTERRA, 1999, *Summary Report, Monitoring System Review and Revision, Rattlesnake Canyon Dam and Reservoir, Irvine, California;* by GENTERRA; dated August 24, 1999.

9. URS Corporation, 2014, *2013 Annual Surveillance Report for Rattlesnake Canyon Dam, DSOD Dam No. 1029-003, Orange County, California;* by URS; dated June 30, 2014.

TABLES

TABLE 1
RATTLESNAKE CANYON DAM
DETAILS FOR PIEZOMETERS, OBSERVATION WELLS, AND SEEPAGE FLOW POINTS

ID	Location	Original Reference Data			Current (2005) Reference Data			Material at Tip (if known)	Installation or First Reading	Final Reading
		Top Elev. (ft)	Tip Elev. (ft)	Depth (ft)	Top Elev. (ft)	Tip Elev. (ft)	Depth (ft)			
Active Operating Piezometers										
P-1A	Dam Crest	418.50	287.40	131.1	420.43	287.40	133.0	Foundation Alluvium	4/1965	--
P-2	Dam Crest	418.70	363.40	55.3	420.62	363.40	57.2	Embankment	4/1965	--
P-3A	Downstream Bench Elev. 385	385.40	303.70	81.7	385.40	303.70	81.7	Foundation Bedrock	4/1965	--
P-30A	Dam Crest	417.90	371.70	46.2	420.81	371.70	49.1	Embankment	1966	--
P-30B	Dam Crest	417.90	337.10	80.8	420.81	337.10	83.7	Embankment	1966	--
P-35A	Downstream Slope just above Bench Elev. 385	385.30	357.30	28.0	388.73	357.30	31.4	Embankment D/S of and above Chimney Drain	1966	--
P-35B	Downstream Slope just above Bench Elev. 385	385.50	313.40	72.1	388.45	313.40	75.1	Chimney Drain	1966	--
P-35C	Downstream Slope just above Bench Elev. 385	385.30	343.20	42.1	388.34	343.20	45.1	Chimney Drain	1966	--
P-52	Dam Crest near Right Abutment	418.60	361.20	57.4	421.03	361.20	59.8	Foundation Bedrock	1976	--
P-61	Downstream Left Groin	354.00	311.00	43.0	357.01	311.00	46.0		9/28/2004	--
P-62	On Right Abutment Stability Berm	419.00	365.50	53.5	412.03	365.50	46.5		1/18/2005	--
P-63	Dam Crest at Left Abutment	418.00	335.00	83.0	422.08	335.00	87.1	Abutment Bedrock	9/28/2004	--
P-64	Downstream Bench Elev. 385	385.00	302.00	83.0	388.00	302.00	86.0	Foundation Alluvium	9/28/2004	--
P-65	On Right Abutment Stability Berm	370.00	325.50	44.5	374.72	325.50	49.2		1/18/2005	--
P-66	Downstream near Toe of Dam	352.00	301.00	51.0	359.31	301.00	58.3	Foundation Bedrock	9/28/2004	--
P-67	Downstream near Toe of Dam	352.00	282.50	69.5	355.04	282.50	72.5	Foundation Bedrock	1/18/2005	--
OW-3	Right Abutment just above Spillway Inlet	--	--	--	418.87	386.27	32.6	Abutment Bedrock	3/29/2001	--
Abandoned Piezometers										
P-1B	Dam Crest	385.4	--	--	--	--	--	Foundation Alluvium	4/1965	12/1969
P-3B	Downstream Bench Elev. 385	385.4	345.2	40.2	--	--	--		4/1965	3/30/2004
P-4	Downstream Bench Elev. 385	385.3	286.8	98.5	--	--	--	Foundation Bedrock	4/1965	3/30/2004
P-5	Downstream Bench Elev. 385	385.2	345.2	40.0	--	--	--	Embankment	4/1965	3/30/2004
P-6A	Downstream near Toe of Dam	350.6	333.3	17.3	--	--	--	Foundation Alluvium	4/1965	3/30/2004
P-6B	Downstream near Toe of Dam	350.6	292.0	58.6	--	--	--	Foundation Bedrock	4/1965	3/30/2004
P-7A	Downstream Toe of Dam	343.5	334.6	8.9	--	--	--		9/1965	Unknown
P-7B	Downstream Toe of Dam	343.5	283.2	60.3	--	--	--		9/1965	Unknown
P-8A	Downstream Toe of Dam	340.6	295.9	44.7	--	--	--	Alluvium	9/1965	3/30/2004
P-8B	Downstream Toe of Dam	340.5	325.2	15.3	--	--	--	Alluvium	9/1965	3/30/2004
P-9A	Downstream Toe of Dam	341.4	318.8	22.6	--	--	--	Alluvium	9/1965	3/30/2004
P-9B	Downstream Toe of Dam	341.4	331.1	10.3	--	--	--	Alluvium	9/1965	3/30/2004
P-21	Downstream near Toe of Dam	354.3	328.7	25.6	--	--	--	Abutment Bedrock	6/16/1967	3/30/2004
P-22	Downstream near Toe of Dam	354.2	328.9	25.3	--	--	--		6/16/1967	Unknown
P-23	Downstream Bench Elev. 385	385.8	357.9	27.9	--	--	--	Abutment Bedrock	6/16/1967	3/30/2004
P-27	Right Abutment Stability Berm at Bench Elev. 385	386.7	367.1	19.6	--	--	--	Abutment Sand	6/16/1967	3/30/2004
P-29	Right Abutment Stability Berm above Bench Elev. 385	397.7	382.8	14.9	--	--	--	Abutment Sand	6/16/1967	3/30/2004
P-31A	Dam Crest near Right Abutment	418.3	390.0	28.3	--	--	--	Embankment	1966	3/30/2004
P-31B	Dam Crest near Right Abutment	418.3	364.7	53.6	--	--	--	Embankment	1966	3/30/2004
P-32A	Dam Crest near Right Abutment	417.8	397.7	20.1	--	--	--	Embankment	1966	3/30/2004
P-32B	Dam Crest near Right Abutment	417.8	380.2	37.6	--	--	--	Foundation Bedrock	1966	3/30/2004
P-33	Dam Crest near Left Abutment	417.8	390.0	27.8	--	--	--	Abutment Bedrock	1966	3/30/2004
P-34	Right Abutment in line with crest	--	--	--	--	--	--	Abutment Bedrock	1966	3/30/2004
P-36A	Downstream near Toe of Dam	351.0	338.3	12.7	--	--	--	Embankment	1966	3/30/2004
P-36B	Downstream near Toe of Dam	351.0	307.3	43.7	--	--	--	Foundation Alluvium	1966	3/30/2004
P-37	Right Abutment (downstream)	370.8	346.9	23.9	--	--	--	Abutment	1966 (?)	Unknown
P-38	Downstream of Dam	328.5	292.9	35.6	--	--	--		1966 (?)	3/30/2004
P-42	Downstream of Dam	341.7	321.9	19.8	--	--	--	Foundation Alluvium	1966	3/30/2004
P-51	Dam Crest	417.9	--	--	--	--	--	Foundation Alluvium	1976	3/30/2004
P-53A	Downstream Bench Elev. 385	384.7	--	--	--	--	--	Foundation Bedrock	1976	3/30/2004
P-53B	Downstream Bench Elev. 385	384.9	--	--	--	--	--	Embankment	1976	3/30/2004
P-54	Right Abutment Stability Berm above Bench Elev. 385	390.4	--	--	--	--	--	Abutment Bedrock	1976	3/30/2004
P-55	Right Abutment Stability Berm below Bench Elev. 385	356.0	--	--	--	--	--	Abutment Bedrock	1976	3/30/2004
P-82	Right Abutment near Spillway Inlet	442.0	--	--	--	--	--		12/28/1993	3/30/2004
P-83	Unknown	426.0	--	--	--	--	--		1/31/1994	3/30/2004
P-89	Right Abutment (North of Spillway Chute)	431.0	--	--	--	--	--		12/28/1993	3/30/2004
P-91	Right Abutment just below Dam Crest	439.0	--	--	--	--	--		12/28/1993	3/30/2004
P-92	Right Abutment above Bench Elev. 385	400.0	--	--	--	--	--		12/28/1993	3/30/2004
OW-1	Right Abutment just above Spillway Inlet	--	--	--	468.16	433.46	34.7	Abutment Bedrock	3/29/2001	7/26/2016
OW-2	Right Abutment just above Spillway Inlet	--	--	--	442.91	407.91	35.0	Abutment Bedrock	3/29/2001	7/26/2016
Flow Points										
FP-1	Combined discharge from Subdrains 9 & 10	--	--	--	--	--	--	--	--	3/27/2008
FP-2	Right part of Chimney Drain	--	--	--	--	--	--	--	1960	--
FP-3	Center part of Chimney Drain	--	--	--	--	--	--	--	1960	--
FP-4	Left part of Chimney Drain	--	--	--	--	--	--	--	1960	--
FP-5	Right Abutment contact	--	--	--	--	--	--	--	1969	--
FP-8	Downstream Toe of Dam	--	--	--	--	--	--	--	1966	--
FP-9	Carries discharge from Subdrains 2, 3, 4, 5 & 8 (replaced by FP-1S)	--	--	--	--	--	--	--	1966	4/28/2008
FP-10	Stilling Basin (replaced by FP-1N)	--	--	--	--	--	--	--	1966	4/28/2008
FP-11	Right Abutment Stability Berm	--	--	--	--	--	--	--	1/6/2005	--
FP-1N	Stilling Basin (former FP-10)	--	--	--	--	--	--	--	4/28/2008	--
FP-1S	Carries discharge from Subdrains 2, 3, 4, 5, 8 & 11 (former FP-9)	--	--	--	--	--	--	--	4/28/2008	--

Notes:

1) D/S = Downstream; Elev. = Elevation; FP-1N = Flow Point 1 North; and FP-1S = Flow Point 1 South.
2) Elevations are in feet relative to NGVD29 datum.
3) Information presented herein is based on Woodward-McNeill & Associates (1974), District (2006), and GENTERRA (2007).
4) The list of abandoned piezometers is believed to be incomplete.
5) The District shortened the length of P-62, did not change the lengths of OW-1 to OW-3, and extended the lengths of the remaining operational piezoemters effective 1/18/2005.
6) For Flow Points, "Location" refers to the area in which the flow originates.
7) Several modifications have occurred to the seepage drains and flow points system. Refer to Section 2.3 for details.

TABLE 2
RATTLESNAKE CANYON DAM
PIEZOMETER WATER LEVEL MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Piezometer ID →			P-1A			P-2			P-3A			P-30A		
Top "Reference" Elev. →			418.5	420.43		418.7	420.62		385.4	385.40		417.9	420.81	
Tip Elev. →			287.4	287.4		363.4	363.4		303.7	303.7		371.7	371.7	
Depth of Piezometer →			131.1	133.0		55.3	57.2		81.7	81.7		46.2	49.1	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment
1/31/2008	381.20		61.5	359.0	Dry, Erroneous	16.0	404.6	Dry, Erroneous	38.5	346.9				Blocked; Not Read
2/28/2008	393.10		61.8	358.6	Dry, Erroneous	15.6	405.0		38.5	346.9				Blocked; Not Read
3/27/2008	387.90		31.2	389.2	Cleaning	17.4	403.2	Wet	45.5	339.9				Blocked; Not Read
4/28/2008	404.70		34.2	386.2	Blocked	17.4	403.2		39.7	345.7				Blocked; Not Read
5/28/2008	404.00		36.6	383.8	Blocked	17.4	403.2	Dry, Erroneous	39.5	345.9				Blocked; Not Read
6/25/2008	400.20		38.2	382.2	Blocked	17.4	403.2		40.1	345.3				Blocked; Not Read
7/29/2008	398.70		39.4	381.0	Blocked	17.4	403.2		40.8	344.6				Blocked; Not Read
7/30/2008	398.70	0.00	39.5	380.9	Blocked	17.5	403.1		41.0	344.4				Blocked; Not Read
8/29/2008	395.00	0.00	7.7	412.7	Cleaning	17.6	403.0	Dry, Erroneous	42.7	342.7				Blocked; Not Read
9/25/2008	391.70	0.00	15.6	404.8		17.7	402.9	Dry, Erroneous	43.9	341.5				Blocked; Not Read
10/28/2008	384.05	0.00	23.0	397.4		17.7	403.0		47.0	338.5				Blocked; Not Read
11/26/2008	391.10	1.94	28.2	392.2		17.7	402.9		45.8	339.6				Blocked; Not Read
12/31/2008	397.90	3.20	32.2	388.2		17.7	402.9		42.4	343.0				Blocked; Not Read
1/29/2009	393.40	0.34	34.8	385.6		16.8	403.8		43.5	341.9				Blocked; Not Read
2/25/2009	398.60	3.91	36.8	383.6		17.7	402.9		42.2	343.2				Blocked; Not Read
3/31/2009	393.40	0.16	38.6	381.8		17.6	403.0		43.0	342.4				Blocked; Not Read
4/28/2009	400.70	0.10	40.1	380.3		17.7	402.9		41.1	344.3				Blocked; Not Read
5/18/2009	400.80	0.00	40.8	379.6		17.7	402.9		40.8	344.6				Blocked; Not Read
5/27/2009	400.10	0.00	61.6	358.8		17.6	403.0	Dry, Erroneous	41.0	344.4				Blocked; Not Read
6/29/2009	403.00	0.15	61.0	359.4		17.7	402.9		39.9	345.5				Blocked; Not Read
7/28/2009	396.53	0.00	60.9	359.5		17.7	402.9		41.9	343.6				Blocked; Not Read
8/25/2009	396.60	0.00	60.8	359.6		17.6	403.0		42.2	343.2				Blocked; Not Read
9/30/2009	393.10	0.00	61.1	359.3		17.6	403.0		43.7	341.7				Blocked; Not Read
10/28/2009	401.60	0.42	61.0	359.4		17.7	402.9		40.9	344.5				Blocked; Not Read
11/30/2009	402.50	0.00	60.9	359.5		17.7	402.9		40.1	345.3				Blocked; Not Read
12/29/2009	399.90	2.80	60.8	359.6		17.7	402.9		40.8	344.6				Blocked; Not Read
1/26/2010	401.10	6.75	60.8	359.6		17.6	403.0		40.8	344.6				Blocked; Not Read
2/23/2010	402.50	2.66	60.8	359.6		17.7	402.9	Dry, Erroneous	40.0	345.4				Blocked; Not Read
3/30/2010	400.00	1.25	60.6	359.8		17.7	402.9		40.7	344.7				Blocked; Not Read
4/4/2010	399.60		60.6	359.8		17.7	402.9	Dry, Erroneous	40.9	344.5				Blocked; Not Read
4/27/2010	403.80	1.32	60.6	359.8		17.6	403.0		39.8	345.6				Blocked; Not Read
5/26/2010	403.60	0.03	60.5	359.9		17.6	403.0	Dry, Erroneous	39.7	345.7				Blocked; Not Read
6/29/2010	397.70	0.00	59.4	361.0		17.6	403.0		41.6	343.8				Blocked; Not Read
7/27/2010	396.30	0.00	60.4	360.0		17.6	403.0		42.3	343.1				Blocked; Not Read
8/26/2010	390.70	0.00	60.6	359.8		17.4	403.2		44.2	341.2				Blocked; Not Read
9/28/2010	390.30	0.00	60.6	359.8		17.6	403.0		45.0	340.4				Blocked; Not Read
10/26/2010	403.20	1.56	60.6	359.8		17.2	403.4		41.0	344.4				Blocked; Not Read
11/30/2010	397.10	1.34	60.6	359.8		17.6	403.0		42.0	343.4				Blocked; Not Read
12/28/2010	401.40	9.03	60.6	359.8		17.7	402.9	Dry, Erroneous	40.9	344.5				Blocked; Not Read

Notes:
Elev. = Elevation; in. = Inches.
Elevations are in fee relative to NGVD29 datum.

TABLE 2
RATTLESNAKE CANYON DAM
PIEZOMETER WATER LEVEL MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Piezometer ID →			P-1A			P-2			P-3A			P-30A		
Top "Reference" Elev. →			418.5	420.43		418.7	420.62		385.4	385.40		417.9	420.81	
Tip Elev. →			287.4	287.4		363.4	363.4		303.7	303.7		371.7	371.7	
Depth of Piezometer →			131.1	133.0		55.3	57.2		81.7	81.7		46.2	49.1	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment
1/27/2011	393.80	1.10	60.6	359.8		17.6	403.0	Dry, Erroneous	42.7	342.7				Blocked; Not Read
2/23/2011	391.70	1.17	60.6	359.8		17.7	402.9		44.0	341.4				Blocked; Not Read
3/29/2011	403.00	3.10	60.7	359.7		17.5	403.1		40.6	344.8				Blocked; Not Read
4/27/2011	401.20	0.33	60.7	359.8		17.6	403.0		40.9	344.5				Blocked; Not Read
5/26/2011	399.50	0.48	60.6	359.8		17.8	402.8		41.4	344.0				Blocked; Not Read
6/28/2011	391.00	0.02	60.6	359.8		17.6	403.0		44.0	341.4				Blocked; Not Read
7/26/2011	384.00	0.00	60.8	359.6		17.5	403.1		47.0	338.4				Blocked; Not Read
8/24/2011	382.80	0.00	60.9	359.5		17.5	403.1		47.6	337.8				Blocked; Not Read
9/27/2011	381.80	0.08	61.2	359.2		17.6	403.0		48.2	337.2				Blocked; Not Read
10/26/2011	383.90	0.98	61.2	359.2		17.7	402.9		47.5	337.9				Blocked; Not Read
11/22/2011	389.80	1.46	61.4	359.0		17.6	403.0		45.8	339.6				Blocked; Not Read
12/28/2011	382.30	0.35	61.5	358.9		17.7	402.9		47.5	337.9				Blocked; Not Read
1/25/2012	387.50	1.17	61.7	358.7		17.7	402.9		47.6	337.8				Blocked; Not Read
2/28/2012	381.10	0.79	61.8	358.6		17.6	403.0		48.8	336.6				Blocked; Not Read
3/27/2012	387.70	1.61	62.0	358.4		17.6	403.0		47.1	338.3				Blocked; Not Read
4/23/2012	392.30	1.51	62.0	358.4		17.7	403.0				Not Read; Bees			Blocked; Not Read
5/25/2012	388.30	0.06	62.3	358.1		17.7	402.9		45.6	339.8				Blocked; Not Read
6/13/2012	385.10	0.06	62.1	358.3		17.6	403.0		46.6	338.8				Blocked; Not Read
6/26/2012	386.90	0.00	62.2	358.2		17.6	403.0		46.3	339.1				Blocked; Not Read
7/24/2012	378.00	0.10	62.3	358.1		17.6	403.0		49.0	336.4				Blocked; Not Read
8/8/2012	382.90	0.10	62.4	358.0		17.6	403.0		47.9	337.5				Blocked; Not Read
8/29/2012	382.70		62.5	357.9		17.6	403.0		48.4	337.0				Blocked; Not Read
8/29/2012	382.70	0.00	62.5	357.9		17.6	403.0		48.4	337.0				Blocked; Not Read
9/25/2012	381.90	0.00	62.7	357.7		17.6	403.0		48.0	337.4				Blocked; Not Read
10/24/2012	384.40	0.08	62.8	357.6		17.7	402.9		48.1	337.3				Blocked; Not Read
11/27/2012	389.60	0.86	63.1	357.3		17.6	403.0		45.8	339.6				Blocked; Not Read
12/18/2012	394.70	0.81	63.1	357.3		17.6	403.0		43.9	341.5				Blocked; Not Read
1/23/2013	393.00	1.53	63.1	357.3		17.7	402.9		43.5	341.9				Blocked; Not Read
2/26/2013	391.50	0.49	63.1	357.3		17.7	402.9		44.2	341.2				Blocked; Not Read
3/26/2013	394.40	1.00	63.1	357.3		17.6	403.0		44.1	341.3				Blocked; Not Read
4/25/2013	391.00	0.01	63.0	357.4		17.7	402.9		44.4	341.0				Blocked; Not Read
5/22/2013	392.00	0.00	63.2	357.2		17.7	402.9		43.9	341.5				Blocked; Not Read
6/25/2013	380.60	0.00	63.1	357.3		17.6	403.0		47.4	338.0				Blocked; Not Read
7/23/2013	380.20	0.00	63.2	357.2		17.7	402.9	Dry, Erroneous	48.6	336.8				Blocked; Not Read
8/21/2013	379.60	0.00	63.4	357.0		17.6	403.0	Wet	48.6	336.8				Blocked; Not Read
9/25/2013	382.20	0.00	63.5	356.9		17.6	403.0	Dry, Erroneous	48.4	337.0				Blocked; Not Read
10/29/2013	382.00	0.00	63.7	356.7		17.7	402.9	Wet	48.9	336.5				Blocked; Not Read
11/26/2013	390.10	0.44	63.7	356.7		17.6	403.0	Wet	46.5	338.9				Blocked; Not Read
12/17/2013	394.70	1.10	63.8	356.6		17.6	403.0	Wet	44.1	341.3				Blocked; Not Read

Notes:
Elev. = Elevation; in. = Inches.
Elevations are in fee relative to NGVD29 datum.

TABLE 2
RATTLESNAKE CANYON DAM
PIEZOMETER WATER LEVEL MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Piezometer ID →			P-1A			P-2			P-3A			P-30A		
Top "Reference" Elev. →			418.5	420.43		418.7	420.62		385.4	385.40		417.9	420.81	
Tip Elev. →			287.4	287.4		363.4	363.4		303.7	303.7		371.7	371.7	
Depth of Piezometer →			131.1	133.0		55.3	57.2		81.7	81.7		46.2	49.1	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment
1/28/2014	392.30	0.00	63.8	356.6		17.6	403.0	Wet	43.9	341.5				Blocked; Not Read
2/26/2014	389.90	0.72	63.7	356.7		17.2	403.4	Wet	44.7	340.7				Blocked; Not Read
3/26/2014	387.20		63.8	356.6		17.6	403.0	Wet	45.6	339.8				Blocked; Not Read
3/28/2014	387.20	1.78	63.7	356.7		17.7	402.9	Wet	45.8	339.6				Blocked; Not Read
4/23/2014	393.00	0.34	63.9	356.5		17.6	403.0	Dry, Erroneous	44.4	341.0				Blocked; Not Read
5/28/2014	387.50	0.00	63.9	356.5		17.6	403.0	Dry, Erroneous	45.7	339.7				Blocked; Not Read
6/25/2014	388.70	0.00	63.9	356.5		17.7	402.9	Wet	45.5	339.9				Blocked; Not Read
7/29/2014	382.80	0.00	64.0	356.4		17.6	403.0	Wet	47.4	338.0				Blocked; Not Read
8/28/2014	386.80	0.04	64.0	356.4		17.6	403.0	Wet	46.9	338.5				Blocked; Not Read
9/24/2014	387.90	0.00	64.1	356.3		17.6	403.0	Wet	45.9	339.5				Blocked; Not Read
10/29/2014	383.90	0.00	64.2	356.2		17.3	403.3	Wet	47.4	338.0				Blocked; Not Read
11/21/2014	388.30	0.35	64.2	356.2		17.6	403.0	Wet	46.0	339.4				Blocked; Not Read
12/22/2014	399.80	4.75	64.2	356.2		17.2	403.4	Wet	42.1	343.3				Blocked; Not Read
1/28/2015	396.90	1.25	64.3	356.1		17.7	402.9	Wet	42.5	342.9				Blocked; Not Read
2/24/2015	392.70	0.34	64.2	356.2		17.6	403.0	Wet	43.6	341.8				Blocked; Not Read
3/31/2015	388.90	0.67	64.1	356.3		17.6	403.0	Wet	44.3	341.1				Blocked; Not Read
4/23/2015	390.30	0.20	64.1	356.3		17.7	402.9	Wet	44.6	340.8				Blocked; Not Read
5/28/2015	400.30	1.87	64.1	356.3		17.6	403.0	Wet	41.2	344.2				Blocked; Not Read
6/24/2015	400.70	0.00	64.0	356.4		17.6	403.0	Wet	40.9	344.5				Blocked; Not Read
7/30/2015	400.20	0.00	64.0	356.4		3.8	416.8	Cleaning	41.0	344.4				Blocked; Not Read
8/25/2015	384.00	0.00	63.0	357.4		5.7	414.9		45.1	340.3				Blocked; Not Read
9/23/2015	388.60	2.17	64.0	356.4		8.0	412.6		45.2	340.2				Blocked; Not Read
10/29/2015	387.60	0.16	64.0	356.4		10.4	410.2		45.8	339.6				Blocked; Not Read
11/25/2015	386.90	0.15	64.1	356.3		12.7	407.9		46.0	339.4				Blocked; Not Read
12/23/2015	395.90	1.55	64.1	356.3		13.6	407.0		44.4	341.0				Blocked; Not Read
1/26/2016	401.20	2.86	64.0	356.4		15.0	405.6		41.2	344.2				Blocked; Not Read
2/24/2016	393.60	0.39	64.0	356.4		15.3	405.3		43.3	342.1				Blocked; Not Read
3/29/2016	397.10	1.55	63.9	356.5		16.1	404.5		42.2	343.2				Blocked; Not Read
4/29/2016	391.60	0.04	63.9	356.5		16.5	404.1		43.8	341.6				Blocked; Not Read
5/24/2016	401.60	0.13	63.8	356.6		16.5	404.1		41.3	344.1				Blocked; Not Read
6/29/2016	392.50	0.00	63.8	356.6		17.0	403.6		43.3	342.1				Blocked; Not Read
7/26/2016	377.70	0.00	63.8	356.6		17.5	403.1		47.8	337.6				Blocked; Not Read
8/24/2016	388.10	0.00	63.9	356.5		17.7	402.9		46.1	339.3				Blocked; Not Read
9/29/2016	388.20	0.00	64.0	356.4		17.7	402.9		45.7	339.7				Blocked; Not Read
10/26/2016	392.10	0.96	64.0	356.4		17.7	402.9		45.1	340.3				Blocked; Not Read
11/22/2016	395.70	1.42	64.2	356.2		17.7	402.9		43.3	342.1				Blocked; Not Read
12/28/2016	400.70	4.11	64.2	356.2		17.8	402.8		41.1	344.3				Blocked; Not Read

Notes:
Elev. = Elevation; in. = Inches.
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TABLE 2
RATTLESNAKE CANYON DAM
PIEZOMETER WATER LEVEL MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Piezometer ID →			P-1A			P-2			P-3A			P-30A		
Top "Reference" Elev. →			418.5	420.43		418.7	420.62		385.4	385.40		417.9	420.81	
Tip Elev. →			287.4	287.4		363.4	363.4		303.7	303.7		371.7	371.7	
Depth of Piezometer →			131.1	133.0		55.3	57.2		81.7	81.7		46.2	49.1	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment
1/26/2017	402.40	6.70	64.0	356.4		17.8	402.8		40.5	344.9				Blocked; Not Read
2/28/2017	389.60	4.01	63.9	356.5		17.6	403.0		44.4	341.0				Blocked; Not Read
3/29/2017	391.80	0.14	63.9	356.5		17.6	403.0		44.3	341.1				Blocked; Not Read
4/26/2017	387.00	0.04	63.9	356.5		17.7	402.9		45.5	340.0				Blocked; Not Read
5/23/2017	399.40	0.30	63.9	356.5		17.7	402.9	Dry, Erroneous	41.9	343.5				Blocked; Not Read
6/21/2017	392.60	0.00	63.8	356.6		17.7	402.9	Dry, Erroneous	43.5	341.9				Blocked; Not Read
7/26/2017	384.60	0.00	63.8	356.6		17.7	402.9	Dry, Erroneous	46.4	339.0				Blocked; Not Read
8/30/2017	383.00	0.00	54.1	366.3	Erroneous	17.8	402.8	Dry, Erroneous	47.1	338.3				Blocked; Not Read
9/27/2017	382.00	0.00	64.0	356.4		17.7	402.9		48.1	337.3				Blocked; Not Read
10/27/2017	375.00	0.00	64.1	356.3		17.8	402.8		49.5	335.9				Blocked; Not Read
11/30/2017	382.80	0.14	64.2	356.2		17.8	402.8		48.1	337.3				Blocked; Not Read
12/21/2017	380.50	0.00	64.3	356.1		17.7	402.9		48.6	336.8				Blocked; Not Read

Notes:
Elev. = Elevation; in. = Inches.
Elevations are in fee relative to NGVD29 datum.

TABLE 2
RATTLESNAKE CANYON DAM
PIEZOMETER WATER LEVEL MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Piezometer ID →			P-30B			P-35A			P-35B			P-35C		
Top "Reference" Elev. →			417.9	420.81		385.3	388.73		385.5	388.45		385.3	388.34	
Tip Elev. →			337.1	337.1		357.3	357.3		313.4	313.4		343.2	343.2	
Depth of Piezometer →			80.8	83.7		28.0	31.4		72.1	75.1		42.1	45.1	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment
1/31/2008	381.20		47.5	370.4	Dry, Erroneous	31.3	357.4		44.2	344.3		44.7	343.7	Dry
2/28/2008	393.10		46.7	371.2	Dry, Erroneous	33.3	355.4		44.1	344.4		44.8	343.5	Dry
3/27/2008	387.90		48.3	369.6		31.4	357.3	Dry	49.6	338.9		44.6	343.7	Dry
4/28/2008	404.70		48.3	369.6	Dry, Erroneous	31.3	357.4	Dry	44.3	344.2		44.1	344.2	
5/28/2008	404.00		46.6	371.3		31.4	357.3	Dry	44.0	344.5		43.1	345.2	
6/25/2008	400.20		46.0	371.9		31.4	357.3	Dry	44.5	344.0		42.5	345.8	
7/29/2008	398.70		44.0	373.9		31.3	357.4	Dry	45.4	343.1		42.5	345.8	
7/30/2008	398.70	0.00	46.0	371.9		31.3	357.4	Dry	45.5	343.0		42.5	345.8	
8/29/2008	395.00	0.00	47.1	370.8	Cleaning	31.3	357.4	Dry	46.8	341.7		42.5	345.8	
9/25/2008	391.70	0.00	48.6	369.3		31.3	357.4	Dry	47.9	340.6		43.5	344.8	
10/28/2008	384.05	0.00	51.0	366.9		31.3	357.4	Dry	50.8	337.7		43.3	345.0	
11/26/2008	391.10	1.94	53.1	364.8		31.4	357.3	Dry	49.7	338.8		43.7	344.6	
12/31/2008	397.90	3.20	48.6	369.3		31.3	357.4	Dry	46.7	341.8		43.3	345.0	
1/29/2009	393.40	0.34	49.0	368.9		31.3	357.4	Dry	47.6	340.9		43.1	345.2	
2/25/2009	398.60	3.91	48.6	369.3		31.3	357.4	Dry	46.1	342.4		43.1	345.2	
3/31/2009	393.40	0.16	47.3	370.6		31.4	357.3	Dry	47.1	341.4		42.8	345.5	
4/28/2009	400.70	0.10	47.1	370.8		31.2	357.5		45.5	343.0		42.8	345.5	
5/18/2009	400.80	0.00	45.5	372.4		30.3	358.4		45.2	343.3		42.4	345.9	
5/27/2009	400.10	0.00	45.6	372.3		31.1	357.6	Dry	45.4	343.1		42.4	345.9	
6/29/2009	403.00	0.15	43.6	374.3		31.3	357.4		44.4	344.1		41.9	346.4	
7/28/2009	396.53	0.00	44.7	373.2		30.8	357.9		46.2	342.3		41.9	346.5	
8/25/2009	396.60	0.00	46.5	371.4		31.0	357.7		46.5	342.0		42.1	346.2	
9/30/2009	393.10	0.00	48.4	369.5		31.3	357.4		47.9	340.6		42.7	345.6	
10/28/2009	401.60	0.42	46.6	371.3		31.3	357.4		45.4	343.1		42.6	345.7	
11/30/2009	402.50	0.00	44.0	373.9		31.3	357.4		44.6	343.9		41.8	346.5	
12/29/2009	399.90	2.80	44.7	373.2		31.3	357.4		45.3	343.2		41.7	346.6	
1/26/2010	401.10	6.75	46.0	371.9		28.3	360.4		45.2	343.3		41.9	346.4	
2/23/2010	402.50	2.66	44.7	373.2		30.5	358.2		44.6	343.9		41.8	346.5	
3/30/2010	400.00	1.25	44.5	373.4		30.0	358.7		45.1	343.4		41.3	347.0	
4/4/2010	399.60		44.8	373.1		30.1	358.6		45.3	343.2		41.5	346.8	
4/27/2010	403.80	1.32	44.1	373.8		30.2	358.5		44.4	344.1		41.4	346.9	
5/26/2010	403.60	0.03	43.5	374.4		29.7	359.0		44.3	344.2		41.2	347.1	
6/29/2010	397.70	0.00	43.0	374.9		29.5	359.2		46.0	342.5		40.3	348.0	
7/27/2010	396.30	0.00	46.7	371.2		30.3	358.4		46.7	341.8		41.8	346.5	
8/26/2010	390.70	0.00	42.9	375.0		31.3	357.4		48.3	340.2		41.8	346.5	
9/28/2010	390.30	0.00	42.8	375.1		31.1	357.6		48.7	339.8		42.9	345.4	
10/26/2010	403.20	1.56	43.0	374.9		31.5	357.2		45.7	342.8		42.7	345.6	
11/30/2010	397.10	1.34	43.0	374.9		31.3	357.4		46.5	342.0		47.9	340.4	Erroneous
12/28/2010	401.40	9.03	43.1	374.8		22.5	366.2		45.5	343.0		42.0	346.3	

Notes:
Elev. = Elevation; in. = Inches.
Elevations are in fee relative to NGVD29 datum.

TABLE 2
RATTLESNAKE CANYON DAM
PIEZOMETER WATER LEVEL MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Piezometer ID →			P-30B			P-35A			P-35B			P-35C		
Top "Reference" Elev. →			417.9	420.81		385.3	388.73		385.5	388.45		385.3	388.34	
Tip Elev. →			337.1	337.1		357.3	357.3		313.4	313.4		343.2	343.2	
Depth of Piezometer →			80.8	83.7		28.0	31.4		72.1	75.1		42.1	45.1	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment
1/27/2011	393.80	1.10	43.0	374.9		30.6	358.1		47.1	341.4		41.8	346.5	
2/23/2011	391.70	1.17	43.2	374.7		31.3	357.4		48.3	340.2		42.4	345.9	
3/29/2011	403.00	3.10	43.0	374.9		31.2	357.5		45.2	343.3		42.1	346.2	
4/27/2011	401.20	0.33	43.2	374.7	Dry, Erroneous	31.0	357.7		45.5	343.0		41.5	346.8	
5/26/2011	399.50	0.48	43.0	375.0	Dry, Erroneous	30.7	358.1		46.0	342.5		41.7	346.6	
6/28/2011	391.00	0.02	43.0	374.9		31.0	357.7		48.4	340.1		42.0	346.3	
7/26/2011	384.00	0.00	43.0	374.9		31.2	357.5		50.9	337.6		42.8	345.5	
8/24/2011	382.80	0.00	43.2	374.7		31.3	357.4		51.6	336.9		43.5	344.8	
9/27/2011	381.80	0.08	43.0	374.9		31.3	357.4		52.2	336.3		44.0	344.3	
10/26/2011	383.90	0.98	42.9	375.0		31.3	357.4		51.5	337.0		44.2	344.1	
11/22/2011	389.80	1.46	43.0	374.9		31.3	357.4		50.1	338.4		44.4	343.9	
12/28/2011	382.30	0.35	43.0	374.9		31.4	357.3		51.5	337.0		44.1	344.2	
1/25/2012	387.50	1.17	43.0	374.9		31.4	357.3		51.5	337.0		44.5	343.8	
2/28/2012	381.10	0.79	43.0	374.9		31.4	357.3		52.6	335.9		44.7	343.6	
3/27/2012	387.70	1.61	43.0	374.9		31.3	357.4		51.2	337.3		44.7	343.6	
4/23/2012	392.30	1.51	43.1	374.8		31.4	357.4		49.3	339.2		44.7	343.6	
5/25/2012	388.30	0.06	43.1	374.8		31.5	357.2		49.6	338.9		44.4	343.9	
6/13/2012	385.10	0.06	43.1	374.8		31.2	357.5		50.8	337.7		44.4	343.9	
6/26/2012	386.90	0.00	43.1	374.8		31.3	357.4		50.4	338.1		44.2	344.1	
7/24/2012	378.00	0.10	43.1	374.8		31.3	357.4		52.8	335.7		44.5	343.8	
8/8/2012	382.90	0.10	43.1	374.8		31.3	357.4		51.9	336.6		44.7	343.6	
8/29/2012	382.70		43.1	374.8		31.3	357.4		52.3	336.2		44.7	343.6	
8/29/2012	382.70	0.00	43.1	374.8		31.3	357.4		52.3	336.2		44.7	343.6	
9/25/2012	381.90	0.00	43.1	374.8		31.3	357.4		52.9	335.6		44.7	343.6	
10/24/2012	384.40	0.08	43.0	374.9		31.0	357.7		52.1	336.4		44.6	343.7	
11/27/2012	389.60	0.86	43.1	374.8		31.3	357.4		50.0	338.5		44.5	343.8	
12/18/2012	394.70	0.81	43.1	374.8		31.3	357.4		48.4	340.1		44.6	343.7	
1/23/2013	393.00	1.53	43.2	374.7		31.5	357.2		47.9	340.6		43.8	344.5	
2/26/2013	391.50	0.49	43.2	374.7		31.3	357.4		48.4	340.1		43.6	344.7	
3/26/2013	394.40	1.00	43.1	374.8		31.3	357.4		48.5	340.0		43.7	344.6	
4/25/2013	391.00	0.01	42.9	375.0		31.5	357.2		48.8	339.7		43.7	344.6	
5/22/2013	392.00	0.00	43.0	374.9		31.4	357.3		48.4	340.1		43.5	344.8	
6/25/2013	380.60	0.00	42.8	375.1		31.3	357.4		51.4	337.1		43.8	344.5	
7/23/2013	380.20	0.00	43.3	374.6		31.3	357.4	Dry	52.5	336.0		44.3	344.0	
8/21/2013	379.60	0.00	43.0	374.9		31.3	357.4	Dry	52.5	336.0		44.6	343.7	Wet
9/25/2013	382.20	0.00	43.0	374.9	Dry, Erroneous	31.3	357.4	Dry	52.4	336.1		44.7	343.6	Dry
10/29/2013	382.00	0.00	43.2	374.7	Wet	31.2	357.5	Dry	52.8	335.7		44.7	343.6	Dry
11/26/2013	390.10	0.44	43.0	374.9		31.3	357.4	Dry	50.8	337.7		44.7	343.6	Dry
12/17/2013	394.70	1.10	43.0	374.9		31.4	357.3	Dry	48.6	339.9		44.7	343.6	Dry

Notes:
Elev. = Elevation; in. = Inches.
Elevations are in fee relative to NGVD29 datum.

TABLE 2
RATTLESNAKE CANYON DAM
PIEZOMETER WATER LEVEL MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Piezometer ID →			P-30B			P-35A			P-35B			P-35C		
Top "Reference" Elev. →			417.9	420.81		385.3	388.73		385.5	388.45		385.3	388.34	
Tip Elev. →			337.1	337.1		357.3	357.3		313.4	313.4		343.2	343.2	
Depth of Piezometer →			80.8	83.7		28.0	31.4		72.1	75.1		42.1	45.1	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment
1/28/2014	392.30	0.00	43.0	374.9		31.4	357.3	Dry	48.3	340.2		43.9	344.4	
2/26/2014	389.90	0.72	43.0	374.9		31.4	357.3	Dry	49.0	339.5		43.8	344.5	
3/26/2014	387.20		43.2	374.7	Wet	31.4	357.3	Dry	49.1	339.4		43.8	344.5	
3/28/2014	387.20	1.78	43.0	374.9		31.3	357.4		49.9	338.6		43.9	344.4	
4/23/2014	393.00	0.34	43.1	374.8		31.3	357.4		48.8	339.7		43.9	344.4	
5/28/2014	387.50	0.00	42.9	375.0		31.5	357.2		49.9	338.6		43.8	344.5	
6/25/2014	388.70	0.00	43.2	374.7		31.3	357.4	Dry	49.8	338.7		44.7	343.6	
7/29/2014	382.80	0.00	43.1	374.8		31.3	357.4	Dry	51.5	337.0		43.8	344.5	
8/28/2014	386.80	0.04	43.1	374.8		31.2	357.5		51.1	337.4		44.4	343.9	
9/24/2014	387.90	0.00	43.0	374.9		31.2	357.5	Dry	50.2	338.3		44.4	343.9	Wet
10/29/2014	383.90	0.00	43.1	374.8		31.4	357.3	Dry	51.5	337.0		44.5	343.8	
11/21/2014	388.30	0.35	43.0	374.9		31.2	357.5		50.3	338.2		44.5	343.8	
12/22/2014	399.80	4.75	42.7	375.2		31.3	357.4		46.8	341.7		44.0	344.3	
1/28/2015	396.90	1.25	43.1	374.8		31.4	357.3	Dry	47.1	341.4		43.3	345.0	
2/24/2015	392.70	0.34	43.0	374.9		31.4	357.3	Dry	48.1	340.4		43.3	345.0	
3/31/2015	388.90	0.67	43.1	374.8		31.5	357.2	Dry	48.6	339.9		43.0	345.3	
4/23/2015	390.30	0.20	43.1	374.8		31.3	357.4	Dry	49.0	339.5		43.3	345.0	
5/28/2015	400.30	1.87	42.9	375.0		31.4	357.3	Dry	46.0	342.5		43.0	345.3	
6/24/2015	400.70	0.00	43.0	374.9		31.4	357.3	Dry	45.8	342.7		42.5	345.8	
7/30/2015	400.20	0.00	43.1	374.8		31.3	357.4	Dry	45.9	342.6		42.5	345.8	
8/25/2015	384.00	0.00	38.6	379.3		31.3	357.4	Dry	49.4	339.1		42.6	345.7	
9/23/2015	388.60	2.17	43.1	374.8		31.3	357.4	Dry	49.6	338.9		43.3	345.0	
10/29/2015	387.60	0.16	43.2	374.7		31.5	357.2	Dry	50.1	338.4		43.5	344.8	
11/25/2015	386.90	0.15	43.2	374.7		31.4	357.3	Dry	50.4	338.1		43.7	344.6	
12/23/2015	395.90	1.55	43.0	374.9		31.4	357.3	Dry	48.8	339.7		43.9	344.4	
1/26/2016	401.20	2.86	43.2	374.7		31.3	357.4	Dry	46.1	342.4		43.0	345.3	
2/24/2016	393.60	0.39	43.1	374.8		31.4	357.3	Dry	47.9	340.6		42.8	345.5	
3/29/2016	397.10	1.55	43.2	374.7		31.4	357.3	Dry	47.0	341.5		42.9	345.4	
4/29/2016	391.60	0.04	43.0	374.9		31.4	357.3	Dry	47.2	341.3		42.9	345.4	
5/24/2016	401.60	0.13	44.3	373.6		31.4	357.3	Dry	46.2	342.3		43.0	345.3	
6/29/2016	392.50	0.00	43.1	374.8		31.3	357.4	Dry	48.0	340.5		42.5	345.8	
7/26/2016	377.70	0.00	52.2	365.7		31.3	357.4	Dry	51.8	336.7		43.2	345.1	
8/24/2016	388.10	0.00	53.3	364.6		30.4	358.3	Dry	50.5	338.0		44.8	343.5	
9/29/2016	388.20	0.00	52.5	365.4		31.4	357.3	Dry	50.7	337.8		44.7	343.6	
10/26/2016	392.10	0.96	53.1	364.8		31.3	357.4	Dry	49.6	338.9		43.9	344.4	
11/22/2016	395.70	1.42	43.1	374.8		31.3	357.4	Dry	47.9	340.6		43.7	344.6	
12/28/2016	400.70	4.11	41.2	376.7		31.4	357.3	Dry	46.0	342.5		43.0	345.3	

Notes:
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TABLE 2
RATTLESNAKE CANYON DAM
PIEZOMETER WATER LEVEL MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Piezometer ID →			P-30B			P-35A			P-35B			P-35C		
Top "Reference" Elev. →			417.9	420.81		385.3	388.73		385.5	388.45		385.3	388.34	
Tip Elev. →			337.1	337.1		357.3	357.3		313.4	313.4		343.2	343.2	
Depth of Piezometer →			80.8	83.7		28.0	31.4		72.1	75.1		42.1	45.1	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment
1/26/2017	402.40	6.70	43.2	374.7		31.4	357.3	Dry	45.4	343.1		42.7	345.6	
2/28/2017	389.60	4.01	48.1	369.8		31.4	357.3	Dry	48.8	339.7		42.5	345.8	
3/29/2017	391.80	0.14	50.6	367.3		31.3	357.4		48.9	339.6		43.4	344.9	
4/26/2017	387.00	0.04	43.0	374.9		31.3	357.4		49.9	338.6		43.5	344.8	
5/23/2017	399.40	0.30	43.3	374.6		31.4	357.3	Dry	46.8	341.7		43.5	344.8	
6/21/2017	392.60	0.00	47.6	370.3		31.3	357.4	Dry	48.2	340.3		43.2	345.1	
7/26/2017	384.60	0.00	50.6	367.3	Dry, Erroneous	31.4	357.3	Dry	50.6	337.9		43.4	344.9	
8/30/2017	383.00	0.00	50.8	367.1	Dry, Erroneous	31.4	357.3	Dry	51.5	337.0		43.8	344.5	
9/27/2017	382.00	0.00	50.6	367.3	Dry, Erroneous	31.3	357.4	Dry	52.3	336.2		44.4	343.9	
10/27/2017	375.00	0.00	43.2	374.7		31.4	357.3		53.6	334.9		44.8	343.5	Dry
11/30/2017	382.80	0.14	53.4	364.5		31.3	357.4		52.4	336.1		44.8	343.5	Dry
12/21/2017	380.50	0.00	53.6	364.3	Dry, Erroneous	31.3	357.4	Dry	52.8	335.7		44.7	343.6	Dry

Notes:
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TABLE 2
RATTLESNAKE CANYON DAM
PIEZOMETER WATER LEVEL MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Piezometer ID →			P-52			P-61			P-62			P-63		
Top "Reference" Elev. →			418.6	421.03		354.0	357.01		419.0	412.03		418.0	422.08	
Tip Elev. →			361.2	361.2		311.0	311.0		365.5	365.5		335.0	335.0	
Depth of Piezometer →			57.4	59.8		43.0	46.0		53.5	46.5		83.0	87.1	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment
1/31/2008	381.20		35.1	385.9	Dry, Erroneous	29.3	327.7		31.8	380.3		48.8	373.3	
2/28/2008	393.10		35.1	385.9	Dry, Erroneous	28.7	328.3		26.3	385.7		49.0	373.1	
3/27/2008	387.90		40.9	380.1		27.6	329.4		23.5	388.5		49.3	372.8	
4/28/2008	404.70		29.2	391.8		23.7	333.3		15.8	396.2		49.5	372.6	
5/28/2008	404.00		28.1	392.9		22.1	334.9		14.3	397.7		44.5	377.6	
6/25/2008	400.20		27.3	393.7	Dry, Erroneous	21.2	335.8		15.5	396.5		49.3	372.8	
7/29/2008	398.70		27.5	393.5	Dry, Erroneous	21.6	335.4		16.3	395.7		49.1	373.0	
7/30/2008	398.70	0.00	27.8	393.2	Dry, Erroneous	21.6	335.4		16.3	395.7		49.2	372.9	
8/29/2008	395.00	0.00	33.2	387.8		22.4	334.6		18.7	393.3		4.2	417.9	Cleaning
9/25/2008	391.70	0.00	35.3	385.7		23.1	333.9		18.8	393.2		11.0	411.1	
10/28/2008	384.05	0.00	42.0	379.1		25.5	331.6		26.4	385.6		15.8	406.3	
11/26/2008	391.10	1.94	40.7	380.3		27.0	330.0		27.5	384.5		17.8	404.3	
12/31/2008	397.90	3.20	33.7	387.3		25.3	331.7		21.6	390.4		18.7	403.4	
1/29/2009	393.40	0.34	34.9	386.1		22.7	334.3		23.2	388.8		19.6	402.5	
2/25/2009	398.60	3.91	33.3	387.7		21.0	336.0		21.5	390.5		20.1	402.0	
3/31/2009	393.40	0.16	35.2	385.8		20.1	336.9		21.9	390.1		20.6	401.5	
4/28/2009	400.70	0.10	31.5	389.5		20.8	336.2		20.3	391.7		21.2	400.9	
5/18/2009	400.80	0.00	30.6	390.4		20.6	336.4		18.7	393.3		21.5	400.6	
5/27/2009	400.10	0.00	30.8	390.2		20.7	336.3		18.8	393.2		48.8	373.3	
6/29/2009	403.00	0.15	28.3	392.7		20.4	336.6		15.9	396.1		48.6	373.5	
7/28/2009	396.53	0.00	32.3	388.7		20.0	337.0		19.2	392.8		48.5	373.6	
8/25/2009	396.60	0.00	33.0	388.0		21.1	335.9		20.4	391.6		48.4	373.7	
9/30/2009	393.10	0.00	36.4	384.6		22.7	334.3		23.6	388.4		48.5	373.6	
10/28/2009	401.60	0.42	30.9	390.1		22.4	334.6		19.6	392.4		48.5	373.6	
11/30/2009	402.50	0.00	29.0	392.0		19.6	337.4		16.7	395.3		48.3	373.8	
12/29/2009	399.90	2.80	30.5	390.5		19.4	337.6		17.3	394.7		48.3	373.8	
1/26/2010	401.10	6.75	30.0	391.0		19.8	337.2		15.7	396.3		48.3	373.8	
2/23/2010	402.50	2.66	28.8	392.2		18.7	338.3		14.6	397.4		48.2	373.9	
3/30/2010	400.00	1.25	30.2	390.8		18.2	338.8		16.5	395.5		48.0	374.1	
4/4/2010	399.60		30.4	390.6		18.4	338.6		16.9	395.1		48.0	374.1	
4/27/2010	403.80	1.32	28.7	392.3		18.8	338.2		15.7	396.3		48.0	374.1	
5/26/2010	403.60	0.03	27.8	393.2		18.4	338.6		15.4	396.6		47.8	374.3	
6/29/2010	397.70	0.00	31.4	389.6		18.9	338.1		17.7	394.3		47.6	374.5	
7/27/2010	396.30	0.00	32.9	388.1		20.4	336.6		18.9	393.1		47.5	374.6	
8/26/2010	390.70	0.00	41.6	379.4		22.0	335.0		20.8	391.2		47.5	374.6	
9/28/2010	390.30	0.00	38.9	382.1		24.5	332.5		24.8	387.2		47.8	374.3	
10/26/2010	403.20	1.56	29.5	391.5		25.0	332.0		19.8	392.2		47.9	374.2	
11/30/2010	397.10	1.34	32.8	388.2		23.4	333.6		19.5	392.5		47.7	374.4	
12/28/2010	401.40	9.03	29.7	391.3		23.5	333.5		12.0	400.0		47.7	374.4	

Notes:
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TABLE 2
RATTLESNAKE CANYON DAM
PIEZOMETER WATER LEVEL MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Piezometer ID →			P-52			P-61			P-62			P-63		
Top "Reference" Elev. →			418.6	421.03		354.0	357.01		419.0	412.03		418.0	422.08	
Tip Elev. →			361.2	361.2		311.0	311.0		365.5	365.5		335.0	335.0	
Depth of Piezometer →			57.4	59.8		43.0	46.0		53.5	46.5		83.0	87.1	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment
1/27/2011	393.80	1.10	33.4	387.6		23.2	333.8		17.2	394.8		47.7	374.4	
2/23/2011	391.70	1.17	36.7	384.3		24.3	332.7		22.0	390.0		47.8	374.3	
3/29/2011	403.00	3.10	29.7	391.3		24.3	332.7		17.6	394.4		47.8	374.3	
4/27/2011	401.20	0.33	30.3	390.7		23.3	333.7		17.2	394.8		47.7	374.4	
5/26/2011	399.50	0.48	31.3	389.7		23.1	333.9		18.2	393.8		47.7	374.4	
6/28/2011	391.00	0.02	36.6	384.4		23.8	333.2		22.6	389.4		47.7	374.4	
7/26/2011	384.00	0.00	43.6	377.4		25.3	331.7		26.2	385.8		47.8	374.3	
8/24/2011	382.80	0.00	45.9	375.1		26.7	330.3		30.6	381.4		48.1	374.0	
9/27/2011	381.80	0.08	47.4	373.6		25.9	331.1		32.0	380.0		48.6	373.5	
10/26/2011	383.90	0.98	46.2	374.8		28.2	328.8		31.9	380.1		48.6	373.5	
11/22/2011	389.80	1.46	42.9	378.1		28.3	328.7		29.9	382.1		48.9	373.2	
12/28/2011	382.30	0.35	45.8	375.2		28.2	328.8		31.5	380.5		49.0	373.1	
1/25/2012	387.50	1.17	47.3	373.8		28.7	328.3		34.0	378.0		49.4	372.7	
2/28/2012	381.10	0.79	49.0	372.0		29.0	328.0		34.6	377.4		49.6	372.5	
3/27/2012	387.70	1.61	46.6	374.4		29.3	327.7		34.2	377.8		49.8	372.3	
4/23/2012	392.30	1.51	42.0	379.0		28.9	328.1		31.1	380.9		50.0	372.1	
5/25/2012	388.30	0.06	41.8	379.2		28.2	328.8		28.9	383.1		50.2	371.9	
6/13/2012	385.10	0.06	44.4	376.6		27.9	329.1		30.7	381.3		50.2	371.9	
6/26/2012	386.90	0.00	43.9	377.1		25.9	331.1		30.9	381.1		50.3	371.8	
7/24/2012	378.00	0.10	49.1	371.9		28.3	328.7		33.6	378.4		50.4	371.7	
8/8/2012	382.90	0.10	47.5	373.5		28.7	328.3		30.6	381.4		50.6	371.5	
8/29/2012	382.70		48.3	372.7		29.0	328.0		33.8	378.2		50.8	371.3	
8/29/2012	382.70	0.00	48.3	372.7		29.0	328.0		33.8	378.2		50.8	371.3	
9/25/2012	381.90	0.00	49.7	371.3		29.3	327.7		33.8	378.2		50.9	371.2	
10/24/2012	384.40	0.08	48.1	372.9		29.7	327.3		33.0	379.0		51.2	370.9	
11/27/2012	389.60	0.86	43.4	377.6		29.1	327.9		30.8	381.2		51.4	370.7	
12/18/2012	394.70	0.81	39.5	381.5		28.5	328.5		28.6	383.4		51.4	370.7	
1/23/2013	393.00	1.53	37.4	383.6		27.4	329.6		25.0	387.0		51.5	370.6	
2/26/2013	391.50	0.49	38.2	382.8		26.8	330.2		25.7	386.3		51.4	370.7	
3/26/2013	394.40	1.00	39.0	382.0		27.3	329.7		27.0	385.0		51.6	370.5	
4/25/2013	391.00	0.01	39.3	381.7		26.8	330.2		26.4	385.6		51.6	370.5	
5/22/2013	392.00	0.00	38.2	382.8		26.8	330.2		25.0	387.0		51.6	370.5	
6/25/2013	380.60	0.00	44.7	376.3		27.0	330.0		28.4	383.6		51.8	370.3	
7/23/2013	380.20	0.00	47.9	373.1		27.9	329.1		30.5	381.5		51.9	370.2	
8/21/2013	379.60	0.00	47.8	373.2		28.5	328.5		30.8	381.2		52.1	370.0	
9/25/2013	382.20	0.00	47.8	373.2		29.2	327.8		30.9	381.1		52.4	369.7	
10/29/2013	382.00	0.00	48.8	372.2		29.8	327.2		32.4	379.6		52.6	369.5	
11/26/2013	390.10	0.44	46.1	374.9		29.7	327.3		31.6	380.4		52.7	369.4	
12/17/2013	394.70	1.10	39.5	381.5		29.3	327.7		28.0	384.0		52.8	369.3	

Notes:
Elev. = Elevation; in. = Inches.
Elevations are in fee relative to NGVD29 datum.

TABLE 2
RATTLESNAKE CANYON DAM
PIEZOMETER WATER LEVEL MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Piezometer ID →			P-52			P-61			P-62			P-63		
Top "Reference" Elev. →			418.6	421.03		354.0	357.01		419.0	412.03		418.0	422.08	
Tip Elev. →			361.2	361.2		311.0	311.0		365.5	365.5		335.0	335.0	
Depth of Piezometer →			57.4	59.8		43.0	46.0		53.5	46.5		83.0	87.1	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment
1/28/2014	392.30	0.00	38.5	382.5		28.2	328.8		24.5	387.5		52.8	369.3	
2/26/2014	389.90	0.72	39.6	381.4		27.4	329.6		25.5	386.5		52.8	369.3	
3/26/2014	387.20		41.3	379.7		27.5	329.5		26.8	385.2		52.9	369.2	
3/28/2014	387.20	1.78	41.7	379.3		22.5	334.5		27.0	385.0		52.9	369.2	
4/23/2014	393.00	0.34	39.5	381.5		27.7	329.3		26.8	385.2		52.9	369.2	
5/28/2014	387.50	0.00	41.0	380.0		27.5	329.5		24.9	387.1		53.0	369.1	
6/25/2014	388.70	0.00	40.8	380.2		28.7	328.3		25.8	386.2		53.0	369.1	
7/29/2014	382.80	0.00	44.8	376.2		27.9	329.1		28.6	383.4		53.2	368.9	
8/28/2014	386.80	0.04	44.0	377.0		28.4	328.6		28.6	383.4		53.3	368.8	
9/24/2014	387.90	0.00	41.8	379.2		28.5	328.5		27.2	384.8		53.3	368.8	
10/29/2014	383.90	0.00	44.4	376.6		28.7	328.3		28.4	383.6		53.5	368.6	
11/21/2014	388.30	0.35	41.7	379.3		28.8	328.2		26.7	385.3		53.6	368.5	
12/22/2014	399.80	4.75	34.0	387.0		28.5	328.5		22.2	389.8		53.5	368.6	
1/28/2015	396.90	1.25	34.4	386.6		27.5	329.5		21.6	390.4		53.7	368.4	
2/24/2015	392.70	0.34	36.7	384.3		27.2	329.8		22.8	389.2		53.5	368.6	
3/31/2015	388.90	0.67	37.7	383.3		26.8	330.2		23.1	388.9		53.4	368.7	
4/23/2015	390.30	0.20	38.7	382.3		27.0	330.0		24.2	387.8		53.4	368.7	
5/28/2015	400.30	1.87	31.7	389.3		27.0	330.0		19.9	392.1		53.5	368.6	
6/24/2015	400.70	0.00	31.1	389.9		26.5	330.5		19.5	392.5		53.3	368.8	
7/30/2015	400.20	0.00	30.8	390.2		26.3	330.7		19.0	393.0		53.2	368.9	
8/25/2015	384.00	0.00	38.9	382.1		26.1	330.9		23.8	388.2		52.9	369.2	
9/23/2015	388.60	2.17	40.7	380.3		27.0	330.0		28.1	383.9		53.2	368.9	
10/29/2015	387.60	0.16	41.6	379.4		27.5	329.5		29.1	382.9		53.2	368.9	
11/25/2015	386.90	0.15	42.0	379.0		27.9	329.1		29.6	382.4		53.3	368.8	
12/23/2015	395.90	1.55	37.7	383.3		27.4	329.6		27.8	384.3		53.2	368.9	
1/26/2016	401.20	2.86	31.7	389.3		32.7	324.3		21.4	390.7		53.2	368.9	
2/24/2016	393.60	0.39	35.7	385.3		27.0	330.0		23.3	388.7		53.1	369.0	
3/29/2016	397.10	1.55	33.8	387.2		26.8	330.2		22.5	389.5		53.1	369.0	
4/29/2016	391.60	0.04	36.4	384.6		27.0	330.0		24.4	387.7		52.9	369.2	
5/24/2016	401.60	0.13	32.1	388.9		26.8	330.2		22.5	389.5		52.9	369.2	
6/29/2016	392.50	0.00	35.6	385.4		26.6	330.4		22.9	389.1		52.8	369.3	
7/26/2016	377.70	0.00	45.2	375.8		27.2	329.8		30.0	382.0		52.9	369.2	
8/24/2016	388.10	0.00	43.9	377.1		27.9	329.1		32.9	379.1		52.9	369.2	
9/29/2016	388.20	0.00	42.6	378.4		28.3	328.7		31.9	380.1		52.9	369.2	
10/26/2016	392.10	0.96	41.8	379.2		28.4	328.6		32.5	379.5		53.0	369.1	
11/22/2016	395.70	1.42	37.4	383.6		28.2	328.8		28.3	383.7		53.1	369.0	
12/28/2016	400.70	4.11	33.8	387.2		27.6	329.4		24.2	387.8		53.1	369.0	

Notes:
Elev. = Elevation; in. = Inches.
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TABLE 2
RATTLESNAKE CANYON DAM
PIEZOMETER WATER LEVEL MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Piezometer ID →			P-52			P-61			P-62			P-63		
Top "Reference" Elev. →			418.6	421.03		354.0	357.01		419.0	412.03		418.0	422.08	
Tip Elev. →			361.2	361.2		311.0	311.0		365.5	365.5		335.0	335.0	
Depth of Piezometer →			57.4	59.8		43.0	46.0		53.5	46.5		83.0	87.1	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment
1/26/2017	402.40	6.70	30.3	390.7		26.8	330.2		19.3	392.7		52.8	369.3	
2/28/2017	389.60	4.01	37.7	383.3		26.6	330.4		24.5	387.5		52.8	369.3	
3/29/2017	391.80	0.14	38.9	382.1		27.0	330.0		27.6	384.4		52.8	369.3	
4/26/2017	387.00	0.04	40.9	380.1		27.3	329.7		28.7	383.3		52.8	369.3	
5/23/2017	399.40	0.30	34.0	387.0		27.5	329.5		24.9	387.1		52.9	369.2	
6/21/2017	392.60	0.00	36.6	384.4		27.2	329.8		25.0	387.0		52.7	369.4	
7/26/2017	384.60	0.00	42.3	378.7		24.2	332.8		29.6	382.4		52.7	369.4	
8/30/2017	383.00	0.00	45.1	375.9		28.1	328.9		32.9	379.1		52.7	369.4	
9/27/2017	382.00	0.00	47.9	373.1		28.6	328.4		35.6	376.4		52.9	369.2	
10/27/2017	375.00	0.00	50.9	370.1		29.2	327.8		37.5	374.5		53.2	368.9	
11/30/2017	382.80	0.14	48.7	372.3		29.8	327.2		37.7	374.3		53.2	368.9	
12/21/2017	380.50	0.00	49.5	371.5		29.8	327.2		37.7	374.3		53.3	368.8	

Notes:
Elev. = Elevation; in. = Inches.
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TABLE 2
RATTLESNAKE CANYON DAM
PIEZOMETER WATER LEVEL MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Piezometer ID →			P-64			P-65			P-66			P-67		
Top "Reference" Elev. →			385.0	388.00		370.0	374.72		352.0	359.31		352.0	355.04	
Tip Elev. →			302.0	302.0		325.5	325.5		301.0	301.0		282.5	282.5	
Depth of Piezometer →			83.0	86.0		44.5	49.2		51.0	58.3		69.5	72.5	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment
1/31/2008	381.20		49.2	338.8		34.5	340.2		25.8	333.5		27.0	328.0	
2/28/2008	393.10		44.9	343.1		32.8	341.9		22.4	336.9		24.6	330.4	
3/27/2008	387.90		45.8	342.2		32.3	342.4		22.9	336.4		24.6	330.4	Dry, Erroneous
4/28/2008	404.70		40.1	347.9		29.1	345.6		18.4	340.9		21.5	333.5	Dry, Erroneous
5/28/2008	404.00		39.9	348.1		27.1	347.6		18.0	341.3		21.5	333.5	Dry, Erroneous
6/25/2008	400.20		40.5	347.5		26.3	348.4		18.6	340.7		20.8	334.2	Dry, Erroneous
7/29/2008	398.70		41.3	346.7		26.2	348.5		19.2	340.1		21.6	333.4	Dry, Erroneous
7/30/2008	398.70	0.00	41.3	346.7		26.1	348.6		19.5	339.9		21.6	333.4	Dry, Erroneous
8/29/2008	395.00	0.00	43.0	345.0		26.9	347.8		20.7	338.6		22.6	332.4	Dry, Erroneous
9/25/2008	391.70	0.00	44.0	344.0		28.1	346.6		21.7	337.6		23.4	331.6	
10/28/2008	384.05	0.00	47.2	340.8		29.9	344.8		24.2	335.1		24.6	330.4	Dry, Erroneous
11/26/2008	391.10	1.94	46.0	342.0		31.0	343.7		23.5	335.8		24.5	330.5	Dry, Erroneous
12/31/2008	397.90	3.20	42.7	345.3		29.2	345.5		20.7	338.6		23.2	331.8	Dry, Erroneous
1/29/2009	393.40	0.34	43.8	344.2		29.4	345.3		21.4	337.9		23.2	331.8	
2/25/2009	398.60	3.91	42.3	345.7		28.8	345.9		20.2	339.1		22.6	332.4	Dry, Erroneous
3/31/2009	393.40	0.16	43.4	344.6		28.4	346.3		20.9	338.4		22.6	332.4	
4/28/2009	400.70	0.10	41.4	346.6		27.8	346.9		19.6	339.7		22.2	332.8	
5/18/2009	400.80	0.00	41.1	346.9		27.3	347.4		19.3	340.0		21.8	333.2	
5/27/2009	400.10	0.00	41.2	346.8		27.3	347.4		19.5	339.8		21.6	333.4	
6/29/2009	403.00	0.15	40.1	347.9		26.2	348.5		18.6	340.7		21.6	333.4	
7/28/2009	396.53	0.00	42.1	345.9		26.9	347.8		20.1	339.2		21.8	333.2	
8/25/2009	396.60	0.00	42.4	345.6		27.5	347.2		20.4	338.9		22.6	332.4	
9/30/2009	393.10	0.00	44.0	344.0		28.6	346.1		21.7	337.6		23.7	331.3	
10/28/2009	401.60	0.42	41.2	346.8		27.6	347.1		19.5	339.8		22.3	332.7	
11/30/2009	402.50	0.00	40.5	347.5		26.2	348.5		18.9	340.4		21.4	333.6	
12/29/2009	399.90	2.80	41.3	346.7		26.3	348.4		19.3	340.0		21.5	333.5	
1/26/2010	401.10	6.75	41.0	347.0		26.7	348.0		19.3	340.0		21.8	333.2	
2/23/2010	402.50	2.66	40.5	347.5		25.5	349.2		18.7	340.6		21.4	333.6	
3/30/2010	400.00	1.25	41.1	346.9		24.9	349.8		19.2	340.1		21.5	333.5	Dry, Erroneous
4/4/2010	399.60		41.4	346.6		25.1	349.6		19.4	339.9		21.6	333.4	Dry, Erroneous
4/27/2010	403.80	1.32	40.2	347.8		25.0	349.7		18.6	340.7		20.5	334.5	
5/26/2010	403.60	0.03	40.1	347.9		24.8	349.9		18.5	340.8		21.3	333.7	
6/29/2010	397.70	0.00	41.9	346.1		25.7	349.0		19.9	339.4		22.0	333.0	
7/27/2010	396.30	0.00	42.7	345.3		26.5	348.2		20.6	338.7		22.6	332.4	
8/26/2010	390.70	0.00	44.7	343.3		27.6	347.1		22.0	337.3		23.6	331.4	
9/28/2010	390.30	0.00	45.5	342.5		29.1	345.6		22.7	336.6		24.6	330.4	Dry, Erroneous
10/26/2010	403.20	1.56	41.6	346.4		28.1	346.6		19.8	339.5		22.8	332.2	
11/30/2010	397.10	1.34	42.5	345.5		27.6	347.1		20.4	338.9		22.4	332.6	
12/28/2010	401.40	9.03	41.4	346.6		27.1	347.6		19.5	339.8		22.3	332.7	

Notes:
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TABLE 2
RATTLESNAKE CANYON DAM
PIEZOMETER WATER LEVEL MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Piezometer ID →			P-64			P-65			P-66			P-67		
Top "Reference" Elev. →			385.0	388.00		370.0	374.72		352.0	359.31		352.0	355.04	
Tip Elev. →			302.0	302.0		325.5	325.5		301.0	301.0		282.5	282.5	
Depth of Piezometer →			83.0	86.0		44.5	49.2		51.0	58.3		69.5	72.5	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment
1/27/2011	393.80	1.10	43.2	344.8		25.7	349.0		20.8	338.5		20.8	334.2	
2/23/2011	391.70	1.17	44.5	343.5		27.0	347.7		21.9	337.4		23.9	331.1	Dry, Erroneous
3/29/2011	403.00	3.10	41.0	347.0		26.2	348.5		19.4	339.9		22.0	333.0	
4/27/2011	401.20	0.33	41.3	346.7		25.9	348.8		19.5	339.9		22.1	332.9	
5/26/2011	399.50	0.48	41.9	346.1		26.5	348.3		19.9	339.4		22.4	332.7	
6/28/2011	391.00	0.02	43.6	344.4		27.8	346.9		22.0	337.3		23.8	331.2	
7/26/2011	384.00	0.00	47.3	340.7		30.0	344.7		24.3	335.0		25.8	329.2	
8/24/2011	382.80	0.00	47.9	340.1		31.5	343.2		24.9	334.4		26.5	328.5	
9/27/2011	381.80	0.08	48.6	339.4		32.8	341.9		25.4	333.9		26.6	328.4	
10/26/2011	383.90	0.98	47.9	340.1		33.0	341.7		24.8	334.5		26.2	328.8	
11/22/2011	389.80	1.46	46.1	341.9		32.7	342.0		23.5	335.8		25.5	329.5	
12/28/2011	382.30	0.35	47.9	340.1		33.2	341.5		24.8	334.5		25.9	329.1	
1/25/2012	387.50	1.17	47.8	340.2		34.1	340.6		25.0	334.3		26.8	328.2	
2/28/2012	381.10	0.79	49.2	338.8		34.6	340.1		25.9	333.4		26.9	328.1	
3/27/2012	387.70	1.61	47.4	340.6		34.7	340.0		24.9	334.4		26.2	328.8	
4/23/2012	392.30	1.51	45.4	342.6		33.4	341.4		23.0	336.3		25.3	329.8	
5/25/2012	388.30	0.06	46.3	341.7		32.9	341.8		23.2	336.1		25.3	329.7	
6/13/2012	385.10	0.06	47.1	340.9		33.3	341.4		24.1	335.2		25.3	329.7	
6/26/2012	386.90	0.00	46.7	341.3		33.4	341.3		25.4	333.9		23.9	331.1	
7/24/2012	378.00	0.10	49.4	338.6		34.6	340.1		25.9	333.4		26.8	328.2	
8/8/2012	382.90	0.10	48.3	339.7		34.6	340.1		25.5	333.8		26.7	328.3	
8/29/2012	382.70		48.8	339.2		34.8	339.9		25.7	333.6		27.1	327.9	
8/29/2012	382.70	0.00	48.7	339.3		34.8	339.9		25.7	333.6		27.1	327.9	
9/25/2012	381.90	0.00	49.4	338.6		35.0	339.7		26.1	333.2		27.2	327.8	
10/24/2012	384.40	0.08	48.4	339.6		35.0	339.7		25.5	333.8		27.0	328.0	
11/27/2012	389.60	0.86	46.3	341.7		33.7	341.0		23.7	335.6		25.6	329.4	
12/18/2012	394.70	0.81	44.4	343.6		32.7	342.0		22.2	337.1		24.4	330.6	
1/23/2013	393.00	1.53	44.0	344.0		31.3	343.4		21.5	337.8		23.6	331.4	
2/26/2013	391.50	0.49	44.6	343.4		31.2	343.5		21.9	337.4		23.9	331.1	
3/26/2013	394.40	1.00	44.7	343.3		31.7	343.0		22.2	337.1		24.6	330.4	
4/25/2013	391.00	0.01	44.9	343.1		31.3	343.4		22.3	337.0		24.2	330.8	
5/22/2013	392.00	0.00	44.5	343.5		30.9	343.8		22.0	337.3		24.0	331.0	
6/25/2013	380.60	0.00	47.9	340.1		32.4	342.3		24.5	334.8		25.6	329.4	
7/23/2013	380.20	0.00	49.0	339.0		33.6	341.1		25.7	333.6		26.6	328.4	
8/21/2013	379.60	0.00	49.1	338.9		34.2	340.5		25.7	333.6		26.7	328.3	
9/25/2013	382.20	0.00	48.8	339.2		34.5	340.2		25.7	333.6		26.7	328.3	
10/29/2013	382.00	0.00	49.4	338.6		35.4	339.3		26.2	333.1		27.4	327.6	
11/26/2013	390.10	0.44	46.9	341.1		34.6	340.1		24.4	334.9		26.4	328.6	
12/17/2013	394.70	1.10	44.5	343.5		32.9	341.8		22.3	337.0		25.1	329.9	

Notes:
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TABLE 2
RATTLESNAKE CANYON DAM
PIEZOMETER WATER LEVEL MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Piezometer ID →			P-64			P-65			P-66			P-67		
Top "Reference" Elev. →			385.0	388.00		370.0	374.72		352.0	359.31		352.0	355.04	
Tip Elev. →			302.0	302.0		325.5	325.5		301.0	301.0		282.5	282.5	
Depth of Piezometer →			83.0	86.0		44.5	49.2		51.0	58.3		69.5	72.5	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment
1/28/2014	392.30	0.00	44.4	343.6		31.8	342.9		21.9	337.4		24.4	330.6	
2/26/2014	389.90	0.72	45.2	342.8		31.5	343.2		22.5	336.8		24.4	330.6	
3/26/2014	387.20		46.0	342.0		31.7	343.0		23.2	336.1		24.7	330.3	
3/28/2014	387.20	1.78	46.2	341.8		31.9	342.8		23.3	336.0		24.7	330.3	
4/23/2014	393.00	0.34	44.8	343.2		32.3	342.4		22.4	336.9		25.0	330.0	
5/28/2014	387.50	0.00	46.2	341.8		31.8	342.9		23.3	336.0		24.6	330.4	
6/25/2014	388.70	0.00	46.0	342.0		32.2	342.5		23.3	336.0		25.2	329.8	
7/29/2014	382.80	0.00	47.9	340.1		33.1	341.6		24.8	334.5		25.8	329.2	
8/28/2014	386.80	0.04	47.3	340.7		33.5	341.2		24.5	334.8		25.8	329.2	
9/24/2014	387.90	0.00	46.4	341.6		32.8	341.9		23.6	335.7		25.8	329.2	
10/29/2014	383.90	0.00	47.8	340.2		33.6	341.1		24.8	334.5		26.4	328.6	Dry, Erroneous
11/21/2014	388.30	0.35	46.5	341.5		33.0	341.7		23.7	335.6		25.5	329.5	
12/22/2014	399.80	4.75	42.6	345.4		31.1	343.6		20.7	338.6		23.4	331.6	
1/28/2015	396.90	1.25	43.0	345.0		30.0	344.7		20.8	338.5		23.2	331.8	Dry, Erroneous
2/24/2015	392.70	0.34	44.2	343.8		29.9	344.8		21.7	337.6		23.5	331.5	Dry, Erroneous
3/31/2015	388.90	0.67	44.8	343.2		29.3	345.4		22.1	337.2		23.9	331.1	Dry, Erroneous
4/23/2015	390.30	0.20	45.2	342.8		29.9	344.8		22.5	336.8		24.0	331.0	
5/28/2015	400.30	1.87	41.9	346.1		28.5	346.2		19.9	339.4		22.7	332.3	
6/24/2015	400.70	0.00	41.5	346.5		27.9	346.8		19.7	339.6		22.5	332.5	Wet
7/30/2015	400.20	0.00	41.6	346.4		27.4	347.3		19.8	339.5		22.4	332.6	Wet
8/25/2015	384.00	0.00	45.9	342.1		28.5	346.2		22.8	336.5		22.5	332.5	
9/23/2015	388.60	2.17	45.8	342.2		30.4	344.3		23.2	336.1		25.2	329.8	Wet
10/29/2015	387.60	0.16	46.3	341.7		31.3	343.4		23.6	335.7		25.2	329.8	
11/25/2015	386.90	0.15	46.5	341.5		31.7	343.0		23.8	335.5		25.3	329.7	
12/23/2015	395.90	1.55	44.8	343.2		31.7	343.0		22.4	336.9		24.7	330.3	
1/26/2016	401.20	2.86	41.8	346.2		29.4	345.4		20.8	338.5		22.8	332.2	
2/24/2016	393.60	0.39	44.0	344.0		29.5	345.2		21.6	337.7		22.8	332.2	Dry, Erroneous
3/29/2016	397.10	1.55	42.7	345.3		28.9	345.8		20.9	338.5		22.9	332.1	Wet
4/29/2016	391.60	0.04	44.3	343.7		26.2	348.5		22.1	337.2		23.5	331.5	
5/24/2016	401.60	0.13	42.0	346.0		28.7	346.0		20.3	339.0		23.1	331.9	
6/29/2016	392.50	0.00	44.1	343.9		28.7	346.0		21.6	337.7		23.5	331.5	
7/26/2016	377.70	0.00	48.5	339.5		31.1	343.6		25.1	334.2		25.5	329.5	
8/24/2016	388.10	0.00	46.7	341.3		32.4	342.3		24.0	335.3		26.0	329.0	
9/29/2016	388.20	0.00	46.3	341.7		32.5	342.2		23.6	335.7		25.5	329.5	
10/26/2016	392.10	0.96	46.4	341.6		32.7	342.0		23.2	336.1		25.3	329.7	
11/22/2016	395.70	1.42	43.9	344.1		31.5	343.2		21.7	337.6		24.2	330.8	
12/28/2016	400.70	4.11	40.9	347.1		30.0	344.7		20.0	339.3		23.0	332.0	

Notes:
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TABLE 2
RATTLESNAKE CANYON DAM
PIEZOMETER WATER LEVEL MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Piezometer ID →			P-64			P-65			P-66			P-67		
Top "Reference" Elev. →			385.0	388.00		370.0	374.72		352.0	359.31		352.0	355.04	
Tip Elev. →			302.0	302.0		325.5	325.5		301.0	301.0		282.5	282.5	
Depth of Piezometer →			83.0	86.0		44.5	49.2		51.0	58.3		69.5	72.5	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment
1/26/2017	402.40	6.70	41.0	347.0		28.3	346.4		19.5	339.8		22.0	333.0	
2/28/2017	389.60	4.01	44.9	343.1		29.3	345.4		22.2	337.1		22.8	332.2	
3/29/2017	391.80	0.14	44.9	343.1		30.2	344.5		22.4	336.9		24.4	330.6	
4/26/2017	387.00	0.04	46.1	341.9		30.7	344.0		23.2	336.1		24.8	330.2	
5/23/2017	399.40	0.30	42.7	345.3		29.8	344.9		20.8	338.5		23.5	331.5	
6/21/2017	392.60	0.00	44.2	343.8		29.6	345.1		21.8	337.5		23.3	331.7	
7/26/2017	384.60	0.00	46.9	341.1		31.1	343.6		23.9	335.4		23.7	331.3	Dry, Erroneous
8/30/2017	383.00	0.00	47.9	340.1		32.6	342.1		24.8	334.5		23.7	331.3	Dry, Erroneous
9/27/2017	382.00	0.00	48.7	339.3		33.9	340.8		25.6	333.7		23.4	331.6	
10/27/2017	375.00	0.00	50.0	338.0		34.8	339.9		26.5	332.8		23.5	331.5	
11/30/2017	382.80	0.14	48.6	339.4		35.0	339.7		25.7	333.6		23.2	331.8	
12/21/2017	380.50	0.00	49.2	338.8		35.1	339.6		26.0	333.3		23.6	331.4	

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TABLE 2
RATTLESNAKE CANYON DAM
PIEZOMETER WATER LEVEL MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Piezometer ID →			OW-1 (Was OW97-3)			OW-2 (Was OW97-2)			OW-3 (Was OW97-1)		
Top "Reference" Elev. →			468.16	468.16		442.91	442.91		418.87	418.87	
Tip Elev. →			433.46	433.46		407.91	407.91		386.27	386.27	
Depth of Piezometer →			34.7	34.7		35.0	35.0		32.6	32.6	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment
1/31/2008	381.20		34.4	433.8		34.3	408.6	Dry	25.2	393.7	
2/28/2008	393.10		33.4	434.8		34.4	408.5	Dry	22.3	396.6	
3/27/2008	387.90		33.2	435.0		34.4	408.5	Dry	19.1	399.8	
4/28/2008	404.70		31.2	437.0		33.6	409.3		17.6	401.3	
5/28/2008	404.00		34.0	434.2		33.8	409.1		17.1	401.8	
6/25/2008	400.20		34.6	433.6		34.7	408.2	Dry	17.6	401.3	
7/29/2008	398.70		34.5	433.7	Dry	34.4	408.5	Dry	19.1	399.8	
7/30/2008	398.70	0.00	34.5	433.7	Dry	34.5	408.4	Dry	19.1	399.8	
8/29/2008	395.00	0.00	34.5	433.7	Dry	34.4	408.5	Dry	21.3	397.6	
9/25/2008	391.70	0.00	34.7	433.5	Dry	34.8	408.1	Dry	23.5	395.4	
10/28/2008	384.05	0.00	34.5	433.7	Dry	34.4	408.5	Dry	27.0	391.9	Dry, Erroneous
11/26/2008	391.10	1.94	34.7	433.5	Dry	34.6	408.3	Dry	26.8	392.1	
12/31/2008	397.90	3.20	34.5	433.7	Dry	34.4	408.5	Dry	24.6	394.3	
1/29/2009	393.40	0.34	34.5	433.7	Dry	34.4	408.5	Dry	25.6	393.3	
2/25/2009	398.60	3.91	34.8	433.4	Dry	34.4	408.5	Dry	25.1	393.8	
3/31/2009	393.40	0.16	34.5	433.7	Dry	34.4	408.5	Dry	24.6	394.3	
4/28/2009	400.70	0.10	34.6	433.6	Dry	34.5	408.4	Dry	24.2	394.7	
5/18/2009	400.80	0.00	34.5	433.7	Dry	34.4	408.5	Dry	22.3	396.6	
5/27/2009	400.10	0.00	34.5	433.7		34.4	408.6		22.4	396.5	
6/29/2009	403.00	0.15	34.5	433.7	Dry	34.3	408.6	Dry	19.6	399.3	
7/28/2009	396.53	0.00	34.5	433.7	Dry	34.4	408.5	Dry	22.3	396.6	
8/25/2009	396.60	0.00	34.5	433.7	Dry	34.4	408.5	Dry	23.8	395.1	
9/30/2009	393.10	0.00	34.5	433.7	Dry	34.3	408.6	Dry	25.5	393.4	
10/28/2009	401.60	0.42	34.5	433.7	Dry	34.4	408.5	Dry	23.5	395.4	
11/30/2009	402.50	0.00	34.5	433.7	Dry	34.4	408.5	Dry	19.8	399.1	
12/29/2009	399.90	2.80	34.5	433.7	Dry	34.4	408.5	Dry	20.5	398.4	
1/26/2010	401.10	6.75	33.1	435.1		34.3	408.6	Dry	19.7	399.2	
2/23/2010	402.50	2.66	34.2	434.0		34.4	408.5	Dry	18.7	400.2	
3/30/2010	400.00	1.25	34.5	433.7	Dry	34.4	408.5	Dry	19.4	399.5	
4/4/2010	399.60		34.6	433.6	Dry	34.2	408.7	Dry	19.6	399.3	
4/27/2010	403.80	1.32	34.6	433.6	Dry	34.4	408.5	Dry	19.2	399.7	
5/26/2010	403.60	0.03	34.6	433.6	Dry	34.4	408.5	Dry	19.0	399.9	
6/29/2010	397.70	0.00	34.5	433.7	Dry	34.2	408.7	Dry	20.6	398.3	
7/27/2010	396.30	0.00	34.5	433.7	Dry	34.3	408.6	Dry	21.6	397.3	
8/26/2010	390.70	0.00	34.6	433.6	Dry	34.5	408.4	Dry	22.8	396.1	
9/28/2010	390.30	0.00	34.5	433.7	Dry	34.4	408.5	Dry	22.4	396.5	
10/26/2010	403.20	1.56	34.6	433.6	Dry	34.3	408.6	Dry	22.9	396.0	
11/30/2010	397.10	1.34	34.5	433.7		34.3	408.6		21.7	397.2	
12/28/2010	401.40	9.03	23.3	444.9		34.4	408.5		18.2	400.7	

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TABLE 2
RATTLESNAKE CANYON DAM
PIEZOMETER WATER LEVEL MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Piezometer ID →			OW-1 (Was OW97-3)			OW-2 (Was OW97-2)			OW-3 (Was OW97-1)		
Top "Reference" Elev. →			468.16	468.16		442.91	442.91		418.87	418.87	
Tip Elev. →			433.46	433.46		407.91	407.91		386.27	386.27	
Depth of Piezometer →			34.7	34.7		35.0	35.0		32.6	32.6	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment
1/27/2011	393.80	1.10	34.0	434.2		34.3	408.6	Dry	19.4	399.5	
2/23/2011	391.70	1.17	34.5	433.7	Dry	34.4	408.5	Dry	22.9	396.0	
3/29/2011	403.00	3.10	34.4	433.8	Dry	34.3	408.6		22.2	396.7	
4/27/2011	401.20	0.33	34.5	433.7	Dry	34.4	408.5	Dry	20.2	398.7	
5/26/2011	399.50	0.48	34.5	433.7	Dry	34.4	408.5	Dry	20.8	398.1	
6/28/2011	391.00	0.02	34.6	433.6	Dry	34.5	408.4	Dry	23.0	395.9	
7/26/2011	384.00	0.00	34.6	433.6	Dry	34.4	408.5	Dry	27.1	391.8	
8/24/2011	382.80	0.00	34.5	433.7	Dry	34.9	408.0	Dry	28.5	390.4	
9/27/2011	381.80	0.08	34.5	433.7	Dry	34.4	408.5	Dry	29.7	389.2	
10/26/2011	383.90	0.98	34.5	433.7	Dry	34.4	408.5	Dry	29.8	389.1	
11/22/2011	389.80	1.46	32.9	435.3		34.2	408.7		34.1	384.8	Erroneous
12/28/2011	382.30	0.35	34.5	433.7		34.4	408.5		29.2	389.7	
1/25/2012	387.50	1.17	34.5	433.7		34.3	408.6		32.0	386.9	
2/28/2012	381.10	0.79	34.5	433.7		34.3	408.6		32.3	386.6	
3/27/2012	387.70	1.61	35.1	433.1		35.3	407.6	Erroneous	32.2	386.7	
4/23/2012	392.30	1.51	34.8	433.4		34.4	408.5		31.4	387.5	
5/25/2012	388.30	0.06	35.5	432.7	Erroneous	35.8	407.1	Erroneous	27.4	391.5	
6/13/2012	385.10	0.06	34.5	433.7		34.3	408.6		28.9	390.0	
6/26/2012	386.90	0.00	34.5	433.7		34.4	408.5		28.7	390.2	
7/24/2012	378.00	0.10	34.5	433.7		34.4	408.5		29.4	389.5	
8/8/2012	382.90	0.10	34.4	433.8		34.3	408.6		30.7	388.2	
8/29/2012	382.70		34.5	433.7		34.3	408.6		28.4	390.5	
8/29/2012	382.70	0.00	34.5	433.7		34.3	408.6		28.4	390.5	
9/25/2012	381.90	0.00	34.6	433.6		34.4	408.5		26.6	392.3	
10/24/2012	384.40	0.08	34.5	433.7		34.4	408.5		30.3	388.6	
11/27/2012	389.60	0.86	34.4	433.8		34.3	408.6		29.0	389.9	
12/18/2012	394.70	0.81	34.4	433.8		34.3	408.6		29.0	389.9	
1/23/2013	393.00	1.53	35.7	432.5	Erroneous	35.8	407.1	Erroneous	25.8	393.1	
2/26/2013	391.50	0.49	34.5	433.7		34.2	408.7		26.9	392.0	
3/26/2013	394.40	1.00	34.4	433.8		35.3	407.6		27.7	391.2	
4/25/2013	391.00	0.01	34.8	433.4		34.3	408.6		26.9	392.0	
5/22/2013	392.00	0.00	34.5	433.7		34.4	408.5		26.1	392.8	
6/25/2013	380.60	0.00	34.5	433.7		34.4	408.5		27.2	391.7	
7/23/2013	380.20	0.00	34.5	433.7	Dry	34.4	408.5	Dry	27.6	391.3	
8/21/2013	379.60	0.00	34.5	433.7	Dry	34.4	408.5	Dry	28.3	390.6	
9/25/2013	382.20	0.00	34.5	433.7	Dry	34.6	408.3	Dry	27.9	391.0	
10/29/2013	382.00	0.00	34.5	433.7	Dry	34.6	408.3	Dry	29.9	389.0	
11/26/2013	390.10	0.44	34.5	433.7	Dry	34.3	408.6	Dry	30.0	388.9	
12/17/2013	394.70	1.10	34.6	433.6	Dry	34.3	408.6	Dry	29.4	389.5	

Notes:
Elev. = Elevation; in. = Inches.
Elevations are in fee relative to NGVD29 datum.

TABLE 2
RATTLESNAKE CANYON DAM
PIEZOMETER WATER LEVEL MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Piezometer ID →			OW-1 (Was OW97-3)			OW-2 (Was OW97-2)			OW-3 (Was OW97-1)		
Top "Reference" Elev. →			468.16	468.16		442.91	442.91		418.87	418.87	
Tip Elev. →			433.46	433.46		407.91	407.91		386.27	386.27	
Depth of Piezometer →			34.7	34.7		35.0	35.0		32.6	32.6	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment
1/28/2014	392.30	0.00	34.4	433.8	Dry	34.3	408.6	Dry	25.6	393.3	
2/26/2014	389.90	0.72	34.5	433.7	Dry	34.3	408.6	Dry	26.3	392.6	
3/26/2014	387.20		34.5	433.7	Dry	34.4	408.5	Dry	26.8	392.1	Dry, Erroneous
3/28/2014	387.20	1.78	34.5	433.7	Dry	34.4	408.5	Dry	26.8	392.1	Dry, Erroneous
4/23/2014	393.00	0.34	34.5	433.7	Dry	34.3	408.6	Dry	27.0	391.9	
5/28/2014	387.50	0.00	34.5	433.7	Dry	34.4	408.5	Dry	25.8	393.1	
6/25/2014	388.70	0.00	34.5	433.7	Dry	34.3	408.6	Dry	26.2	392.7	
7/29/2014	382.80	0.00	34.5	433.7	Dry	34.3	408.6	Dry	26.5	392.4	
8/28/2014	386.80	0.04	34.4	433.8		34.3	408.6	Dry	27.6	391.3	
9/24/2014	387.90	0.00	34.5	433.7	Dry	34.3	408.6	Dry	27.3	391.6	
10/29/2014	383.90	0.00	34.8	433.4	Dry	34.4	408.5	Dry	28.3	390.6	
11/21/2014	388.30	0.35	34.5	433.7	Dry	34.3	408.6	Dry	26.3	392.6	
12/22/2014	399.80	4.75	34.5	433.7	Dry	34.3	408.6	Dry	26.7	392.2	
1/28/2015	396.90	1.25	34.5	433.7	Dry	34.3	408.6	Dry	24.4	394.5	
2/24/2015	392.70	0.34	34.4	433.8	Dry	34.2	408.7	Dry	24.7	394.2	
3/31/2015	388.90	0.67	34.5	433.7	Dry	34.3	408.6	Dry	22.0	396.9	
4/23/2015	390.30	0.20	34.5	433.7	Dry	34.3	408.6	Dry	26.4	392.5	
5/28/2015	400.30	1.87	34.5	433.7	Dry	34.4	408.5	Dry	24.4	394.5	
6/24/2015	400.70	0.00	35.0	433.2	Dry	34.8	408.1	Dry	23.3	395.6	
7/30/2015	400.20	0.00	34.4	433.8	Dry	35.3	407.6	Dry	21.5	397.4	
8/25/2015	384.00	0.00	34.4	433.8	Dry	34.6	408.3	Dry	25.0	393.9	
9/23/2015	388.60	2.17	34.5	433.7	Dry	34.4	408.5	Dry	29.7	389.2	
10/29/2015	387.60	0.16	34.5	433.7	Dry	34.4	408.5	Dry	32.4	386.5	Dry
11/25/2015	386.90	0.15	34.6	433.6	Dry	34.4	408.5	Dry	31.9	387.0	
12/23/2015	395.90	1.55	33.8	434.4	Dry	33.6	409.3	Dry, Erroneous	31.7	387.2	
1/26/2016	401.20	2.86	33.8	434.4	Dry	33.6	409.3	Dry, Erroneous	24.1	394.7	
2/24/2016	393.60	0.39	33.8	434.4	Dry	33.6	409.3	Dry, Erroneous	23.9	395.0	
3/29/2016	397.10	1.55	34.5	433.7		34.5	408.4		24.7	394.2	
4/29/2016	391.60	0.04	34.5	433.7		34.5	408.4		24.7	394.2	
5/24/2016	401.60	0.13	34.5	433.7		34.5	408.4		25.2	393.7	
6/29/2016	392.50	0.00	34.5	433.7		34.5	408.4		24.0	394.9	
7/26/2016	377.70	0.00	34.5	433.7		34.5	408.4		29.0	389.9	
8/24/2016	388.10	0.00			Abandoned			Abandoned			Not Read; Construction
9/29/2016	388.20	0.00			Abandoned			Abandoned			Not Read; Construction
10/26/2016	392.10	0.96			Abandoned			Abandoned			Not Read; Construction
11/22/2016	395.70	1.42			Abandoned			Abandoned			Not Read; Construction
12/28/2016	400.70	4.11			Abandoned			Abandoned			Not Read; Construction

Notes:
Elev. = Elevation; in. = Inches.
Elevations are in fee relative to NGVD29 datum.

TABLE 2
RATTLESNAKE CANYON DAM
PIEZOMETER WATER LEVEL MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Piezometer ID →			OW-1 (Was OW97-3)			OW-2 (Was OW97-2)			OW-3 (Was OW97-1)		
Top "Reference" Elev. →			468.16	468.16		442.91	442.91		418.87	418.87	
Tip Elev. →			433.46	433.46		407.91	407.91		386.27	386.27	
Depth of Piezometer →			34.7	34.7		35.0	35.0		32.6	32.6	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment	Reading (ft)	Elev. (ft)	Comment
1/26/2017	402.40	6.70			Abandoned			Abandoned			Not Read; Construction
2/28/2017	389.60	4.01			Abandoned			Abandoned			Not Read; Construction
3/29/2017	391.80	0.14			Abandoned			Abandoned			Not Read; Construction
4/26/2017	387.00	0.04			Abandoned			Abandoned			Not Read; Construction
5/23/2017	399.40	0.30			Abandoned			Abandoned			Not Read; Construction
6/21/2017	392.60	0.00			Abandoned			Abandoned			Not Read; Construction
7/26/2017	384.60	0.00			Abandoned			Abandoned			Not Read; Construction
8/30/2017	383.00	0.00			Abandoned			Abandoned			Not Read; Construction
9/27/2017	382.00	0.00			Abandoned			Abandoned			Not Read; Construction
10/27/2017	375.00	0.00			Abandoned			Abandoned			Not Read; Construction
11/30/2017	382.80	0.14			Abandoned			Abandoned			Not Read; Construction
12/21/2017	380.50	0.00			Abandoned			Abandoned			Not Read; Construction

Notes:
Elev. = Elevation; in. = Inches.
Elevations are in fee relative to NGVD29 datum.

TABLE 3
RATTLESNAKE CANYON DAM
SEEPAGE FLOW RATE MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Flow Point ID →			FP-1		FP-2		FP-3		FP-4		FP-5		FP-8	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment
1/31/2008	381.20		0.80		0.06		0.67		0.35		0.00	Dry	0.00	Dry
2/28/2008	393.10		2.40		0.06		0.66		0.33		0.00	Dry	0.00	Dry
3/27/2008	387.90		4.20		0.06		0.74		0.38		0.00	Dry	0.00	Dry
4/28/2008	404.70		18.39		0.09		0.86		0.48		0.95		0.00	Dry
5/28/2008	404.00		25.13		0.10		1.14		0.63		1.35		0.13	
6/25/2008	400.20		27.95		0.10		0.99		0.66		1.06		0.00	Dry
7/29/2008	398.70			Not Read		Not Read		Not Read		Not Read		Not Read	0.00	Dry
7/30/2008	398.70	0.00	27.47		0.14		1.30		0.98		1.09		0.00	Dry
8/29/2008	395.00	0.00	16.56		0.09		1.13		0.63		0.61		0.00	Dry
9/25/2008	391.70	0.00	4.67		0.00		0.30		0.19		0.10		0.00	Dry
10/28/2008	384.05	0.00	7.00		0.09		1.00		0.53		0.00		0.00	Dry
11/26/2008	391.10	1.94	8.03		0.07		0.98		0.51		0.00		0.00	Dry
12/31/2008	397.90	3.20	18.81		0.10		1.01		0.59		0.26		0.00	Dry
1/29/2009	393.40	0.34	11.62		0.08		1.08		0.63		0.29		0.00	Dry
2/25/2009	398.60	3.91	15.92		0.30		0.94		0.59		0.46		0.00	Dry
3/31/2009	393.40	0.16	11.10		0.11		1.20		0.67		0.37		0.00	Dry
4/28/2009	400.70	0.10	17.27		0.09		0.05		0.32		0.36		0.00	Dry
5/18/2009	400.80	0.00	19.34		0.10		1.11		0.69		0.95		0.00	Dry
5/27/2009	400.10	0.00	18.81		0.10		0.32		0.73		0.97		0.00	Dry
6/29/2009	403.00	0.15	23.12		0.10		1.20		0.80		1.59		0.00	Dry
7/28/2009	396.53	0.00	21.12		0.09		1.10		0.79		1.05		0.00	Dry
8/25/2009	396.60	0.00	15.85		0.08		1.19		0.69		0.62		0.00	Dry
9/30/2009	393.10	0.00	13.20		0.07		1.00		0.75		0.25		0.00	Dry
10/28/2009	401.60	0.42	15.20		0.10		1.06		0.71		0.85		0.00	Dry
11/30/2009	402.50	0.00	22.32		0.16		1.30		0.87		1.45		0.00	Dry
12/29/2009	399.90	2.80	26.47		0.10		1.06		0.85		1.19		0.00	Dry
1/26/2010	401.10	6.75	25.36		0.09		1.22		0.84		1.33		0.00	Dry
2/23/2010	402.50	2.66	28.53		0.09		1.16		0.85		1.59		0.00	Dry
3/30/2010	400.00	1.25	25.60		0.10		1.27		0.88		1.32		0.00	Dry
4/4/2010	399.60		25.79		0.11		1.19		0.79		1.29		0.00	Dry
4/27/2010	403.80	1.32	18.23		0.13		1.35		0.92		1.72		0.00	Dry
5/26/2010	403.60	0.03	29.48		0.11		1.29		0.90		1.80		0.00	Dry
6/29/2010	397.70	0.00	25.36		0.11		1.06		0.90		1.37		0.00	Dry
7/27/2010	396.30	0.00	24.57		0.08		1.16		0.79		0.79		0.00	Dry
8/26/2010	390.70	0.00	13.00		0.08		1.16		0.74		0.42		0.00	Dry
9/28/2010	390.30	0.00	7.93		0.08		0.99		0.66		0.06		0.00	Dry
10/26/2010	403.20	1.56	11.06		0.09		1.06		0.71		0.79		0.00	Dry
11/30/2010	397.10	1.34	15.06		0.09		1.16		0.79		0.92		0.00	Dry
12/28/2010	401.40	9.03	17.96		0.10		0.99		0.79		1.71		0.00	Dry

Notes:
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Elevations are in feet relative to NGVD29 datum.

TABLE 3
RATTLESNAKE CANYON DAM
SEEPAGE FLOW RATE MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Flow Point ID →			FP-1		FP-2		FP-3		FP-4		FP-5		FP-8	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment
1/27/2011	393.80	1.10	15.61		0.16		1.36		0.83		1.00		0.00	Dry
2/23/2011	391.70	1.17	9.22		0.31		1.06		0.74		0.36		0.00	Dry
3/29/2011	403.00	3.10	19.55		0.10		1.15		0.79		1.32		0.00	Dry
4/27/2011	401.20	0.33	14.66		0.13		1.16		0.79		1.14		0.00	Dry
5/26/2011	399.50	0.48	13.78		0.11		1.26		0.86		1.06		0.00	Dry
6/28/2011	391.00	0.02	7.58		0.07		1.08		0.76		0.30		0.00	Dry
7/26/2011	384.00	0.00	6.46		0.05		0.93		0.97		0.00	Dry	0.00	Dry
8/24/2011	382.80	0.00	1.40		0.04		0.44		0.27		0.00	Dry	0.00	Dry
9/27/2011	381.80	0.08	1.30		0.06		0.74		0.46		0.00	Dry	0.00	Dry
10/26/2011	383.90	0.98	1.06		0.02		0.79		0.52		0.00	Dry	0.00	Dry
11/22/2011	389.80	1.46	1.55		0.02		0.81		0.50		0.00	Dry	0.00	Dry
12/28/2011	382.30	0.35	1.34		0.03		0.79		0.45		0.00	Dry	0.00	Dry
1/25/2012	387.50	1.17	1.11		0.02		0.74		0.45		0.00	Dry	0.00	Dry
2/28/2012	381.10	0.79	0.95		0.02		0.69		0.37		0.00	Dry	0.00	Dry
3/27/2012	387.70	1.61	0.94		0.02		0.71		0.37		0.00	Dry	0.00	Dry
4/23/2012	392.30	1.51	1.18		0.02		0.76		0.39		0.00	Dry	0.00	Dry
5/25/2012	388.30	0.06	2.58		0.03		0.89		0.46		0.00	Dry	0.00	Dry
6/13/2012	385.10	0.06	1.48		0.03		0.85		0.48		0.00	Dry	0.00	Dry
6/26/2012	386.90	0.00	3.01		0.01		0.86		0.61		0.00	Dry	0.00	Dry
7/24/2012	378.00	0.10	1.13		0.02		0.65		0.40		0.00	Dry	0.00	Dry
8/8/2012	382.90	0.10	0.89		0.03		0.66		0.34		0.00	Dry	0.00	Dry
8/29/2012	382.70		0.96		0.02		0.73		0.40		0.00	Dry	0.00	Dry
8/29/2012	382.70	0.00	0.96		0.02		0.73		0.40		0.00	Dry	0.00	Dry
9/25/2012	381.90	0.00	0.91		0.02		0.94		0.35		0.00	Dry	0.00	Dry
10/24/2012	384.40	0.08	0.82		0.02		0.64		0.32		0.00	Dry	0.00	Dry
11/27/2012	389.60	0.86	2.02		0.07		0.71		0.38		0.00	Dry	0.00	Dry
12/18/2012	394.70	0.81	3.01		0.03		0.82		0.40		0.00	Dry	0.00	Dry
1/23/2013	393.00	1.53	3.04		0.05		1.03		0.55		0.02		0.00	Dry
2/26/2013	391.50	0.49	7.69		0.04		0.98		0.55		0.00		0.00	Dry
3/26/2013	394.40	1.00	5.66		0.08		0.87		0.49		0.00		0.00	Dry
4/25/2013	391.00	0.01	6.03		0.06		0.95		0.50		0.00	Dry	0.00	Dry
5/22/2013	392.00	0.00	6.45		0.06		0.86		0.55		0.00	Dry	0.00	Dry
6/25/2013	380.60	0.00	3.23		0.07		0.86		0.46		0.00	Dry	0.00	Dry
7/23/2013	380.20	0.00	1.62		0.05		0.51		0.43		0.00	Dry	0.00	Dry
8/21/2013	379.60	0.00	0.83		0.34		0.77		0.45		0.00	Dry	0.00	Dry
9/25/2013	382.20	0.00	0.91		0.03		0.73		0.37		0.00	Dry	0.00	Dry
10/29/2013	382.00	0.00	0.83		0.03		0.35		0.33		0.00	Dry	0.00	Dry
11/26/2013	390.10	0.44	0.85		0.03		0.69		0.33		0.00	Dry	0.00	Dry
12/17/2013	394.70	1.10	2.24		0.04		0.85		0.41		0.00	Dry	0.00	Dry

Notes:
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TABLE 3
RATTLESNAKE CANYON DAM
SEEPAGE FLOW RATE MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Flow Point ID →			FP-1		FP-2		FP-3		FP-4		FP-5		FP-8	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment
1/28/2014	392.30	0.00	5.77		0.05		0.90		0.48		0.00	Dry	0.00	Dry
2/26/2014	389.90	0.72	4.97		0.04		0.92		0.48		0.00	Dry	0.00	Dry
3/26/2014	387.20		4.91		0.04		0.94		0.48		0.00	Dry	0.00	Dry
3/28/2014	387.20	1.78	4.91		0.04		0.74		0.42		0.00	Dry	0.00	Dry
4/23/2014	393.00	0.34	4.33		0.23		0.87		0.45		0.00	Dry	0.00	Dry
5/28/2014	387.50	0.00	4.72		0.02		0.90		0.49		0.00	Dry	0.00	Dry
6/25/2014	388.70	0.00	3.99		0.01		0.92		0.48		0.00	Dry	0.00	Dry
7/29/2014	382.80	0.00	2.05		0.03		0.89		0.45		0.00	Dry	0.00	Dry
8/28/2014	386.80	0.04	1.74		0.04		0.82		0.40		0.00	Dry	0.00	Dry
9/24/2014	387.90	0.00	2.48		0.02		0.85		0.41		0.00	Dry	0.00	Dry
10/29/2014	383.90	0.00	1.11		0.04		0.78		0.36		0.00	Dry	0.00	Dry
11/21/2014	388.30	0.35	2.38		0.02		0.82		0.43		0.00	Dry	0.00	Dry
12/22/2014	399.80	4.75	2.79		0.04		0.81		0.41		0.00	Dry	0.00	Dry
1/28/2015	396.90	1.25	8.02		0.05		1.06		0.55		0.30		0.00	Dry
2/24/2015	392.70	0.34	7.69		0.06		1.10		0.50		0.10		0.00	Dry
3/31/2015	388.90	0.67	8.34		0.04		1.10		0.58		0.04		0.00	Dry
4/23/2015	390.30	0.20	6.34		0.03		1.11		0.61		0.00	Dry	0.00	Dry
5/28/2015	400.30	1.87	7.90		0.04		1.09		0.60		0.55		0.00	Dry
6/24/2015	400.70	0.00	7.40		0.16		1.06		0.69		0.63		0.00	Dry
7/30/2015	400.20	0.00	8.73		0.09		1.19		0.69		0.87		0.00	Dry
8/25/2015	384.00	0.00	11.27		0.02		0.90		0.71		0.01		0.00	Dry
9/23/2015	388.60	2.17	5.62		0.04		1.00		0.55		0.00		0.00	Dry
10/29/2015	387.60	0.16	3.82		0.04		0.95		0.58		0.00		0.00	Dry
11/25/2015	386.90	0.15	3.21		0.03		0.97		0.52		0.00		0.00	
12/23/2015	395.90	1.55	4.33		0.08		0.95		0.50		0.04		0.01	
1/26/2016	401.20	2.86	13.14		0.04		1.06		0.62		0.63		0.00	
2/24/2016	393.60	0.39	9.59		0.05		1.17		0.62		0.24		0.00	
3/29/2016	397.10	1.55	9.94		0.05		1.15		0.71		0.36		0.08	
4/29/2016	391.60	0.04	8.43		0.06		1.08		0.81		0.16		0.00	
5/24/2016	401.60	0.13	9.51		0.10		1.22		0.55		0.46		0.00	
6/29/2016	392.50	0.00	9.22		0.07		1.12		0.69		0.25		0.00	
7/26/2016	377.70	0.00	3.20		0.06		1.10		0.64		0.00		0.00	
8/24/2016	388.10	0.00	0.72		0.06		1.22		0.59		0.00		0.00	
9/29/2016	388.20	0.00	0.58		0.03		0.89		0.55		0.00		0.00	
10/26/2016	392.10	0.96	1.53		0.05		1.03		0.53		0.00		0.00	
11/22/2016	395.70	1.42	2.12		0.17		0.97		0.78		0.09		0.00	
12/28/2016	400.70	4.11	6.50		0.06		1.66		0.63		0.55		0.00	

Notes:
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TABLE 3
RATTLESNAKE CANYON DAM
SEEPAGE FLOW RATE MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Flow Point ID →			FP-1		FP-2		FP-3		FP-4		FP-5		FP-8	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment
1/26/2017	402.40	6.70	12.52		0.08		1.24		0.56		1.25		0.00	
2/28/2017	389.60	4.01	5.39		0.10		1.16		0.66		0.13		0.00	
3/29/2017	391.80	0.14	7.45		0.04		0.95		0.55		0.00		0.00	
4/26/2017	387.00	0.04	5.31		0.04		0.98		0.53		0.00		0.00	
5/23/2017	399.40	0.30	6.83		0.06		0.98		0.59		0.60		0.00	
6/21/2017	392.60	0.00	8.24		0.04		1.18		0.62		0.12		0.00	
7/26/2017	384.60	0.00	4.49		0.08		1.00		0.58		0.00		0.00	
8/30/2017	383.00	0.00	1.68		0.06		0.94		0.48		0.00		0.00	
9/27/2017	382.00	0.00	0.84		0.04		0.65		0.44		0.00		0.00	
10/27/2017	375.00	0.00	0.73		0.05		0.78		0.40		0.00		0.00	
11/30/2017	382.80	0.14	0.69		0.05		0.79		0.37		0.01		0.00	
12/21/2017	380.50	0.00	0.69		0.02		0.77		0.36		0.00		0.00	

Notes:
Elev. = Elevation; gpm = gallons per minute; in. = Inches.
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TABLE 3
RATTLESNAKE CANYON DAM
SEEPAGE FLOW RATE MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Flow Point ID →			FP-9		FP-10		FP-1 SOUTH		FP-1 NORTH		FP-11	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment
1/31/2008	381.20			Replaced by FP-1 South		Replaced by FP-1 North					0.00	Dry
2/28/2008	393.10			Replaced by FP-1 South		Replaced by FP-1 North					0.00	Dry
3/27/2008	387.90			Replaced by FP-1 South		Replaced by FP-1 North					0.00	Dry
4/28/2008	404.70			Replaced by FP-1 South		Replaced by FP-1 North	6.66		11.73		0.00	Dry
5/28/2008	404.00			Replaced by FP-1 South		Replaced by FP-1 North	17.12		8.01		0.00	Dry
6/25/2008	400.20			Replaced by FP-1 South		Replaced by FP-1 North	15.85		12.10		0.00	Dry
7/29/2008	398.70			Replaced by FP-1 South		Replaced by FP-1 North		Not Read		Not Read	0.00	Dry
7/30/2008	398.70	0.00		Replaced by FP-1 South		Replaced by FP-1 North	19.02		8.45		0.00	Dry
8/29/2008	395.00	0.00		Replaced by FP-1 South		Replaced by FP-1 North	3.49		13.08		0.00	Dry
9/25/2008	391.70	0.00		Replaced by FP-1 South		Replaced by FP-1 North	0.61		4.06		0.00	Dry
10/28/2008	384.05	0.00		Replaced by FP-1 South		Replaced by FP-1 North	2.00		5.00		0.00	Dry
11/26/2008	391.10	1.94		Replaced by FP-1 South		Replaced by FP-1 North	6.45		1.59		0.00	Dry
12/31/2008	397.90	3.20		Replaced by FP-1 South		Replaced by FP-1 North	4.68		14.13		0.00	Dry
1/29/2009	393.40	0.34		Replaced by FP-1 South		Replaced by FP-1 North	2.59		9.04		0.00	Dry
2/25/2009	398.60	3.91		Replaced by FP-1 South		Replaced by FP-1 North	4.50		11.42		0.00	Dry
3/31/2009	393.40	0.16		Replaced by FP-1 South		Replaced by FP-1 North	3.17		7.93		0.00	Dry
4/28/2009	400.70	0.10		Replaced by FP-1 South		Replaced by FP-1 North	7.19		10.09		0.00	Dry
5/18/2009	400.80	0.00		Replaced by FP-1 South		Replaced by FP-1 North	8.24		11.10		0.00	Dry
5/27/2009	400.10	0.00		Replaced by FP-1 South		Replaced by FP-1 North	7.50		11.31		0.00	Dry
6/29/2009	403.00	0.15		Replaced by FP-1 South		Replaced by FP-1 North	10.65		12.47		0.00	Dry
7/28/2009	396.53	0.00		Replaced by FP-1 South		Replaced by FP-1 North	7.93		13.20		0.00	Dry
8/25/2009	396.60	0.00		Replaced by FP-1 South		Replaced by FP-1 North	5.39		10.46		0.00	Dry
9/30/2009	393.10	0.00		Replaced by FP-1 South		Replaced by FP-1 North	3.60		9.60		0.00	Dry
10/28/2009	401.60	0.42		Replaced by FP-1 South		Replaced by FP-1 North	6.00		9.20		0.00	Dry
11/30/2009	402.50	0.00		Replaced by FP-1 South		Replaced by FP-1 North	13.63		8.69		0.00	Dry
12/29/2009	399.90	2.80		Replaced by FP-1 South		Replaced by FP-1 North	11.10		15.38		0.00	Dry
1/26/2010	401.10	6.75		Replaced by FP-1 South		Replaced by FP-1 North	12.68		12.68		0.00	Dry
2/23/2010	402.50	2.66		Replaced by FP-1 South		Replaced by FP-1 North	15.85		12.68		0.00	Dry
3/30/2010	400.00	1.25		Replaced by FP-1 South		Replaced by FP-1 North	12.68		12.92		0.00	Dry
4/4/2010	399.60			Replaced by FP-1 South		Replaced by FP-1 North	14.47		11.32		0.00	Dry
4/27/2010	403.80	1.32		Replaced by FP-1 South		Replaced by FP-1 North	5.28		12.95		0.00	Dry
5/26/2010	403.60	0.03		Replaced by FP-1 South		Replaced by FP-1 North	17.70		11.78		0.00	Dry
6/29/2010	397.70	0.00		Replaced by FP-1 South		Replaced by FP-1 North	14.27		11.10		0.00	Dry
7/27/2010	396.30	0.00		Replaced by FP-1 South		Replaced by FP-1 North	8.72		15.85		0.00	Dry
8/26/2010	390.70	0.00		Replaced by FP-1 South		Replaced by FP-1 North	5.87		7.13		0.00	Dry
9/28/2010	390.30	0.00		Replaced by FP-1 South		Replaced by FP-1 North	2.64		5.28		0.00	Dry
10/26/2010	403.20	1.56		Replaced by FP-1 South		Replaced by FP-1 North	3.57		7.50		0.00	Dry
11/30/2010	397.10	1.34		Replaced by FP-1 South		Replaced by FP-1 North	11.10		3.96		0.00	Dry
12/28/2010	401.40	9.03		Replaced by FP-1 South		Replaced by FP-1 North	15.32		2.64		0.00	Dry

Notes:
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TABLE 3
RATTLESNAKE CANYON DAM
SEEPAGE FLOW RATE MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Flow Point ID →			FP-9		FP-10		FP-1 SOUTH		FP-1 NORTH		FP-11	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment
1/27/2011	393.80	1.10		Replaced by FP-1 South		Replaced by FP-1 North	11.60		4.02		0.00	Dry
2/23/2011	391.70	1.17		Replaced by FP-1 South		Replaced by FP-1 North	6.74		2.48		0.00	Dry
3/29/2011	403.00	3.10		Replaced by FP-1 South		Replaced by FP-1 North	17.44		2.11		0.00	Dry
4/27/2011	401.20	0.33		Replaced by FP-1 South		Replaced by FP-1 North	13.00		1.66		0.00	Dry
5/26/2011	399.50	0.48		Replaced by FP-1 South		Replaced by FP-1 North	12.13		1.66		0.00	Dry
6/28/2011	391.00	0.02		Replaced by FP-1 South		Replaced by FP-1 North	6.18		1.39		0.00	Dry
7/26/2011	384.00	0.00		Replaced by FP-1 South		Replaced by FP-1 North	6.34		0.12		0.00	Dry
8/24/2011	382.80	0.00		Replaced by FP-1 South		Replaced by FP-1 North	1.32		0.08		0.00	Dry
9/27/2011	381.80	0.08		Replaced by FP-1 South		Replaced by FP-1 North	1.30		0.00		0.00	Dry
10/26/2011	383.90	0.98		Replaced by FP-1 South		Replaced by FP-1 North	1.06		0.00		0.00	Dry
11/22/2011	389.80	1.46		Replaced by FP-1 South		Replaced by FP-1 North	1.55		0.00		0.00	Dry
12/28/2011	382.30	0.35		Replaced by FP-1 South		Replaced by FP-1 North	1.24		0.10		0.00	Dry
1/25/2012	387.50	1.17		Replaced by FP-1 South		Replaced by FP-1 North	1.11		0.00		0.00	Dry
2/28/2012	381.10	0.79		Replaced by FP-1 South		Replaced by FP-1 North	0.95		0.00		0.00	Dry
3/27/2012	387.70	1.61		Replaced by FP-1 South		Replaced by FP-1 North	0.94		0.00		0.00	Dry
4/23/2012	392.30	1.51		Replaced by FP-1 South		Replaced by FP-1 North	1.18		0.00		0.00	Dry
5/25/2012	388.30	0.06		Replaced by FP-1 South		Replaced by FP-1 North	1.84		0.74		0.00	Dry
6/13/2012	385.10	0.06		Replaced by FP-1 South		Replaced by FP-1 North	0.74		0.74		0.00	Dry
6/26/2012	386.90	0.00		Replaced by FP-1 South		Replaced by FP-1 North	1.45		1.56		0.00	Dry
7/24/2012	378.00	0.10		Replaced by FP-1 South		Replaced by FP-1 North	0.97		0.16		0.00	Dry
8/8/2012	382.90	0.10		Replaced by FP-1 South		Replaced by FP-1 North	0.88		0.01		0.00	Dry
8/29/2012	382.70			Replaced by FP-1 South		Replaced by FP-1 North	0.96		0.00		0.00	Dry
8/29/2012	382.70	0.00		Replaced by FP-1 South		Replaced by FP-1 North	0.96		0.00		0.00	Dry
9/25/2012	381.90	0.00		Replaced by FP-1 South		Replaced by FP-1 North	0.91		0.00		0.00	Dry
10/24/2012	384.40	0.08		Replaced by FP-1 South		Replaced by FP-1 North	0.82		0.00		0.00	Dry
11/27/2012	389.60	0.86		Replaced by FP-1 South		Replaced by FP-1 North	0.73		1.29		0.00	Dry
12/18/2012	394.70	0.81		Replaced by FP-1 South		Replaced by FP-1 North	1.27		1.74		0.00	Dry
1/23/2013	393.00	1.53		Replaced by FP-1 South		Replaced by FP-1 North	1.27		1.77		0.00	Dry
2/26/2013	391.50	0.49		Replaced by FP-1 South		Replaced by FP-1 North	2.77		4.91		0.00	Dry
3/26/2013	394.40	1.00		Replaced by FP-1 South		Replaced by FP-1 North	2.25		3.41		0.00	Dry
4/25/2013	391.00	0.01		Replaced by FP-1 South		Replaced by FP-1 North	2.50		3.53		0.00	Dry
5/22/2013	392.00	0.00		Replaced by FP-1 South		Replaced by FP-1 North	2.38		4.07		0.00	Dry
6/25/2013	380.60	0.00		Replaced by FP-1 South		Replaced by FP-1 North	1.33		1.90		0.00	Dry
7/23/2013	380.20	0.00		Replaced by FP-1 South		Replaced by FP-1 North	1.17		0.45		0.00	Dry
8/21/2013	379.60	0.00		Replaced by FP-1 South		Replaced by FP-1 North	0.77		0.07		0.00	Dry
9/25/2013	382.20	0.00		Replaced by FP-1 South		Replaced by FP-1 North	0.91		0.00		0.00	Dry
10/29/2013	382.00	0.00		Replaced by FP-1 South		Replaced by FP-1 North	0.83		0.00		0.00	Dry
11/26/2013	390.10	0.44		Replaced by FP-1 South		Replaced by FP-1 North	0.85		0.00		0.00	Dry
12/17/2013	394.70	1.10		Replaced by FP-1 South		Replaced by FP-1 North	1.24		1.00		0.00	Dry

Notes:
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TABLE 3
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SEEPAGE FLOW RATE MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Flow Point ID →			FP-9		FP-10		FP-1 SOUTH		FP-1 NORTH		FP-11	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment
1/28/2014	392.30	0.00		Replaced by FP-1 South		Replaced by FP-1 North	2.36		3.41		0.00	Dry
2/26/2014	389.90	0.72		Replaced by FP-1 South		Replaced by FP-1 North	2.27		2.69		0.00	Dry
3/26/2014	387.20			Replaced by FP-1 South		Replaced by FP-1 North	1.98		2.93		0.00	Dry
3/28/2014	387.20	1.78		Replaced by FP-1 South		Replaced by FP-1 North	1.98		2.93		0.00	Dry
4/23/2014	393.00	0.34		Replaced by FP-1 South		Replaced by FP-1 North	1.66		2.67		0.00	Dry
5/28/2014	387.50	0.00		Replaced by FP-1 South		Replaced by FP-1 North	1.98		2.73		0.00	Dry
6/25/2014	388.70	0.00		Replaced by FP-1 South		Replaced by FP-1 North	1.29		2.69		0.00	Dry
7/29/2014	382.80	0.00		Replaced by FP-1 South		Replaced by FP-1 North	1.20		0.85		0.00	Dry
8/28/2014	386.80	0.04		Replaced by FP-1 South		Replaced by FP-1 North	1.12		0.62		0.00	Dry
9/24/2014	387.90	0.00		Replaced by FP-1 South		Replaced by FP-1 North	1.22		1.27		0.00	Dry
10/29/2014	383.90	0.00		Replaced by FP-1 South		Replaced by FP-1 North	0.79		0.32		0.00	Dry
11/21/2014	388.30	0.35		Replaced by FP-1 South		Replaced by FP-1 North	1.19		1.19		0.00	Dry
12/22/2014	399.80	4.75		Replaced by FP-1 South		Replaced by FP-1 North	1.48		1.31		0.00	Dry
1/28/2015	396.90	1.25		Replaced by FP-1 South		Replaced by FP-1 North	2.71		5.31		0.00	Dry
2/24/2015	392.70	0.34		Replaced by FP-1 South		Replaced by FP-1 North	3.33		4.36		0.00	Dry
3/31/2015	388.90	0.67		Replaced by FP-1 South		Replaced by FP-1 North	2.79		5.55		0.00	Dry
4/23/2015	390.30	0.20		Replaced by FP-1 South		Replaced by FP-1 North	2.54		3.80		0.00	Dry
5/28/2015	400.30	1.87		Replaced by FP-1 South		Replaced by FP-1 North	3.28		4.62		0.00	Dry
6/24/2015	400.70	0.00		Replaced by FP-1 South		Replaced by FP-1 North	3.09		4.31		0.00	Dry
7/30/2015	400.20	0.00		Replaced by FP-1 South		Replaced by FP-1 North	3.78		4.95		0.00	Dry
8/25/2015	384.00	0.00		Replaced by FP-1 South		Replaced by FP-1 North	3.50		7.77		0.00	Dry
9/23/2015	388.60	2.17		Replaced by FP-1 South		Replaced by FP-1 North	1.95		3.67		0.00	Dry
10/29/2015	387.60	0.16		Replaced by FP-1 South		Replaced by FP-1 North	1.60		2.22		0.00	Dry
11/25/2015	386.90	0.15		Replaced by FP-1 South		Replaced by FP-1 North	1.43		1.78		0.00	Dry
12/23/2015	395.90	1.55		Replaced by FP-1 South		Replaced by FP-1 North	1.80		2.54		0.00	Dry
1/26/2016	401.20	2.86		Replaced by FP-1 South		Replaced by FP-1 North	3.87		9.27		0.00	Dry
2/24/2016	393.60	0.39		Replaced by FP-1 South		Replaced by FP-1 North	3.01		6.58		0.00	Dry
3/29/2016	397.10	1.55		Replaced by FP-1 South		Replaced by FP-1 North	3.60		6.34		0.00	Dry
4/29/2016	391.60	0.04		Replaced by FP-1 South		Replaced by FP-1 North	3.17		5.26		0.00	Dry
5/24/2016	401.60	0.13		Replaced by FP-1 South		Replaced by FP-1 North	4.04		5.47		0.00	Dry
6/29/2016	392.50	0.00		Replaced by FP-1 South		Replaced by FP-1 North	3.61		5.61		0.00	Dry
7/26/2016	377.70	0.00		Replaced by FP-1 South		Replaced by FP-1 North	1.69		1.51		0.00	Dry
8/24/2016	388.10	0.00		Replaced by FP-1 South		Replaced by FP-1 North	0.72		0.00		0.00	Dry
9/29/2016	388.20	0.00		Replaced by FP-1 South		Replaced by FP-1 North	0.58		0.00		0.00	Dry
10/26/2016	392.10	0.96		Replaced by FP-1 South		Replaced by FP-1 North	1.53		0.00		0.00	Dry
11/22/2016	395.70	1.42		Replaced by FP-1 South		Replaced by FP-1 North	2.12		0.00		0.00	Dry
12/28/2016	400.70	4.11		Replaced by FP-1 South		Replaced by FP-1 North	6.18		0.32		0.00	Dry

Notes:
Elev. = Elevation; gpm = gallons per minute; in. = Inches.
Elevations are in feet relative to NGVD29 datum.

TABLE 3
RATTLESNAKE CANYON DAM
SEEPAGE FLOW RATE MEASUREMENTS
JANUARY 2008 THROUGH DECEMBER 2017

Flow Point ID →			FP-9		FP-10		FP-1 SOUTH		FP-1 NORTH		FP-11	
Date	Reservoir Elevation (ft)	Monthly Rainfall (in.)	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment	Reading (gpm)	Comment
1/26/2017	402.40	6.70		Replaced by FP-1 South		Replaced by FP-1 North	5.23		7.29		0.00	Dry
2/28/2017	389.60	4.01		Replaced by FP-1 South		Replaced by FP-1 North	2.38		3.01		0.00	Dry
3/29/2017	391.80	0.14		Replaced by FP-1 South		Replaced by FP-1 North	4.28		3.17		0.00	Dry
4/26/2017	387.00	0.04		Replaced by FP-1 South		Replaced by FP-1 North	1.59		3.73		0.00	Dry
5/23/2017	399.40	0.30		Replaced by FP-1 South		Replaced by FP-1 North	2.36		4.47		0.00	Dry
6/21/2017	392.60	0.00		Replaced by FP-1 South		Replaced by FP-1 North	2.85		5.39		0.00	Dry
7/26/2017	384.60	0.00		Replaced by FP-1 South		Replaced by FP-1 North	1.64		2.85		0.00	Dry
8/30/2017	383.00	0.00		Replaced by FP-1 South		Replaced by FP-1 North	1.05		0.63		0.00	Dry
9/27/2017	382.00	0.00		Replaced by FP-1 South		Replaced by FP-1 North	0.84		0.00		0.00	Dry
10/27/2017	375.00	0.00		Replaced by FP-1 South		Replaced by FP-1 North	0.73		0.00		0.00	Dry
11/30/2017	382.80	0.14		Replaced by FP-1 South		Replaced by FP-1 North	0.69		0.00		0.00	Dry
12/21/2017	380.50	0.00		Replaced by FP-1 South		Replaced by FP-1 North	0.69		0.00		0.00	Dry

Notes:
Elev. = Elevation; gpm = gallons per minute; in. = Inches.
Elevations are in feet relative to NGVD29 datum.

TABLE 4
RATTLESNAKE CANYON DAM
HORIZONTAL MOVEMENT OF SURVEY MONUMENTS
1985 THROUGH 2017

Monument ID →		A		B		B-1		C		D		E		E-1		Comment
Approx. Station →		2+14.8		2+74.7		2+77.7		5+74.6		8+74.6		11+74.7		11+75.1		
Year	Date	(feet)	(inches)	(feet)	(inches)	(feet)	(inches)	(feet)	(inches)	(feet)	(inches)	(feet)	(inches)	(feet)	(inches)	
1985	10/19/1985	-0.090	-1.080					0.010	0.120	0.000	0.000	-0.010	-0.120			Initial Reading for A,C,D & E
1986																Data were not found
1987	8/19/1987	-0.100	-1.200					0.020	0.240	0.000	0.000	-0.010	-0.120			
1988																Data were not found
1989																Data were not found
1990	10/5/1990	-0.050	-0.600			0.000	0.000	0.060	0.720	0.020	0.240	0.000	0.000			Initial Reading for B-1
1991	6/12/1991	-0.020	-0.240			0.000	0.000	0.080	0.960	0.050	0.600	0.010	0.120			
1992																Data were not found
1993																Data were not found
1994	5/11/1994	-0.040	-0.480			0.020	0.240	0.080	0.960	0.060	0.720	0.020	0.240			BM-2 was destroyed
1995																Data were not found
1996	5/2/1996	-0.050	-0.600			0.000	0.000	0.040	0.480	0.050	0.600	0.020	0.240			
1997	5/28/1997	-0.050	-0.600			0.000	0.000	0.050	0.600	0.050	0.600	0.020	0.240			
1998	5/1/1998	-0.060	-0.720			-0.020	-0.240	0.050	0.600	0.050	0.600	0.020	0.240			
1999	4/28/1999	-0.065	-0.780			0.010	0.120	0.070	0.840	0.050	0.600					Monument E was paved over
2000	6/28/2000	-0.065	-0.780			0.005	0.060	0.065	0.780	0.050	0.600	0.080	0.960			Monument E was reestablished
2001	5/3/2001	-0.070	-0.840	0.060	0.720	0.020	0.240	0.080	0.960	0.050	0.600	0.085	1.020	0.000	0.000	Initial Reading for B and E-1
2002	5/20/2002	-0.075	-0.900	0.070	0.840	0.020	0.240	0.085	1.020	0.060	0.720	0.090	1.080	-0.005	-0.060	
2003	5/22/2003	-0.070	-0.840	0.085	1.020	0.030	0.360	0.090	1.080	0.055	0.660	0.100	1.200	0.000	0.000	
2004	5/18/2004	-0.070	-0.840	0.085	1.020	0.030	0.360	0.095	1.140	0.060	0.720	0.100	1.200	0.000	0.000	
2005	5/31/2005	-0.070	-0.840	0.080	0.960	0.030	0.360	0.095	1.140	0.060	0.720	0.105	1.260	0.000	0.000	
2006	5/31/2006	-0.065	-0.780	0.085	1.020	0.040	0.480	0.095	1.140	0.060	0.720	0.100	1.200	0.000	0.000	
2007	5/16/2007	-0.065	-0.780	0.090	1.080	0.040	0.480	0.090	1.080	0.065	0.780	0.100	1.200	0.000	0.000	
2008	5/23/2008	-0.065	-0.780	0.095	1.140	0.045	0.540	0.100	1.200	0.065	0.780	0.115	1.380	0.000	0.000	
2009	6/10/2009	-0.075	-0.900	0.115	1.380	0.060	0.720	0.110	1.320	0.070	0.840	0.120	1.440	0.000	0.000	
2010	5/19/2010	-0.065	-0.780	0.105	1.260	0.055	0.660	0.100	1.200	0.075	0.900	0.105	1.260	0.000	0.000	
2011	5/18/2011	-0.065	-0.780	0.115	1.380	0.065	0.780	0.100	1.200	0.075	0.900	0.110	1.320	0.015	0.180	
2012	5/18/2012	-0.070	-0.840	0.115	1.380	0.065	0.780	0.095	1.140	0.075	0.900	0.095	1.140	0.010	0.120	
2013	6/6/2013	-0.075	-0.900	0.120	1.440	0.070	0.840	0.095	1.140	0.075	0.900	0.115	1.380	0.005	0.060	
2014	4/21/2014	-0.075	-0.900	0.120	1.440	0.080	0.960	0.110	1.320	0.090	1.080	0.125	1.500	0.010	0.120	
2015	6/4/2015	-0.080	-0.960	0.120	1.440	0.080	0.960	0.110	1.320	0.085	1.020	0.115	1.380	0.010	0.120	
2016	7/25/2016	-0.085	-1.020	0.125	1.500	0.080	0.960	0.110	1.320	0.085	1.020	0.115	1.380	0.010	0.120	BM-4 was destroyed
2017																No survey was done in 2017

Notes:
(1) Positive values represent downstream offset.
(2) Negative values represent upstream offset.

TABLE 5
RATTLESNAKE CANYON DAM
CUMULATIVE HORIZONTAL DISPLACEMENT OF SURVEY MONUMENTS
1985 THROUGH 2017

Monument ID →		A		B		B-1		C		D		E		E-1		Comment
Approx. Station →		2+14.8		2+74.7		2+77.7		5+74.6		8+74.6		11+74.7		11+75.1		
Year	Date	(feet)	(inches)	(feet)	(inches)	(feet)	(inches)	(feet)	(inches)	(feet)	(inches)	(feet)	(inches)	(feet)	(inches)	
1985	10/19/1985	0.000	0.000					0.000	0.000	0.000	0.000	0.000	0.000			Initial Reading for A,C,D & E
1986																Data were not found
1987	8/19/1987	-0.010	-0.120					0.010	0.120	0.000	0.000	0.000	0.000			
1988																Data were not found
1989																Data were not found
1990	10/5/1990	0.040	0.480			0.000	0.000	0.050	0.600	0.020	0.240	0.010	0.120			Initial Reading for B-1
1991	6/12/1991	0.070	0.840			0.000	0.000	0.070	0.840	0.050	0.600	0.020	0.240			
1992																Data were not found
1993																Data were not found
1994	5/11/1994	0.050	0.600			0.020	0.240	0.070	0.840	0.060	0.720	0.030	0.360			BM-2 was destroyed
1995													0.000			Data were not found
1996	5/2/1996	0.040	0.480			0.000	0.000	0.030	0.360	0.050	0.600	0.030	0.360			
1997	5/28/1997	0.040	0.480			0.000	0.000	0.040	0.480	0.050	0.600	0.030	0.360			
1998	5/1/1998	0.030	0.360			-0.020	-0.240	0.040	0.480	0.050	0.600	0.030	0.360			
1999	4/28/1999	0.025	0.300			0.010	0.120	0.060	0.720	0.050	0.600					Monument E was paved over
2000	6/28/2000	0.025	0.300			0.005	0.060	0.055	0.660	0.050	0.600	0.030	0.360			Monument E was reestablished
2001	5/3/2001	0.020	0.240	0.000	0.000	0.020	0.240	0.070	0.840	0.050	0.600	0.035	0.420	0.000	0.000	Initial Reading for B and E-1
2002	5/20/2002	0.015	0.180	0.010	0.120	0.020	0.240	0.075	0.900	0.060	0.720	0.040	0.480	-0.005	-0.060	
2003	5/22/2003	0.020	0.240	0.025	0.300	0.030	0.360	0.080	0.960	0.055	0.660	0.050	0.600	0.000	0.000	
2004	5/18/2004	0.020	0.240	0.025	0.300	0.030	0.360	0.085	1.020	0.060	0.720	0.050	0.600	0.000	0.000	
2005	5/31/2005	0.020	0.240	0.020	0.240	0.030	0.360	0.085	1.020	0.060	0.720	0.055	0.660	0.000	0.000	
2006	5/31/2006	0.025	0.300	0.025	0.300	0.040	0.480	0.085	1.020	0.060	0.720	0.050	0.600	0.000	0.000	
2007	5/16/2007	0.025	0.300	0.030	0.360	0.040	0.480	0.080	0.960	0.065	0.780	0.050	0.600	0.000	0.000	
2008	5/23/2008	0.025	0.300	0.035	0.420	0.045	0.540	0.090	1.080	0.065	0.780	0.065	0.780	0.000	0.000	
2009	6/10/2009	0.015	0.180	0.055	0.660	0.060	0.720	0.100	1.200	0.070	0.840	0.070	0.840	0.000	0.000	
2010	5/19/2010	0.025	0.300	0.045	0.540	0.055	0.660	0.090	1.080	0.075	0.900	0.055	0.660	0.000	0.000	
2011	5/18/2011	0.025	0.300	0.055	0.660	0.065	0.780	0.090	1.080	0.075	0.900	0.060	0.720	0.015	0.180	
2012	5/18/2012	0.020	0.240	0.055	0.660	0.065	0.780	0.085	1.020	0.075	0.900	0.045	0.540	0.010	0.120	
2013	6/6/2013	0.015	0.180	0.060	0.720	0.070	0.840	0.085	1.020	0.075	0.900	0.065	0.780	0.005	0.060	
2014	4/21/2014	0.015	0.180	0.060	0.720	0.080	0.960	0.100	1.200	0.090	1.080	0.075	0.900	0.010	0.120	
2015	6/4/2015	0.010	0.120	0.060	0.720	0.080	0.960	0.100	1.200	0.085	1.020	0.065	0.780	0.010	0.120	
2016	7/25/2016	0.005	0.060	0.065	0.780	0.080	0.960	0.100	1.200	0.085	1.020	0.065	0.780	0.010	0.120	BM-4 was destroyed
2017																No survey was done in 2017

Notes:
(1) Positive values represent downstream displacement (West).
(2) Negative values represent upstream displacement (East).
(3) The displacment calculated for Monument E, which was destroyed and reestablished, assumes that no displacement occurred between the last reading on the original monument (1998) and the first reading on the new monument (2000).

TABLE 6
RATTLESNAKE CANYON DAM
ELEVATIONS OF SURVEY MONUMENTS
1985 THROUGH 2017

Monument ID →		A	B	B-1	C	D	E	E-1	Comment
Approx. Station →		2+14.8	2+74.7	2+77.7	5+74.6	8+74.6	11+74.7	11+75.1	
Year	Date	(feet)	(feet)	(feet)	(feet)	(feet)	(feet)	(feet)	
1985	10/19/1985	419.320			417.980	418.280	418.530		Initial Reading for A,C,D & E
1986									Data were not found
1987	8/19/1987	419.280			417.970	418.260	418.560		
1988									Data were not found
1989									Data were not found
1990	10/5/1990	419.200		417.980	417.930	418.250	418.530		Initial Reading for B-1
1991	6/12/1991	419.190		417.980	417.910	418.210	418.530		
1992									Data were not found
1993									Data were not found
1994	5/11/1994	419.180		417.950	417.910	418.220	418.530		BM-2 was destroyed
1995									Data were not found
1996	5/2/1996	419.180		417.940	417.900	418.220	418.530		
1997	5/28/1997	419.180		417.940	417.910	418.230	418.530		
1998	5/1/1998	419.180		417.930	417.900	418.220	418.530		
1999	4/28/1999	419.180		417.925	417.905	418.230			Monument E was paved over
2000	6/28/2000	419.180		417.920	417.900	418.225	418.065		Monument E was reestablished
2001	5/3/2001	419.185	418.015	417.925	417.915	418.250	418.090	418.745	Initial Reading for B and E-1
2002	5/21/2002	419.185	418.005	417.915	417.915	418.245	418.090	418.745	
2003	5/22/2003	419.105	418.000	417.915	417.910	418.245	418.090	418.750	
2004	5/18/2004	419.185	418.000	417.915	417.910	418.250	418.100	418.750	
2005	5/31/2005	419.180	417.995	417.905	417.915	418.245	418.095	418.750	
2006	5/31/2006	419.185	417.990	417.900	417.920	418.250	418.095	418.755	
2007	5/16/2007	419.182	417.987	417.898	417.921	418.254	418.106	418.759	
2008	5/23/2008	419.185	417.985	417.900	417.925	418.260	418.115	418.770	
2009	6/10/2009	419.180	417.980	417.895	417.925	418.260	418.100	418.760	
2010	5/19/2010	419.180	417.980	417.890	417.920	418.255	418.100	418.755	
2011	5/18/2011	419.180	417.975	417.885	417.925	418.260	418.110	418.760	
2012	5/24/2012	419.175	417.970	417.880	417.930	418.265	418.115	418.765	
2013	6/6/2013	419.170	417.970	417.880	417.935	418.270	418.120	418.775	
2014	4/21/2014	419.170	417.970	417.885	417.940	418.275	418.125	418.780	
2015	6/4/2015	419.165	417.975	417.890	417.945	418.280	418.135	418.790	
2016	7/25/2016	419.160	417.975	417.890	417.950	418.290	418.145	418.800	BM-4 was destroyed
2017									No survey was done in 2017

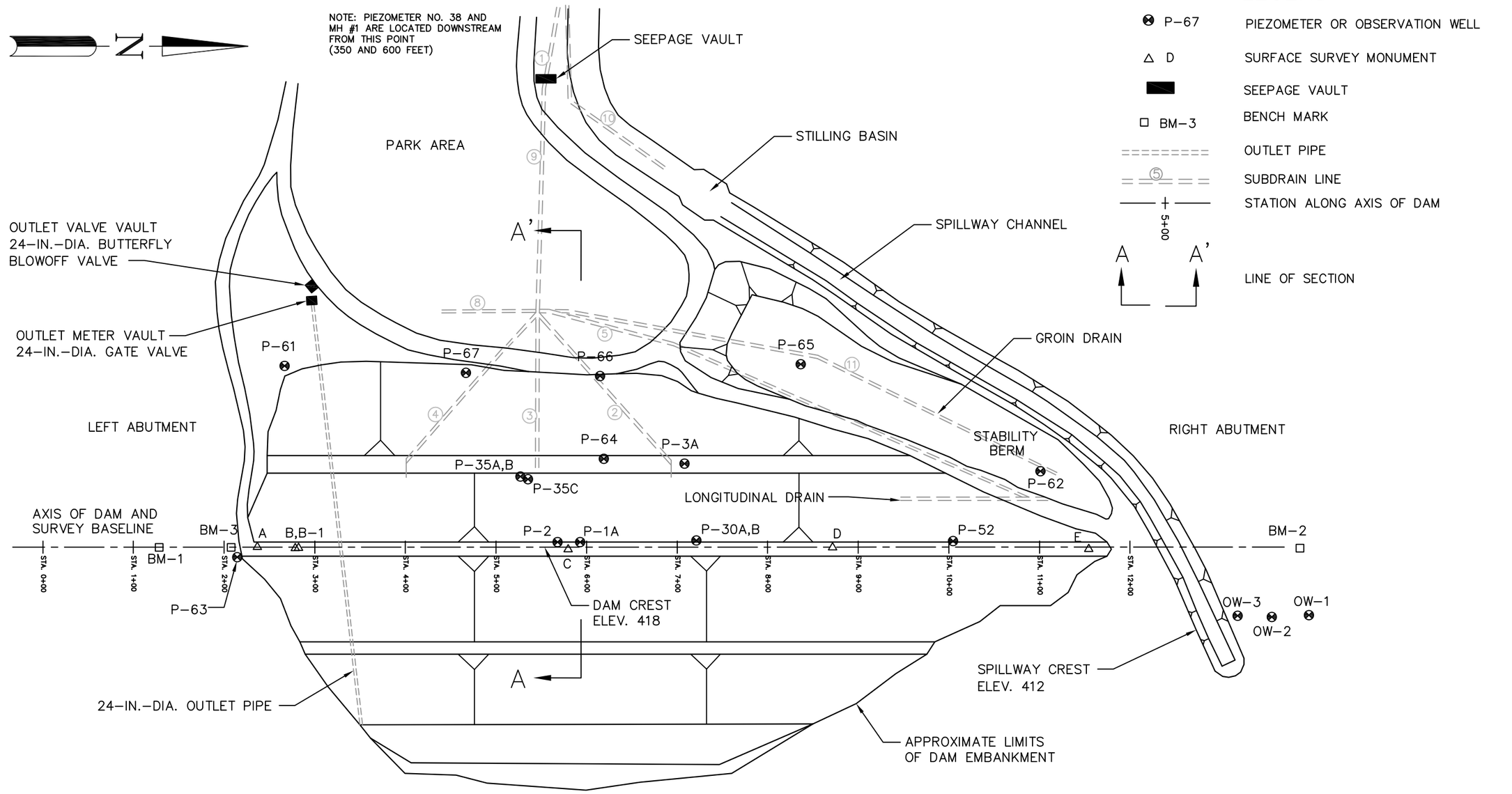
Note:
Elevations are in feet relative to NGVD29 datum.

TABLE 7
RATTLESNAKE CANYON DAM
CUMULATIVE VERTICAL MOVEMENT OF SURVEY MONUMENTS
1985 THROUGH 2017

Monument ID →		A		B		B-1		C		D		E		E-1		Comment
Approx. Station →		2+14.8		2+74.7		2+77.7		5+74.6		8+74.6		11+74.7		11+75.1		
Year	Date	(feet)	(inches)	(feet)	(inches)	(feet)	(inches)	(feet)	(inches)	(feet)	(inches)	(feet)	(inches)	(feet)	(inches)	
1985	10/19/1985	0.000	0.000					0.000	0.000	0.000	0.000	0.000	0.000			Initial Reading for A,C,D & E
1986																Data were not found
1987	8/19/1987	0.040	0.480					0.010	0.120	0.020	0.240	-0.030	-0.360			
1988																Data were not found
1989																Data were not found
1990	10/5/1990	0.120	1.440			0.000	0.000	0.050	0.600	0.030	0.360	0.000	0.000			Initial Reading for B-1
1991	6/12/1991	0.130	1.560			0.000	0.000	0.070	0.840	0.070	0.840	0.000	0.000			
1992																Data were not found
1993																Data were not found
1994	5/11/1994	0.140	1.680			0.030	0.360	0.070	0.840	0.060	0.720	0.000	0.000			BM-2 was destroyed
1995																Data were not found
1996	5/2/1996	0.140	1.680			0.040	0.480	0.080	0.960	0.060	0.720	0.000	0.000			
1997	5/28/1997	0.140	1.680			0.040	0.480	0.070	0.840	0.050	0.600	0.000	0.000			
1998	5/1/1998	0.140	1.680			0.050	0.600	0.080	0.960	0.060	0.720	0.000	0.000			
1999	4/28/1999	0.140	1.680			0.055	0.660	0.075	0.900	0.050	0.600					Monument E was paved over
2000	6/28/2000	0.140	1.680			0.060	0.720	0.080	0.960	0.055	0.660	0.000	0.000			Monument E was reestablished
2001	5/3/2001	0.135	1.620	0.000	0.000	0.055	0.660	0.065	0.780	0.030	0.360	-0.025	-0.300	0.000	0.000	Initial Reading for B and E-1
2002	5/21/2002	0.135	1.620	0.010	0.120	0.065	0.780	0.065	0.780	0.035	0.420	-0.025	-0.300	0.000	0.000	
2003	5/22/2003	0.215	2.580	0.015	0.180	0.065	0.780	0.070	0.840	0.035	0.420	-0.025	-0.300	-0.005	-0.060	
2004	5/18/2004	0.135	1.620	0.015	0.180	0.065	0.780	0.070	0.840	0.030	0.360	-0.035	-0.420	-0.005	-0.060	
2005	5/31/2005	0.140	1.680	0.020	0.240	0.075	0.900	0.065	0.780	0.035	0.420	-0.030	-0.360	-0.005	-0.060	
2006	5/31/2006	0.135	1.620	0.025	0.300	0.080	0.960	0.060	0.720	0.030	0.360	-0.030	-0.360	-0.010	-0.120	
2007	5/16/2007	0.138	1.656	0.028	0.336	0.082	0.984	0.059	0.708	0.026	0.312	-0.041	-0.492	-0.014	-0.168	
2008	5/23/2008	0.135	1.620	0.030	0.360	0.080	0.960	0.055	0.660	0.020	0.240	-0.050	-0.600	-0.025	-0.300	
2009	6/10/2009	0.140	1.680	0.035	0.420	0.085	1.020	0.055	0.660	0.020	0.240	-0.035	-0.420	-0.015	-0.180	
2010	5/19/2010	0.140	1.680	0.035	0.420	0.090	1.080	0.060	0.720	0.025	0.300	-0.035	-0.420	-0.010	-0.120	
2011	5/18/2011	0.140	1.680	0.040	0.480	0.095	1.140	0.055	0.660	0.020	0.240	-0.045	-0.540	-0.015	-0.180	
2012	5/24/2012	0.145	1.740	0.045	0.540	0.100	1.200	0.050	0.600	0.015	0.180	-0.050	-0.600	-0.020	-0.240	
2013	6/6/2013	0.150	1.800	0.045	0.540	0.100	1.200	0.045	0.540	0.010	0.120	-0.055	-0.660	-0.030	-0.360	
2014	4/21/2014	0.150	1.800	0.045	0.540	0.095	1.140	0.040	0.480	0.005	0.060	-0.060	-0.720	-0.035	-0.420	
2015	6/4/2015	0.155	1.860	0.040	0.480	0.093	1.116	0.038	0.456	0.000	0.000	-0.070	-0.840	-0.045	-0.540	
2016	7/25/2016	0.160	1.920	0.040	0.480	0.090	1.080	0.030	0.360	-0.010	-0.120	-0.080	-0.960	-0.055	-0.660	BM-4 was destroyed
2017																No survey was done in 2017

Notes:
(1) Positive values represent downward movement (settlement).
(2) Negative values represent upward movement (uplift).
(3) The movement calculated for Monument E, which was destroyed and reestablished, assumes that no movement occurred between the last reading on the original monument (1998) and the first reading on the new monument (2000).

FIGURES



NOTES:
(1) SECTION A-A' SHOWN ON FIGURE 2.
(2) ELEVATIONS ARE IN FEET RELATIVE TO NGVD29.

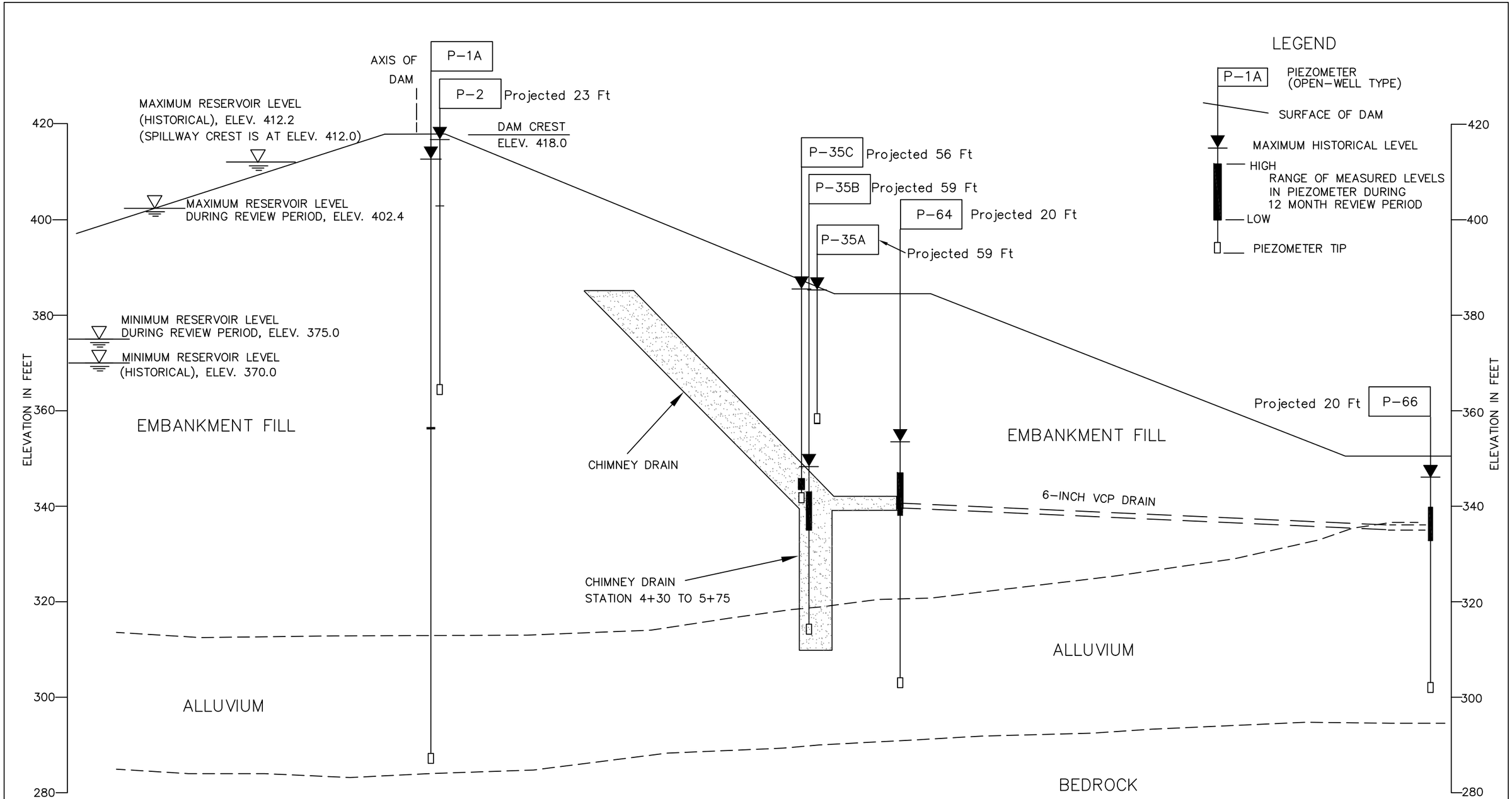
Irvine Ranch WATER DISTRICT

GENTERRA CONSULTANTS, INC.
Engineering & Geotechnical Services
Irvine, California

RATTLESNAKE CANYON DAM AND RESERVOIR

SITE AND INSTRUMENTATION PLAN

PROJECT NO.	DATE	FIGURE
397A-IRW	NOVEMBER 2018	1



SECTION A-A' (STATION 5+94)
(MAXIMUM SECTION)

1"=20'

20' 0' 20'

SCALE

NOTES:
(1) LOCATION OF SECTION A-A' IS SHOWN ON FIGURE 1.
(2) ELEVATIONS ARE IN FEET RELATIVE TO NGVD29.

Irvine Ranch WATER DISTRICT

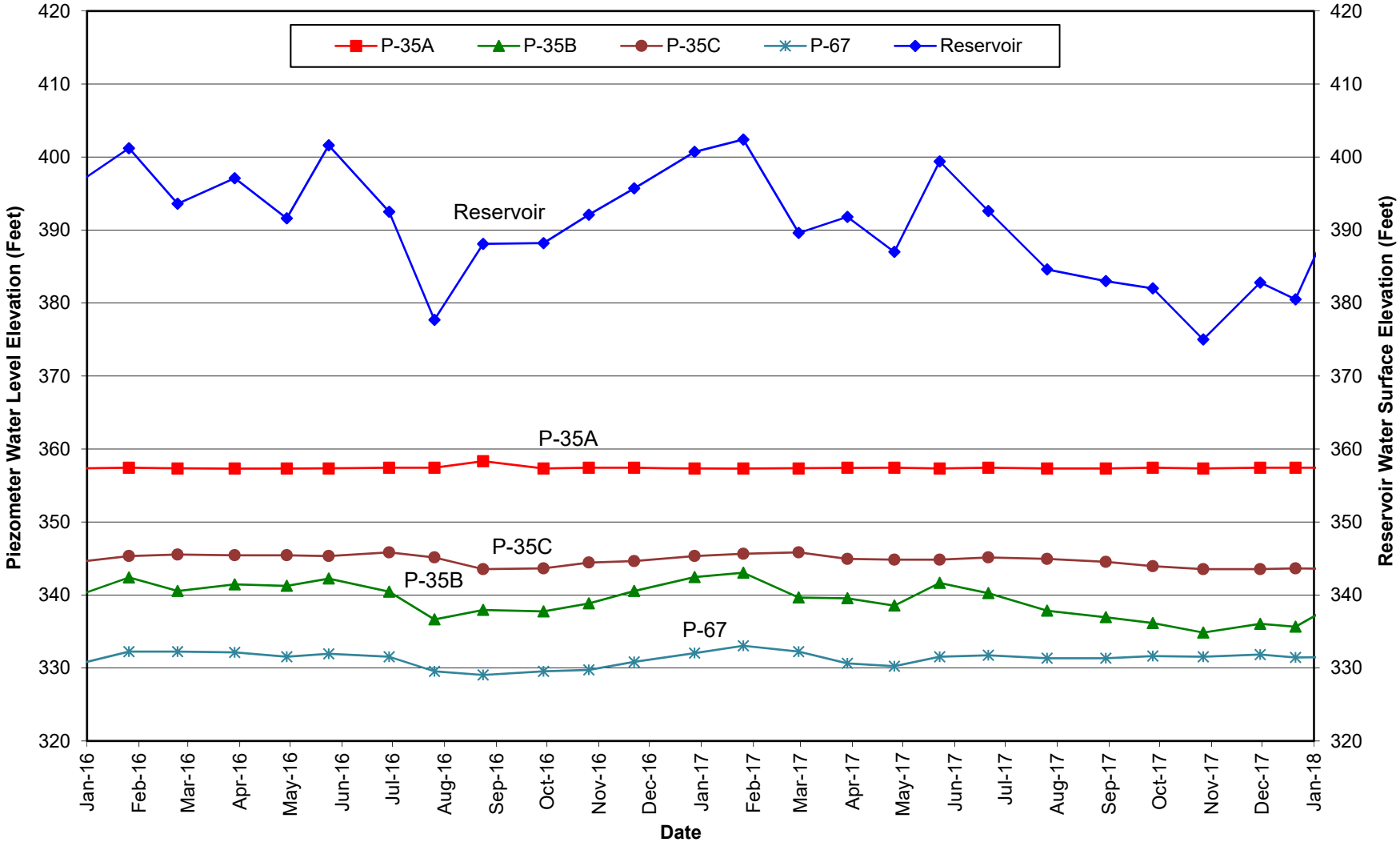
GENTERRA CONSULTANTS, INC.
Engineering & Geotechnical Services
Irvine, California

RATTLESNAKE CANYON DAM AND RESERVOIR

SECTION A-A'

PROJECT NO.	DATE	FIGURE
397A-IRW	NOVEMBER 2018	2

RATTLESNAKE CANYON DAM
2-YR PIEZOMETER AND RESERVOIR WATER SURFACE ELEVATIONS
PIEZOMETERS P-35A, P-35B, P-35C, AND P-67
JANUARY 2016 THROUGH DECEMBER 2017

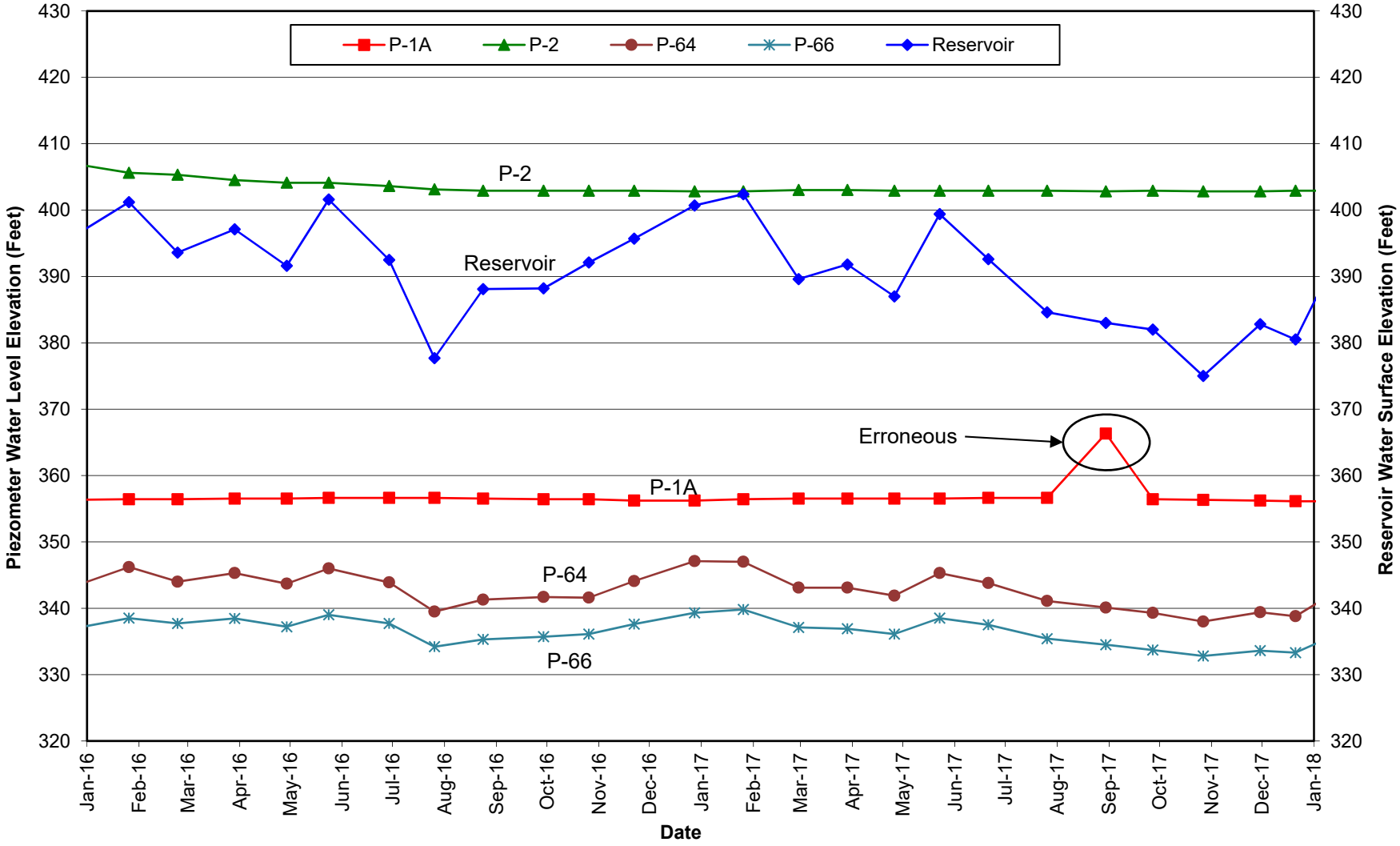


NGVD29 DATUM

IRVINE RANCH WATER DISTRICT

FIGURE 3A

RATTLESNAKE CANYON DAM
2-YR PIEZOMETER AND RESERVOIR WATER SURFACE ELEVATIONS
PIEZOMETERS P-1A, P-2, P-64, AND P-66
JANUARY 2016 THROUGH DECEMBER 2017

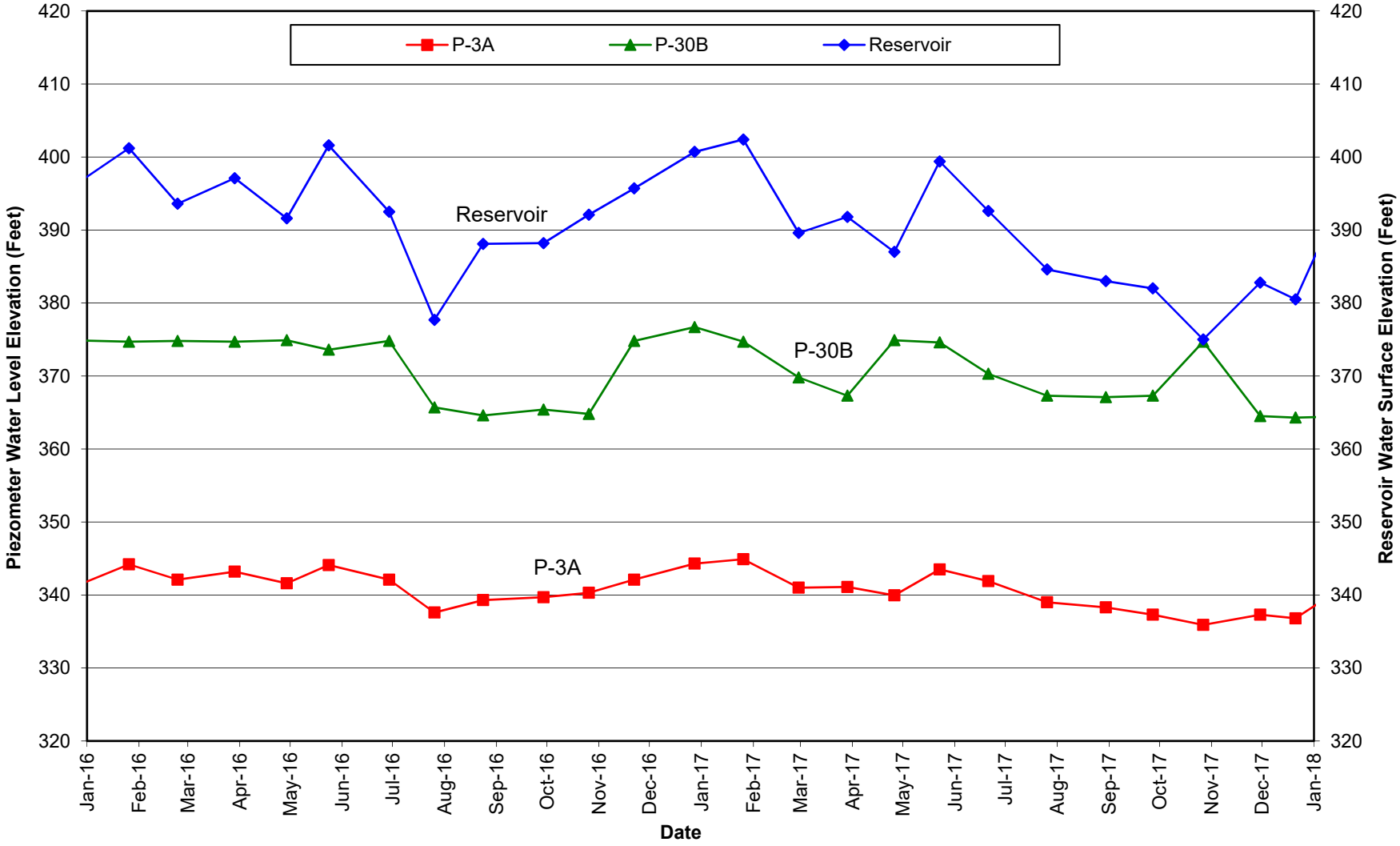


NGVD29 DATUM

IRVINE RANCH WATER DISTRICT

FIGURE 3B

RATTLESNAKE CANYON DAM
2-YR PIEZOMETER AND RESERVOIR WATER SURFACE ELEVATIONS
PIEZOMETERS P-3A AND P-30B
JANUARY 2016 THROUGH DECEMBER 2017

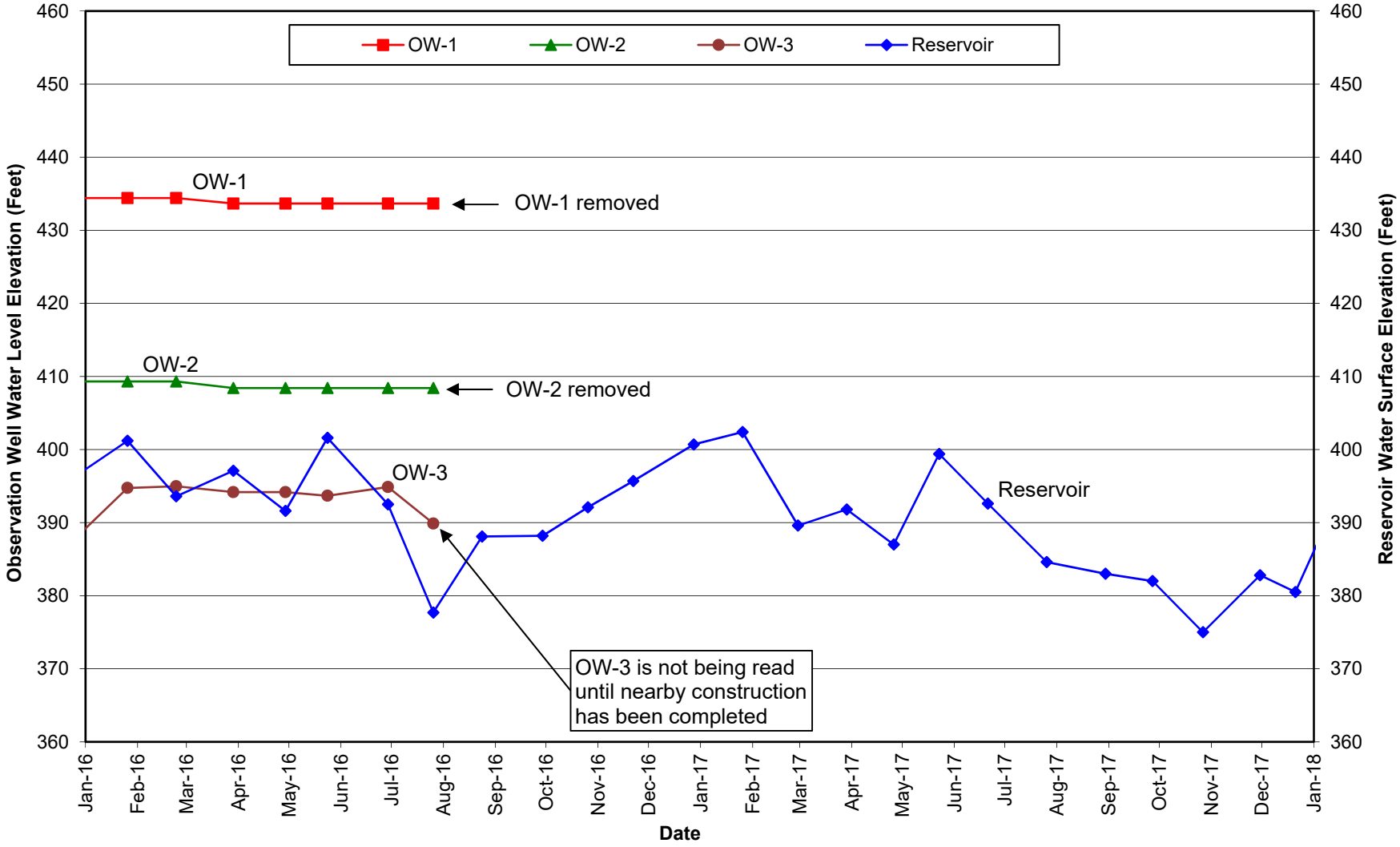


NGVD29 DATUM

IRVINE RANCH WATER DISTRICT

FIGURE 3C

RATTLESNAKE CANYON DAM
2-YR OBSERVATION WELL AND RESERVOIR WATER SURFACE ELEVATIONS
OBSERVATION WELLS OW-1, OW-2, AND OW-3
JANUARY 2016 THROUGH DECEMBER 2017

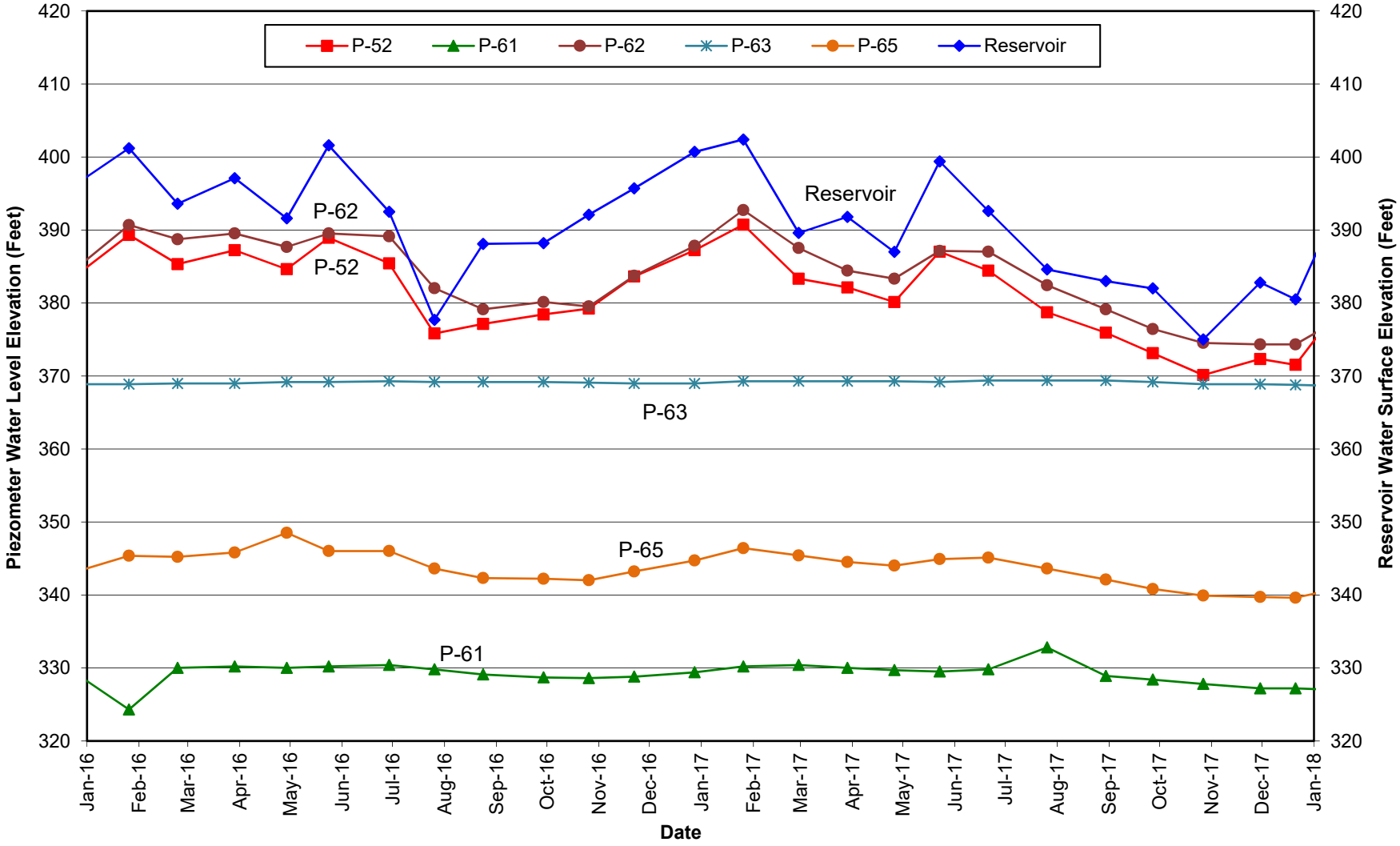


NGVD29 DATUM

IRVINE RANCH WATER DISTRICT

FIGURE 3D

RATTLESNAKE CANYON DAM
2-YR PIEZOMETER AND RESERVOIR WATER SURFACE ELEVATIONS
PIEZOMETERS P-52, P-61, P-62, P-63, AND P-65
JANUARY 2016 THROUGH DECEMBER 2017

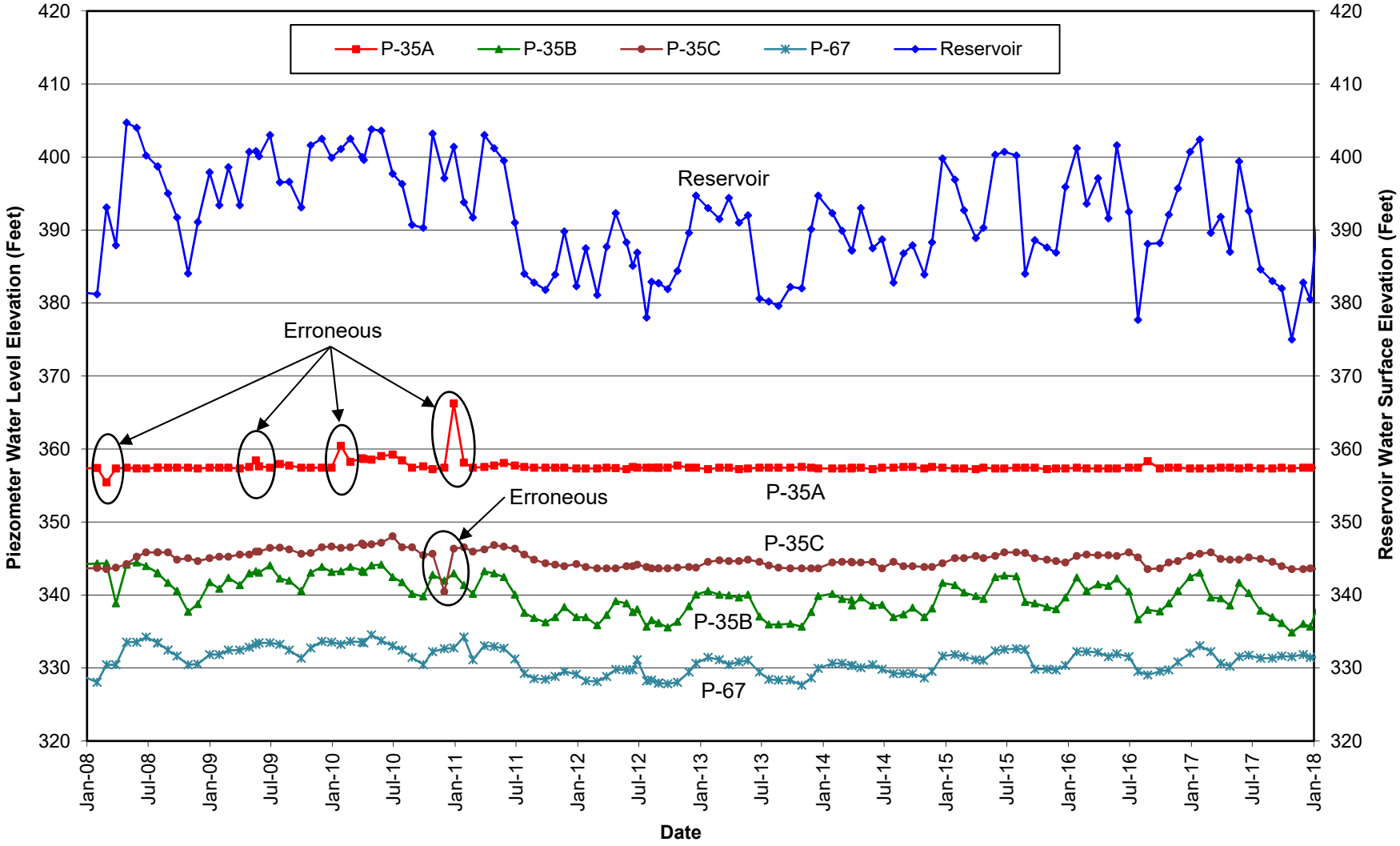


NGVD29 DATUM

IRVINE RANCH WATER DISTRICT

FIGURE 3E

RATTLESNAKE CANYON DAM
10-YR HISTORICAL PIEZOMETER AND RESERVOIR WATER SURFACE ELEVATIONS
PIEZOMETERS P-35A, P-35B, P-35C, AND P-67
JANUARY 2008 THROUGH DECEMBER 2017

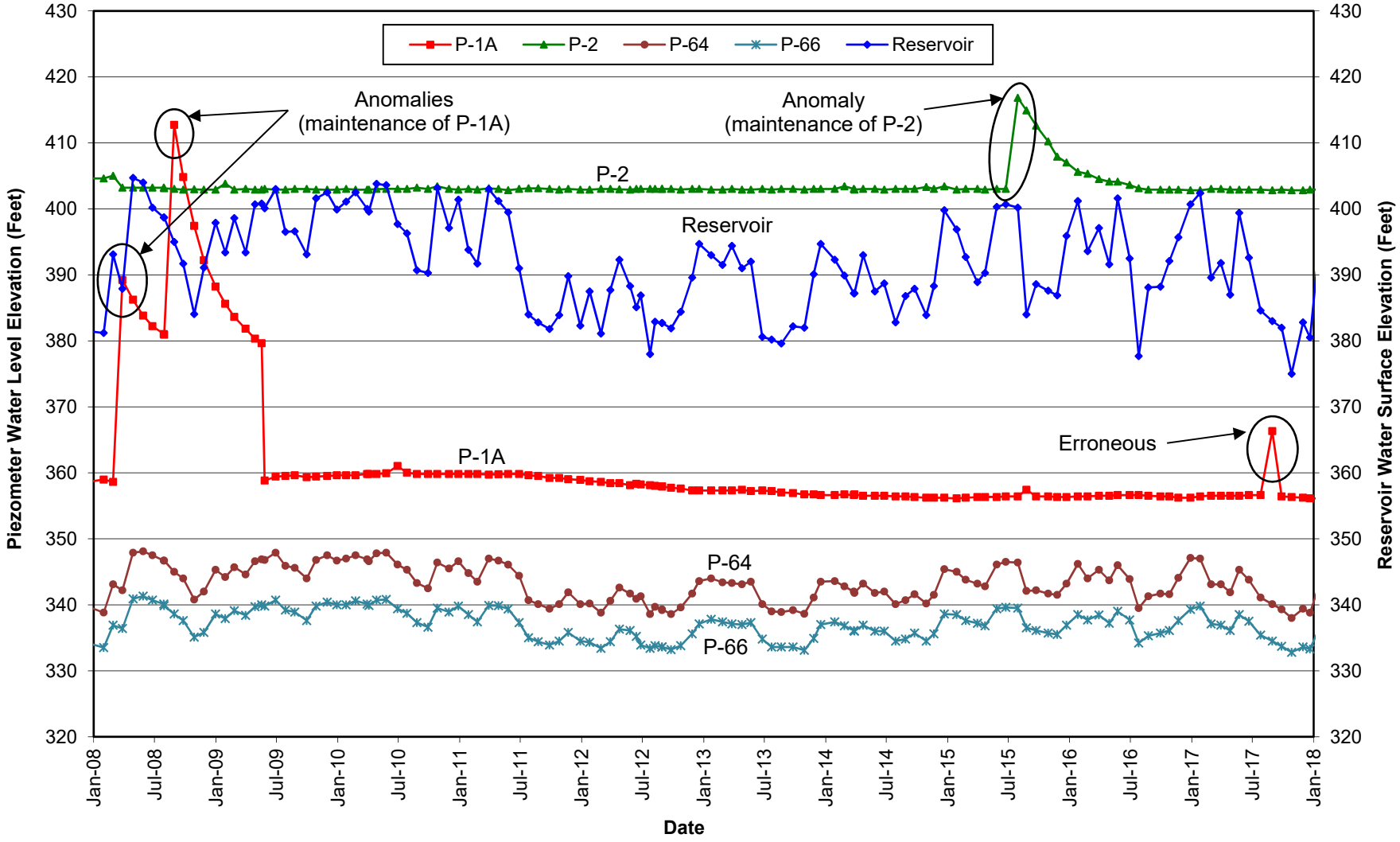


NGVD29 DATUM

IRVINE RANCH WATER DISTRICT

FIGURE 4A

RATTLESNAKE CANYON DAM
10-YR HISTORICAL PIEZOMETER AND RESERVOIR WATER SURFACE ELEVATIONS
PIEZOMETERS P-1A, P-2, P-64, AND P-66
JANUARY 2008 THROUGH DECEMBER 2017

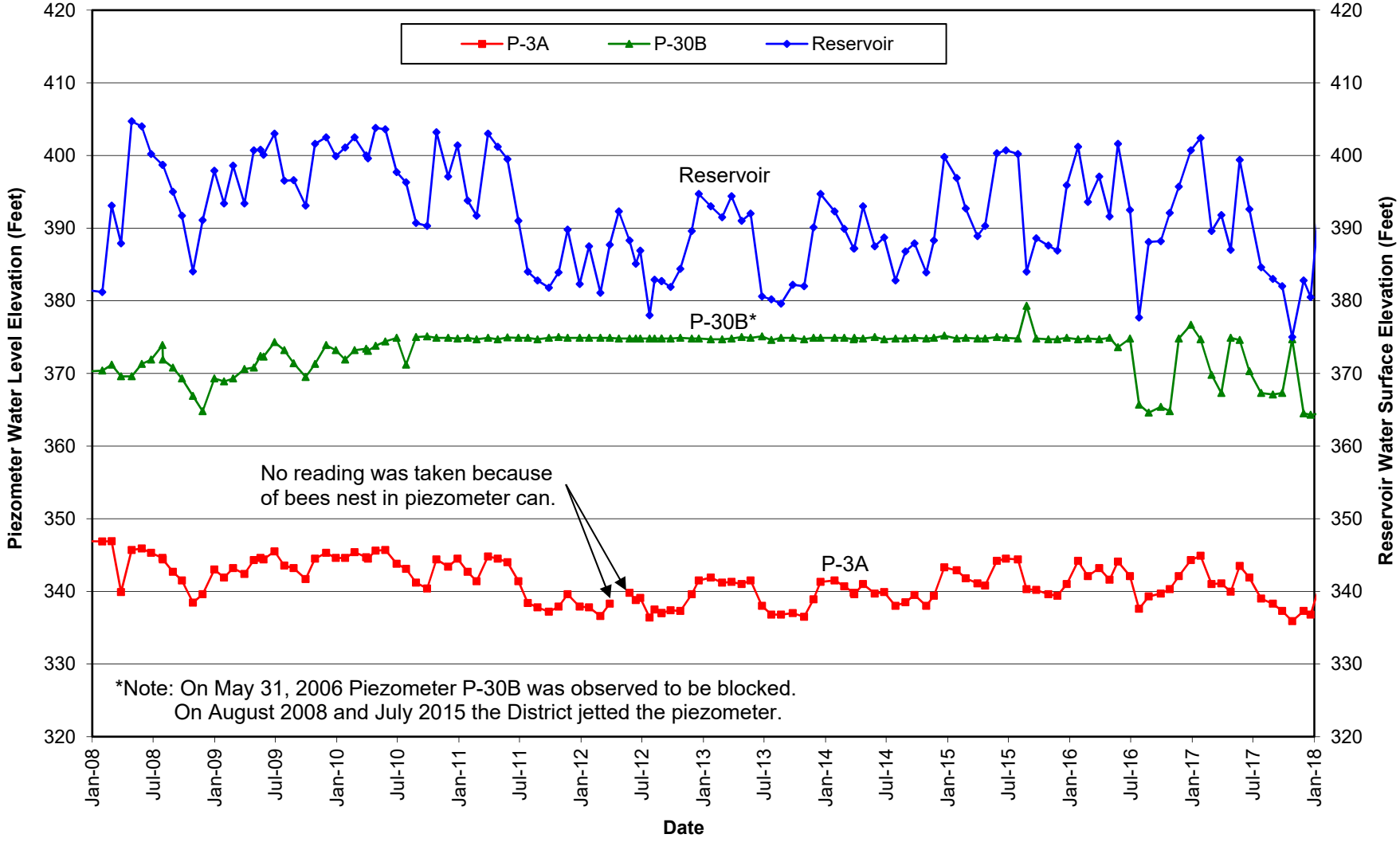


NGVD29 DATUM

IRVINE RANCH WATER DISTRICT

FIGURE 4B

RATTLESNAKE CANYON DAM
10-YR HISTORICAL PIEZOMETER AND RESERVOIR WATER SURFACE ELEVATIONS
PIEZOMETERS P-3A AND P-30B
JANUARY 2008 THROUGH DECEMBER 2017

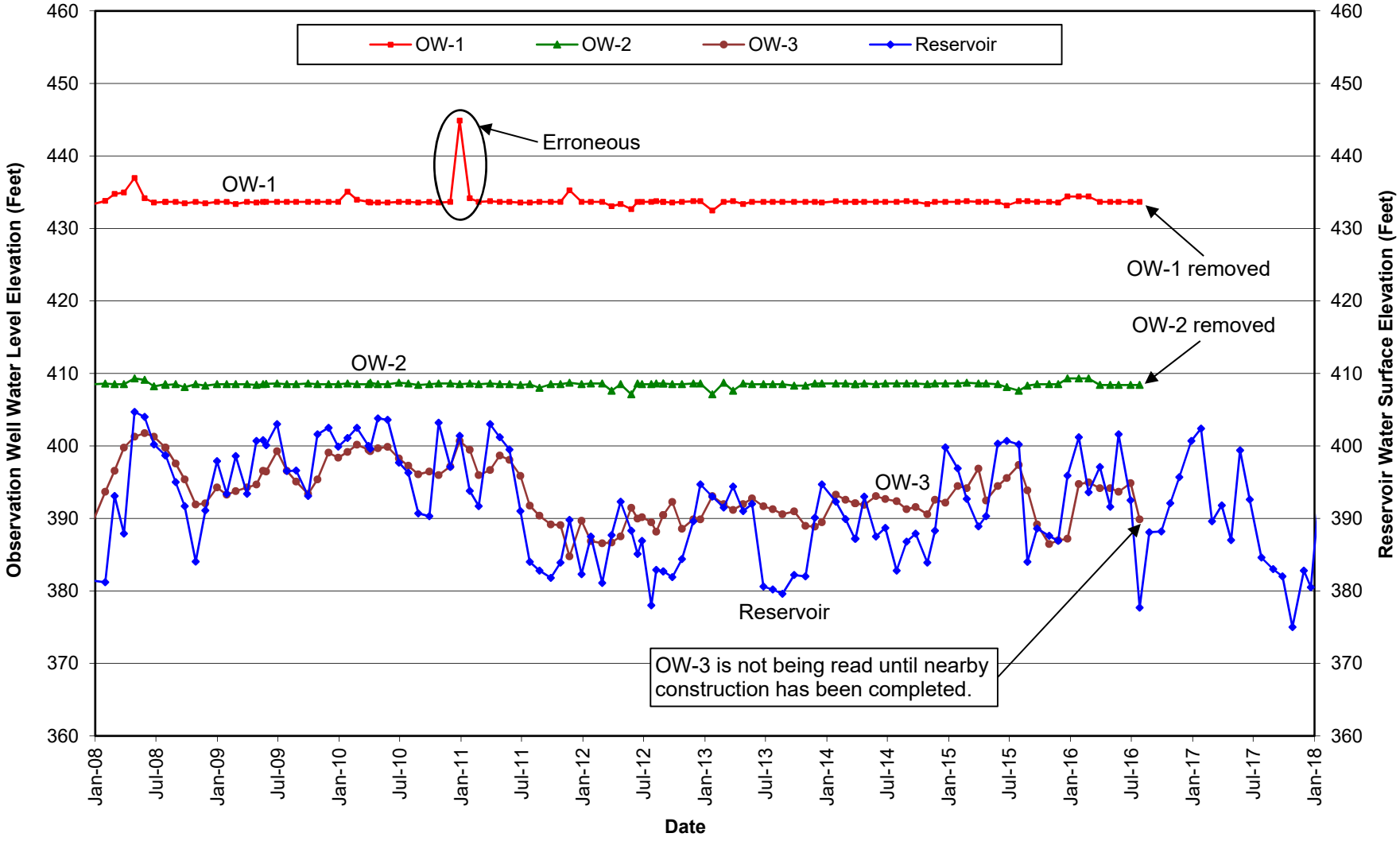


NGVD29 DATUM

IRVINE RANCH WATER DISTRICT

FIGURE 4C

RATTLESNAKE CANYON DAM
10-YR HISTORICAL OBSERVATION WELL AND RESERVOIR WATER SURFACE ELEVATIONS
OBSERVATION WELLS OW-1, OW-2, AND OW-3
JANUARY 2008 THROUGH DECEMBER 2017

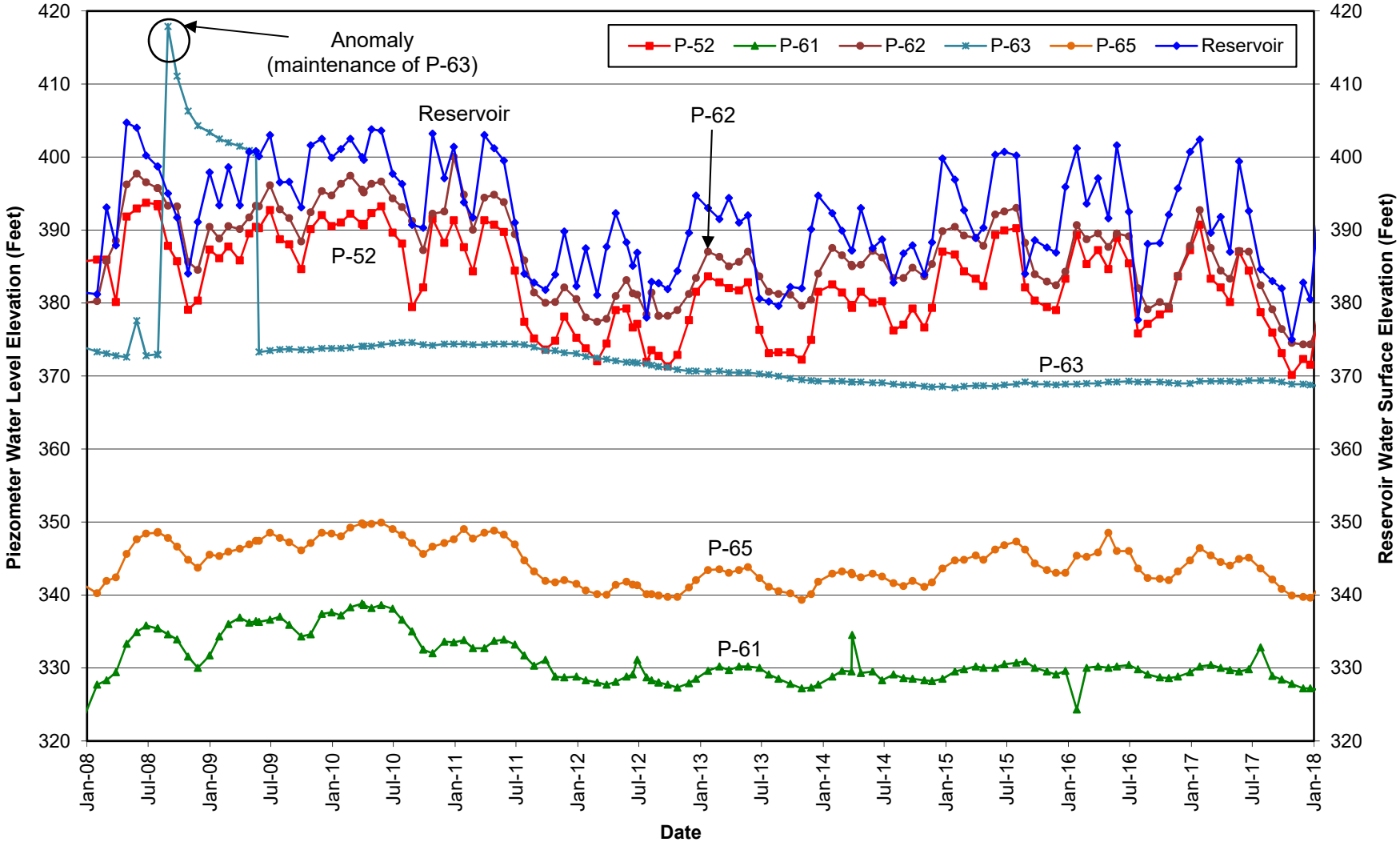


NGVD29 DATUM

IRVINE RANCH WATER DISTRICT

FIGURE 4D

RATTLESNAKE CANYON DAM
10-YR HISTORICAL PIEZOMETER AND RESERVOIR WATER SURFACE ELEVATIONS
PIEZOMETERS P-52, P-61, P-62, P-63, AND P-65
JANUARY 2008 THROUGH DECEMBER 2017

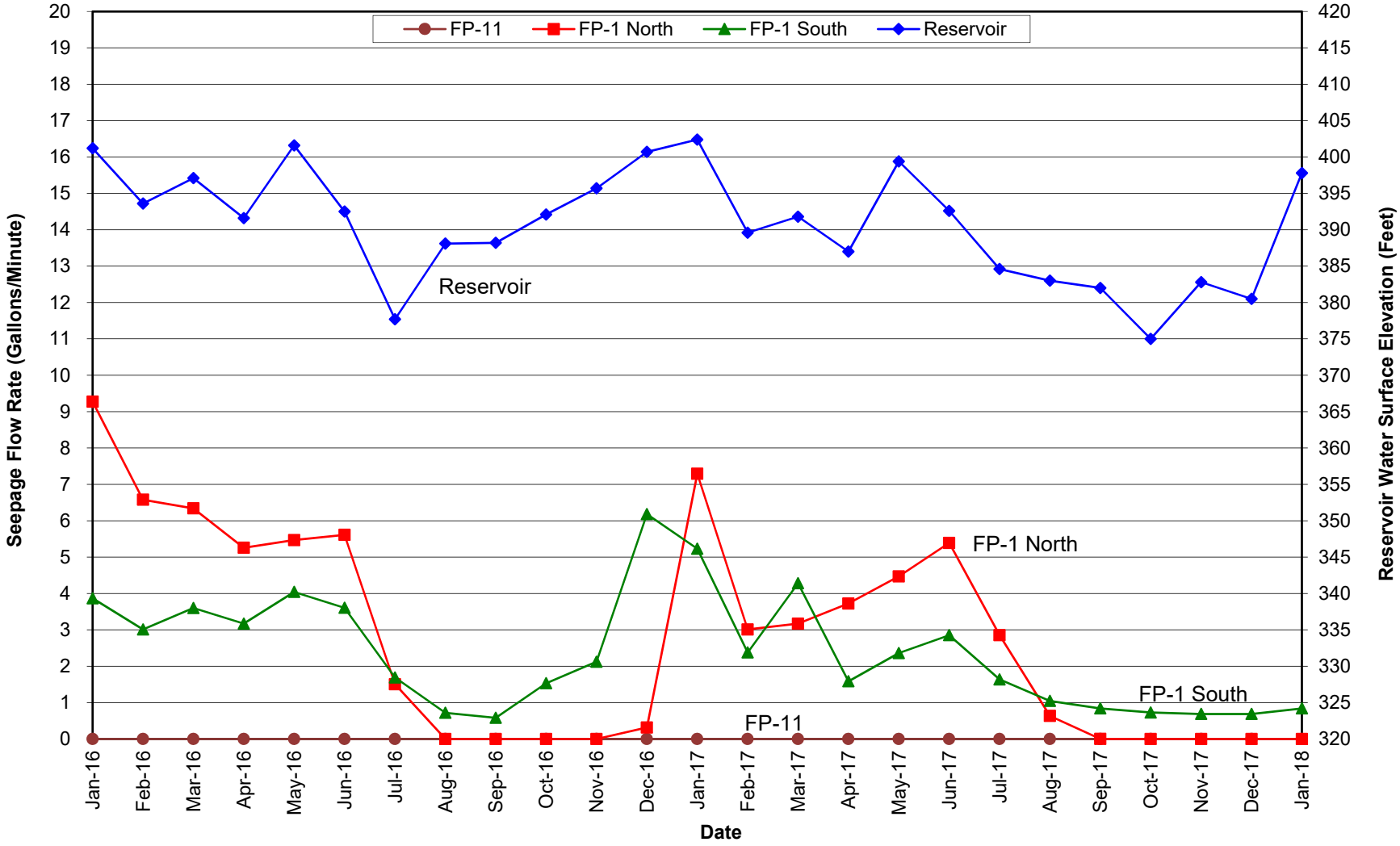


NGVD29 DATUM

IRVINE RANCH WATER DISTRICT

FIGURE 4E

RATTLESNAKE CANYON DAM
2-YR SEEPAGE FLOW RATE MEASUREMENTS
FLOW POINTS FP-11, FP-1 NORTH, AND FP-1 SOUTH
JANUARY 2016 THROUGH DECEMBER 2017

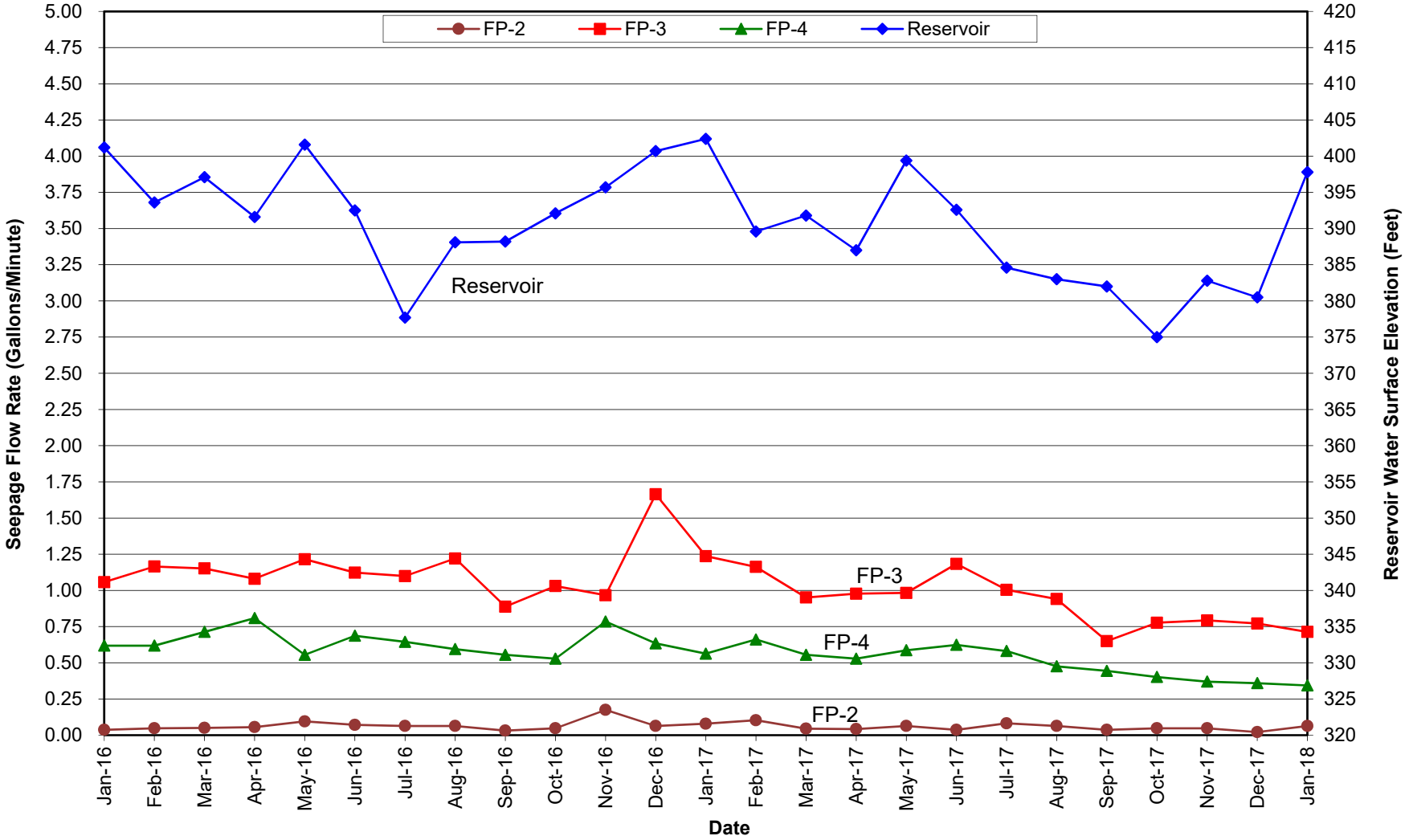


NGVD29 DATUM

IRVINE RANCH WATER DISTRICT

FIGURE 5A

RATTLESNAKE CANYON DAM
2-YR SEEPAGE FLOW RATE MEASUREMENTS
FLOW POINTS FP-2, FP-3, AND FP-4
JANUARY 2016 THROUGH DECEMBER 2017

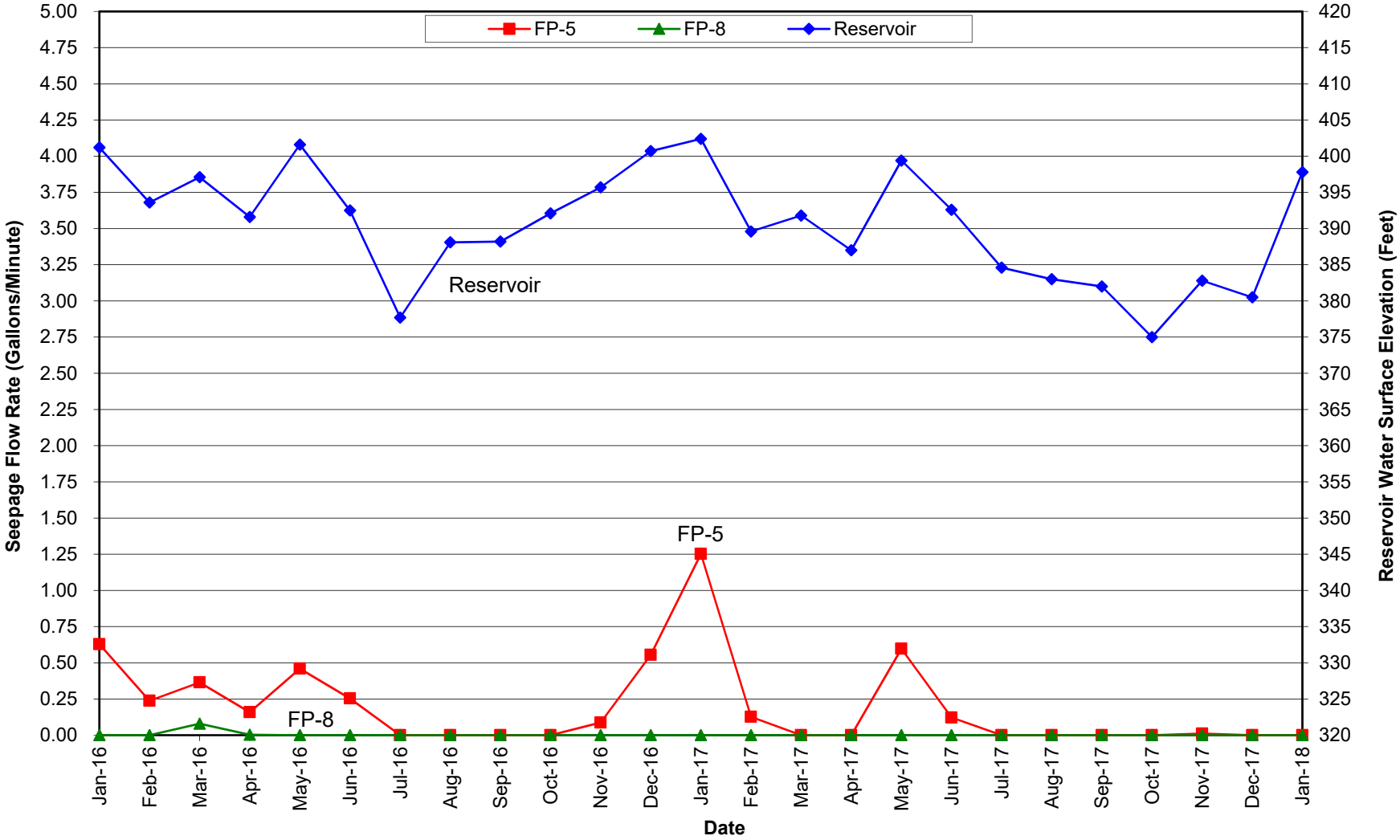


NGVD29 DATUM

IRVINE RANCH WATER DISTRICT

FIGURE 5B

RATTLESNAKE CANYON DAM
2-YR SEEPAGE FLOW RATE MEASUREMENTS
FLOW POINTS FP-5 AND FP-8
JANUARY 2016 THROUGH DECEMBER 2017

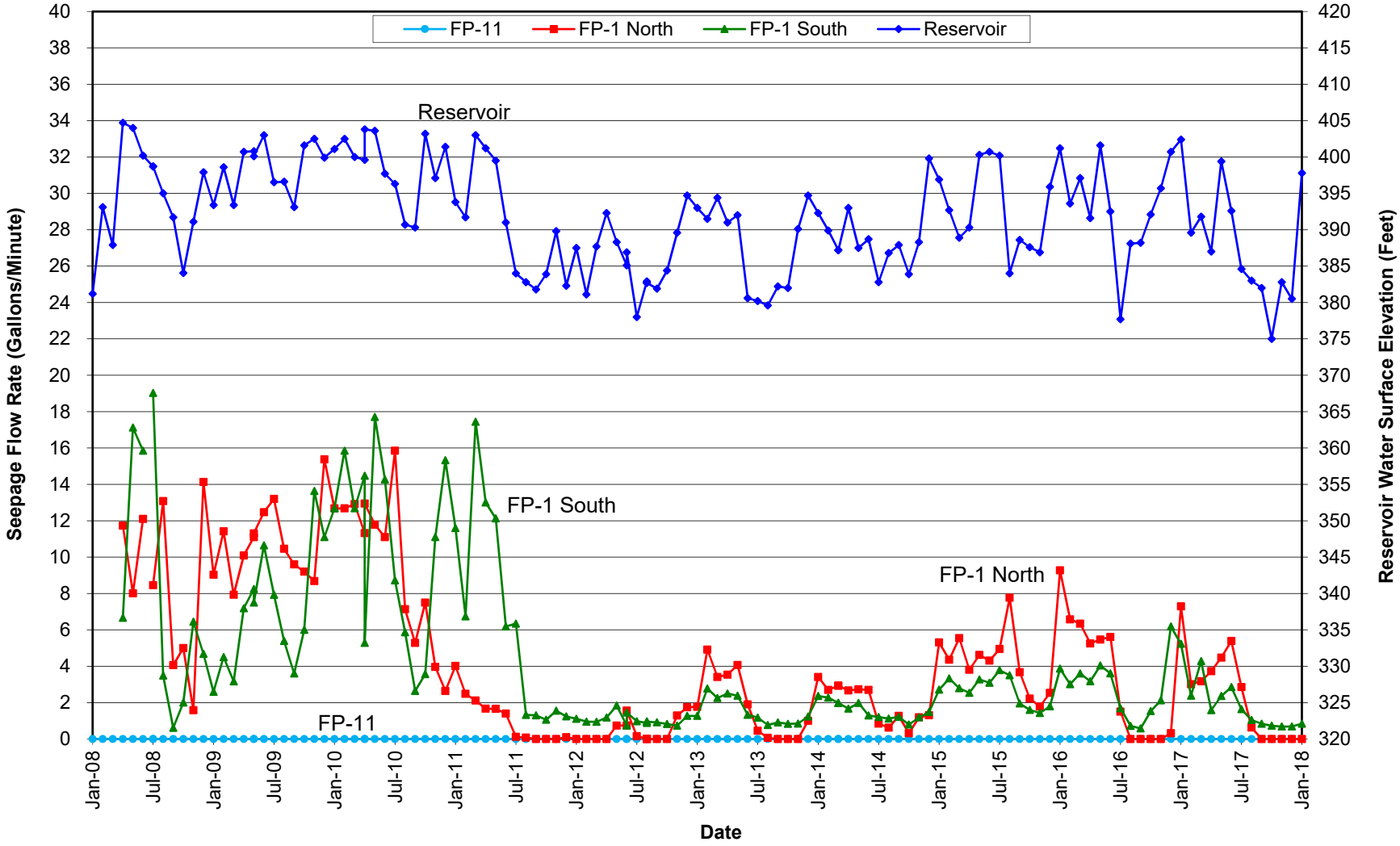


NGVD29 DATUM

IRVINE RANCH WATER DISTRICT

FIGURE 5C

RATTLESNAKE CANYON DAM
10-YR HISTORICAL SEEPAGE FLOW RATE MEASUREMENTS
FLOW POINTS FP-11, FP-1 NORTH, AND FP-1 SOUTH
JANUARY 2008 THROUGH DECEMBER 2017

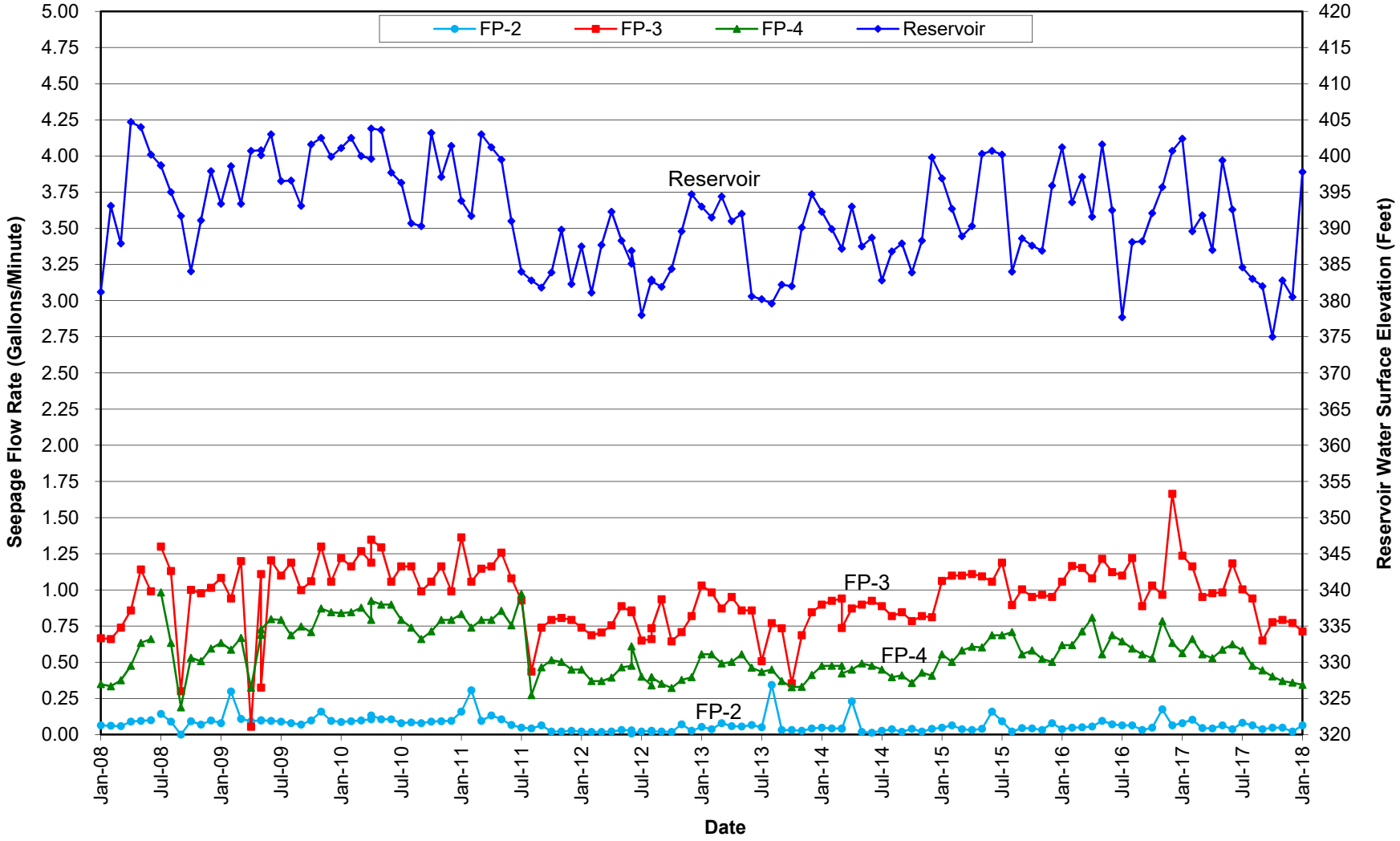


NGVD29 DATUM

IRVINE RANCH WATER DISTRICT

FIGURE 6A

RATTLESNAKE CANYON DAM
10-YR HISTORICAL SEEPAGE FLOW RATE MEASUREMENTS
FLOW POINTS FP-2, FP-3, AND FP-4
JANUARY 2008 THROUGH DECEMBER 2017

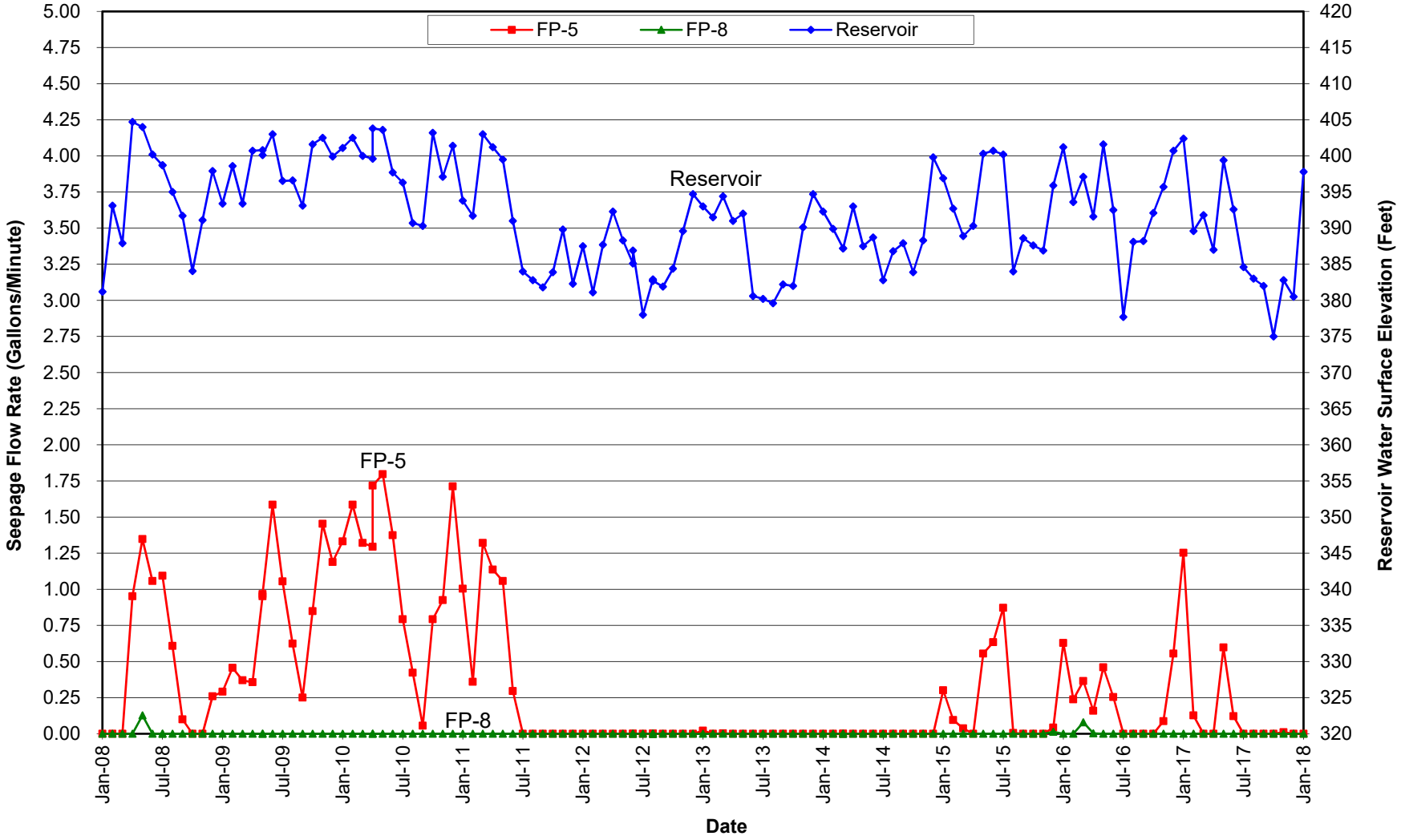


NGVD29 DATUM

IRVINE RANCH WATER DISTRICT

FIGURE 6B

RATTLESNAKE CANYON DAM
10-YR HISTORICAL SEEPAGE FLOW RATE MEASUREMENTS
FLOW POINTS FP-5 AND FP-8
JANUARY 2008 THROUGH DECEMBER 2017

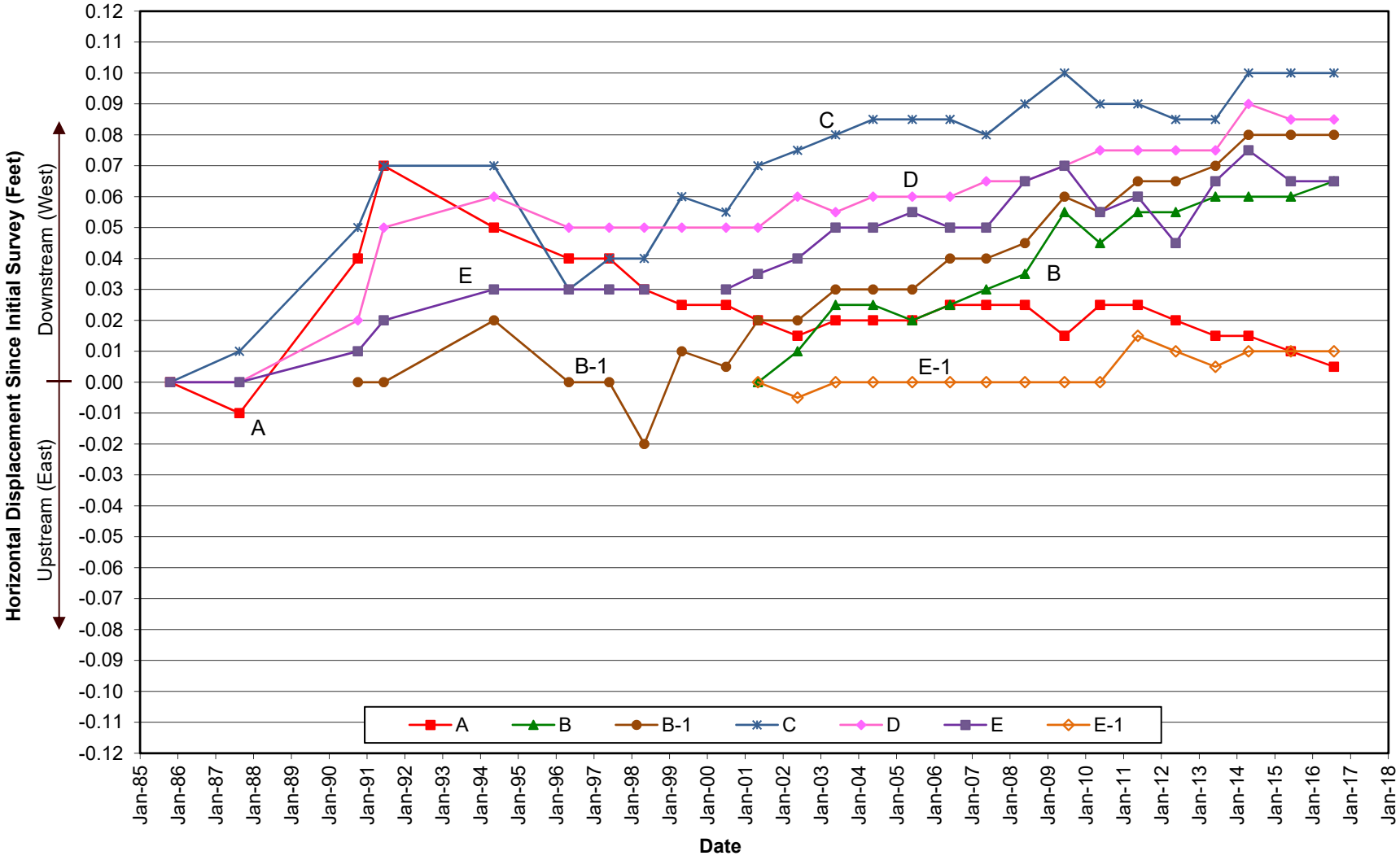


NGVD29 DATUM

IRVINE RANCH WATER DISTRICT

FIGURE 6C

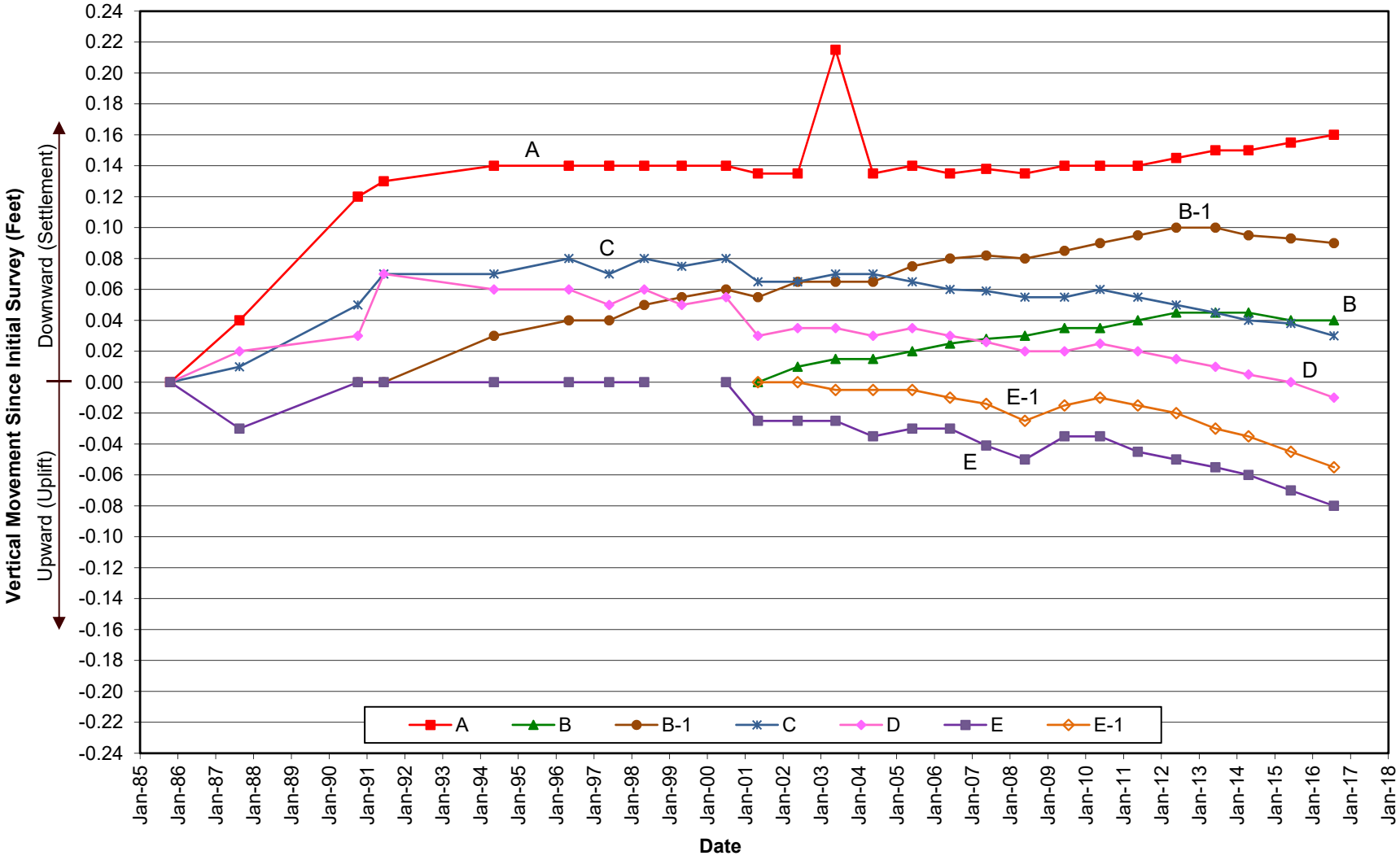
RATTLESNAKE CANYON DAM
33-YR HISTORICAL CUMULATIVE HORIZONTAL DISPLACEMENT
SURVEY MONUMENTS A, B, B-1, C, D, E AND E-1
1985 THROUGH 2017



IRVINE RANCH WATER DISTRICT

FIGURE 7

RATTLESNAKE CANYON DAM
33-YR HISTORICAL CUMULATIVE VERTICAL MOVEMENT
SURVEY MONUMENTS A, B, B-1, C, D, E AND E-1
1985 THROUGH 2017



IRVINE RANCH WATER DISTRICT

FIGURE 8