



WATER-RIGHT DOCKET

Yosemite National Park

Docket No: 21

EL PORTAL WELL #6

Preliminary Docket Information

06-26-1996: notes to the file: primary water supply for el portal is from wells 2-7; well no. 1 is no longer in use

NOTES TO THE FILE

YOSE 010: El Portal Well #2 June 26, 1996
YOSE 012: El Portal Well #1
YOSE 018: El Portal Well #3
YOSE 019: El Portal Well #4
YOSE 020: El Portal Well #5
YOSE 021: El Portal Well #6
YOSE 022: El Portal Well #7

The primary water supply for El Portal is from wells 2 through 7. Well 1 is no longer in use. All 7 wells are thought to tap the underflow of the Merced River. For information pertaining to land status and riparian rights common to all the above dockets, please refer to YOSE 012: El Portal Well #1.

A handwritten signature in cursive script, appearing to read "Alice Johns".

Alice Johns
Hydrologist
Water Rights Branch
Water Resources Division

. . . R E P O R T O F T E L E P H O N E C O N V E R S A T I O N

DATE: June 26, 1996 TIME: 11:30 a.m.
PROJECT: YOSE - El Portal

NPS PERSON ON CALL: Alice E. Johns

[] I RECEIVED A CALL FROM [x] I CALLED

PERSON: Ed Walls
ORGANIZATION: Chief of Maintenance
ADDRESS: YOSE

TELEPHONE: 209-379-1077

DISCUSSION: I called for clarification on the current water system at El Portal. Ed said that the water system consists of 6 wells--numbers 2-7. Well number 1 is no longer in use. Number 7 has just gone on line.

He also asked about water right issues associated with Tuolumne Meadows. I told him that Steve Stone of DSC had requested a water right analysis, and that it would be next after El Portal and Biledo. If there was a need for it to be placed at a higher priority, I suggested that Ed talk to Mark Butler.

Ed said that he would call back with current information on well production. He called back and said that the current system is capable of producing 307 gpm. In 95, 42 million gallons were withdrawn. Averaged over the year, that is about 80 gpm. Withdrawals are about 100,000 gpd in winter, more 200,000 gpd in summer.

ACTION TO BE TAKEN:

COPIES TO:

L54
YOSE/GEN
(WR)RW

March 6, 1981

Reed
Werrell
Witucki
PX 3/9
Kilgore
Davis
Res. Dir.
3/10

Memorandum

To: Superintendent, Yosemite
From: Regional Director, Western Region
Subject: NPS #4 Well at El Portal, Yosemite National Park, California

Enclosed for your review and files is a copy of the data and analysis of the aquifer test for the new well (NPS #6) at El Portal. As agreed with the Denver Service Center, this aquifer test was conducted by the Division of Water Resources.

This well is capable of producing about 45 gallons per minute for 24 hours or 50 gallons per minute for about 30 minutes, see Figure 5.

Field specific conductance measurements were taken during the test to provide an index of water quality. The specific conductance was about 200 micromhos per centimeter at 25° C, indicating about 130 parts per million dissolved solids by use of a conversion factor of 0.65. This is excellent water quality. The water temperature ranged from 15.0° C (59.0° F) to 15.5° C (59.9° F). At the end of the test a water sample was collected for a full chemical analysis by a professional laboratory.

(Sgd) HOWARD H. CHAPMAN

Enclosures

cc: DSC, Pacific Northwest/Western Team
Attn: John Ballard w/encl.

(WR)RW:Reed:Werrell:ms 3/6/81

NATIONAL PARK SERVICE
YOSEMITE NATIONAL PARK, EL PORTAL #6
WELL # 3 S / 20 E - 17 M

AQUIFER TEST

This well was drilled by the cable tool method and it is reported by the driller that water was first encountered during drilling at a depth of 51 feet, at which time water rose in the boring. Preceding the aquifer test, the static water level was 19.41 feet below land surface datum, determined by steel tape. There had been no pumping or surging of the well for at least 13 hours prior to the first measurement.

The aquifer test consisted of three pumping periods as follows:

The first pumping period began at 1009. Our intent was to pump the well at a rate of about 25 gpm. From the onset of the pumpage difficulties were encountered -- the discharge control valve had been set too far open and a period of ten minutes was required to adjust the valve such that the proper flow rate was established. Additionally, a leak in the dike around the Parshall flume caused error in the flow rate reading -- this was corrected. Due to these difficulties it was elected to stop the pumpage and allow the well to recover to static. Drawdown data is not plotted or analyzed. No recovery data was collected. After 76 minutes the well had recovered to static.

The second pumping period began at 1211 and consisted of pumping the well a total of 590 minutes during which the pumpage was increased (stepped up) three times -- see Figure 1.

At the beginning of the first step the discharge valve was initially not opened enough for the desired discharge rate, even though an attempt had been made to set the valve at the desired rate for this step at the end of the previous pumping period. The valve was adjusted (slightly opened) during the first few minutes to achieve the desired rate. This initial setting of the valve accounts for the inflection point in the data line at the beginning of the first step at $t = 3$ minutes.

At the beginning of the following two steps the desired rates were quickly established. Recovery data was collected for 140 minutes; residual drawdown was 0.07 feet at 0021 -- see Figure 3.

The third pumping period began at 0021 on January 30. The third pumping period consisted of pumping the well at a rate of 27.7 gpm, for 149 minutes -- see Figure 2. At the beginning of the pumping period the discharge valve was initially opened too far for the desired rate. The valve was adjusted (slightly closed) during the first few minutes to achieve the desired rate.

This initial setting of the valve accounts for the inflection points in the data line at $t = 3$ and $t = 4$ minutes. Recovery data was collected for 40 minutes; residual drawdown was 0.15 feet at 0330 -- see Figure 4. In constructing Figures 2 and 4, no adjustment of the field data was made regarding the residual drawdown present at the beginning of the third pumping period. This value was only 0.07 and thus insignificant.

Throughout the second pumping period, field specific conductance readings were taken. These values remained within 12 units of 202 micromhos per centimeter at 25°C . These data indicate that the water produced from the well is of the same source regardless of the pumpage rate and that the water is of excellent chemical quality (considering the total amount of dissolved solids -- calculated from the data to be 131 parts per million using a conversion factor of 0.65). The temperature of the water decreased from 15.5°C to 15.0°C . No hydrologic significance is attributed to the slight decrease. Specific conductance and temperature data was collected at the end of the plastic discharge hose which was 125 feet northwest of the well. The decrease in water temperature is believed to be due to a decrease in the temperature of the plastic hose because of the decrease in air temperature from mid-day to evening. By using the contractor's Hach chemical kit at 0215 on January 30 (114 minutes into the third pumping period), the total amount of dissolved solids was 126 ppm (parts per million); the total hardness was 87 ppm; the iron concentration was 0.6 ppm; and the pH was 7.0. Note that the total amount of dissolved solids during the second and third pumping periods, although derived by separate methods, is within an instrumental error of 5 ppm. A water sample was collected during the last pumping period -- this sample will be fully analyzed by a professional laboratory.

This well was drilled in an alluvial valley and drilling ceased upon contact with bedrock. The closest distance to the Merced River is southwest 110 feet, by steel tape, to water's edge. The last 35 feet of this distance is river bank with a slope of approximately 0.43. Considering the geology of the local area and the quickness of the well to reach a constant pumping water level during the various pumping rates, it is believed that the Merced River acts as a positive boundary to the aquifer as the cone of depression extends southwest, west or northwest. However, the amount of the effect and the exact time at which it would become significant cannot be determined from this aquifer test due to the lack of an observation well which would allow for the determination of the storage coefficient of the aquifer. A negative boundary, due to consolidated rocks, exists to the north of the dirt road which trends east-west and is located at the base of the hill about 200 feet north of the well.

This well is located approximately 500 feet southeast of El Portal #2, 550 feet west-southwest of El Portal #3, and is approximately 115 feet north of the northeastern end of the highway bridge. The pump used during the aquifer test is the drilling contractor's property and was removed on January 30, 1981.

At the time this aquifer test was conducted, the well was fully completed in construction except for placement of the concrete for the sanitary seal. When in place, the concrete will extend from one to two feet above the slotted portions of the screen to the surface.

ANALYSIS OF AQUIFER TEST DATA

By utilizing the recovery data for the third pumping period (Figure 4) and solving for the aquifer transmissivity using the Theis Recovery Method: $T = 128 \text{ feet}^2/\text{day}$. The reason that the recovery data for the second pumping period is not utilized for confirmation of the above value is given on Figure 3.

Figure 5 was constructed to provide evaluation of the well drawdown vs. time for various pumpage rates. This figure indicates that at all pumping rates less than approximately 49.0 gpm the well is capable of maintaining a constant, although different for each rate, water level after 30 minutes of pumping time. This is considered an indication that this well's drawdown characteristics and pumping capacity are strongly influenced by the Merced River acting as a constant head (positive) boundary to the aquifer. Therefore, it appears reasonable to expect the pumping capacity of this well to be somewhat seasonal. The exact amount of seasonal variation cannot be calculated from available data but it appears reasonable that this well is capable of pumping at a rate of 45 gpm for a 24 hour period during any season of a normal water year. By utilization of the procedure for analysis of step-drawdown test data outlined by Donald H. Lennox*, it was determined that laminar-flow conditions existed for pumping rates less than or equal to 27.7 gpm and therefore drawdown curves on Figure 5 within this range were determined by utilizing the equation:

$$dd = (B_t + C')Q_n$$

and the data for $Q_n = 25.6, 27.7 \text{ gpm}$ at $t = 30$ and $t = 60$ minutes.

Continuing the analysis, it was determined that flow conditions were turbulent at 41.4 and 47.4 gpm. The data available was enough only to determine a range for the various parameters of the equation for turbulent flow conditions:

$$dd = B_t Q_n + C Q_n^p$$

The parameters which were selected for development of Figure 5 were those which produced the greatest amount of drawdown calculation. The drawdown values for pumpages of 41.4, 48.0 and 50 gpm were thus derived. (Drawdown calculations were also made using the parameters which produce the least amount of drawdown -- the maximum variance was 0.61 feet at 50 gpm.)

* Lennox, D.H., 1966, Analysis and application of step-drawdown test: American Society of Civil Engineers Proceedings, v. 92, Separate 4967, 19 p.

The drawdown value for the pumpage rate of 50 gpm was dashed due to an additional uncertainty in the actual value -- any drawdown which would occur below the screen would be a reflection of aquifer characteristics in a free or "water table" condition. The plot on Figure 5 corresponding to a pumpage rate of 34.6 gpm was accomplished by graphic, logarithmic, interpolation between the data lines of 27.7 and 41.4 gpm.

In conclusion, this well exhibits a large well loss factor under turbulent flow conditions and the magnitude of this influence increases rapidly with the pumpage rate. Within the discharge rate range of 45-50 gpm, each additional gallon of discharge will result in about one foot of additional drawdown.

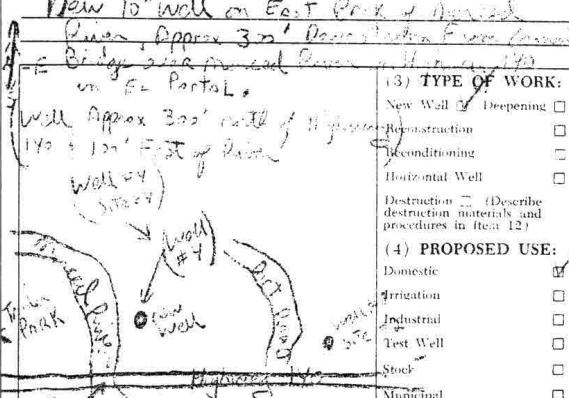
W. Reed
W. Werrell

February 26, 1981

DUPLICATE
Driller's CopySTATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
WATER WELL DRILLERS REPORTDo not fill in
No. 075821Notice of Intent No. 175662Local Permit No. or Date 175662

State Well No. _____

Other Well No. _____

(1) OWNER: Name Vated State Court & Estate
Address 255 Park Street
City Denver, Colorado Zip 80205(2) LOCATION OF WELL (See instructions):
County Missouri Owner's Well Number 175662Well address if different from above EL Portal, Calif
Township _____ Range _____ Section _____Distance from cities, roads, railroads, fences, etc. New 10' Well on East Park & approx

WELL LOCATION SKETCH

(3) TYPE OF WORK:

New Well ☒ Deepening ☐Reconstruction ☐ Reconditioning ☐Horizontal Well ☐ Destruction ☐ (Describe

destruction materials and procedures in Item 12)

(4) PROPOSED USE:

Domestic ☒ Irrigation ☐Industrial ☐ Test Well ☐Stock ☐ Municipal ☐Other ☐

(5) EQUIPMENT:

Rotary ☒ Reverse ☐ Yes ☐ No ☐ Size _____Cable ☒ Air ☐ Diameter of bore _____Other ☐ Bucket ☐ Packed from _____ to _____ ft.

(6) CASING INSTALLED:

Steel ☒ Plastic ☐ Concrete ☐ Type of perforation or size of screen _____

(7) PERFORATIONS:

From ft. To ft. Dia. in. Cage or Wall

From ft. To ft. Slot size

(8) WELL SEAL: 0-50' 17' 50' 17' 50' 17'

Was surface sanitary seal provided? Yes ☒ No ☐ If yes, to depth _____ ft.Were strata sealed against pollution? Yes ☐ No ☒ Internal _____ ft.

Method of sealing _____

(9) WATER LEVELS:

Depth of first water, if known _____ ft.

Standing level after well completion _____ ft.

(10) WELL TESTS:

Was well test made? Yes ☒ No ☐ If yes, by whom? _____Type of test _____ Pump ☐ Bailers ☐ At end of test _____

Depth to water at start of test _____ ft.

Discharge _____ gal/min after _____ hours Water temperature _____

Chemical analysis made? Yes ☐ No ☒ If yes, by whom? _____Was electric log made? Yes ☐ No ☒ If yes, attach copy to this report(12) WELL LOG: Total depth 70' ft. Depth of completed well 67' ft.
from ft. to ft. Formation (Describe by color, character, size or material)

2-4 10' 10' 10' 10'

2-14 10' 10' 10' 10'

18-18 10' 10' 10' 10'

18-21 10' 10' 10' 10'

21-24 10' 10' 10' 10'

21-30 10' 10' 10' 10'

30-36 10' 10' 10' 10'

36-42 10' 10' 10' 10'

42-46 10' 10' 10' 10'

46-51 10' 10' 10' 10'

51-54 10' 10' 10' 10'

54-57 10' 10' 10' 10'

57-63 10' 10' 10' 10'

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360-365 10' 10' 10' 10'

365-370 10' 10' 10' 10'

370-375 10' 10' 10' 10'

375-380 10' 10' 10' 10'

DWR 188 (REV. 7-76)

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

El Portal #6
35/20 E-17M

NARRATIVE FOR THE DRILLING PROGRAM AT
YOSEMITE NATIONAL PARK -- EL PORTAL, 1980 - 1981

Prior to 1980 two wells existed on El Portal National Park Service lands. These two wells are El Portal #1, 3 S/20 E - 18 K1, a shallow well dug about 1959 and reported to produce 170 gpm at its maximum drawdown, and El Portal #2, 3 S/20 E - 17 E1, a well drilled by the cable tool method in 1973. The results of an aquifer test indicate that a reasonable pumping rate for this well would be about 70 gpm.

In January of 1981 it was reported that El Portal #2 was being pumped at 50 gpm due to complaints by users of too much air in the lines when the well was pumped at a higher rate.

In 1980 the Denver Service Center awarded a contract to develop a supplemental water supply at Yosemite National Park -- El Portal. The contract was for a domestic ground water supply in excess of 220 gpm in order to eliminate the present usage of a surface water supply to better meet the requirements of the Public Health Service. This was to be accomplished by drilling one, two, or three producing wells, as needed.

After drilling wells, El Portal #3 - 5, a supply of 225 gpm had been obtained: El Portal #3 capable of producing about 100 gpm for 24 hours, El Portal #4 capable of producing about 30 gpm for 24 hours, and El Portal #5 capable of producing about 95 gpm for 24 hours. The corresponding site numbers for these wells are:

El Portal #3 -- 3 S/20 E - 17 L1
El Portal #4 -- 3 S/20 E - 18 J1
El Portal #5 -- 3 S/20 E - 18 Q1

At this point it was decided since two (El Portal #4 and #5) of the above three wells were across the Merced River (south) from the existing water supply lines (the supply lines of El Portal #1 and #2) it would be to the advantage of the Service to have a fourth well on the same side of the Merced River as El Portal #1, #2, and #3. It was also agreed that a member of the Region's Division of Water Resources would choose the site for this well (El Portal #6) under the above constraint, i.e., ruling out a possible site near El Portal #5. A site was chosen approximately 500 feet southeast of El Portal #2 and 550 feet west-southwest of El Portal #3. This site was chosen for two reasons: 1) it was hoped that a well drilled at this site would encounter a buried incised channel before bedrock, and 2) to allow for the maximum possible distances from El Portal #2 and #3 (to avoid these wells influencing the capacity of the new well when all wells are pumping simultaneously).

El Portal #6, 3 S/20 E - 17 M1, was drilled at the above site but no buried incised channel was encountered before bedrock. The well is capable of producing about 45 gallons per minute for 24 hours.

To aid in any future selection of well sites, the following parameters were compared between the present existing wells (El Portal #1 - #6) to see if a correlation between parameters and pumping capacity could be established: upstream area as opposed to downstream area, distance from Merced River, artesian head, average slot size of screen, and local thickness of aquifer. No correlations were determined.

El Portal #3 and #5 are the best producing wells of those drilled in 1980-1981. The fact that these wells encountered a basal gravel above the bedrock is believed to be the major factor in contributing to their high yield.

The strongest well in the area, El Portal #1, is constructed such that water from this well is essentially pumped directly from the Merced River. This construction is not in accordance with present State Public Health requirements.

El Portal #3, #4, and #6 experience turbulent flow conditions when pumped at capacity. These wells exhibit a large well loss component of drawdown under turbulent flow conditions and the magnitude of this influence increases rapidly with the pumping rate as the flow velocities in the immediate vicinity of the wells become sufficiently large. Therefore, if future wells are drilled with sufficiently large well diameters to reduce the flow velocities in the immediate vicinity of the wells, the production capacity of the future wells can be expected to surpass the capacity of present wells.

W. Reed
W. Werrell
3/6/81

. . . R E P O R T O F T E L E P H O N E C O N V E R S A T I O N

DATE: June 26, 1996 TIME: 11:10 a.m.
PROJECT: YOSE - El Portal

NPS PERSON ON CALL: Alice E. Johns

[] I RECEIVED A CALL FROM [x] I CALLED

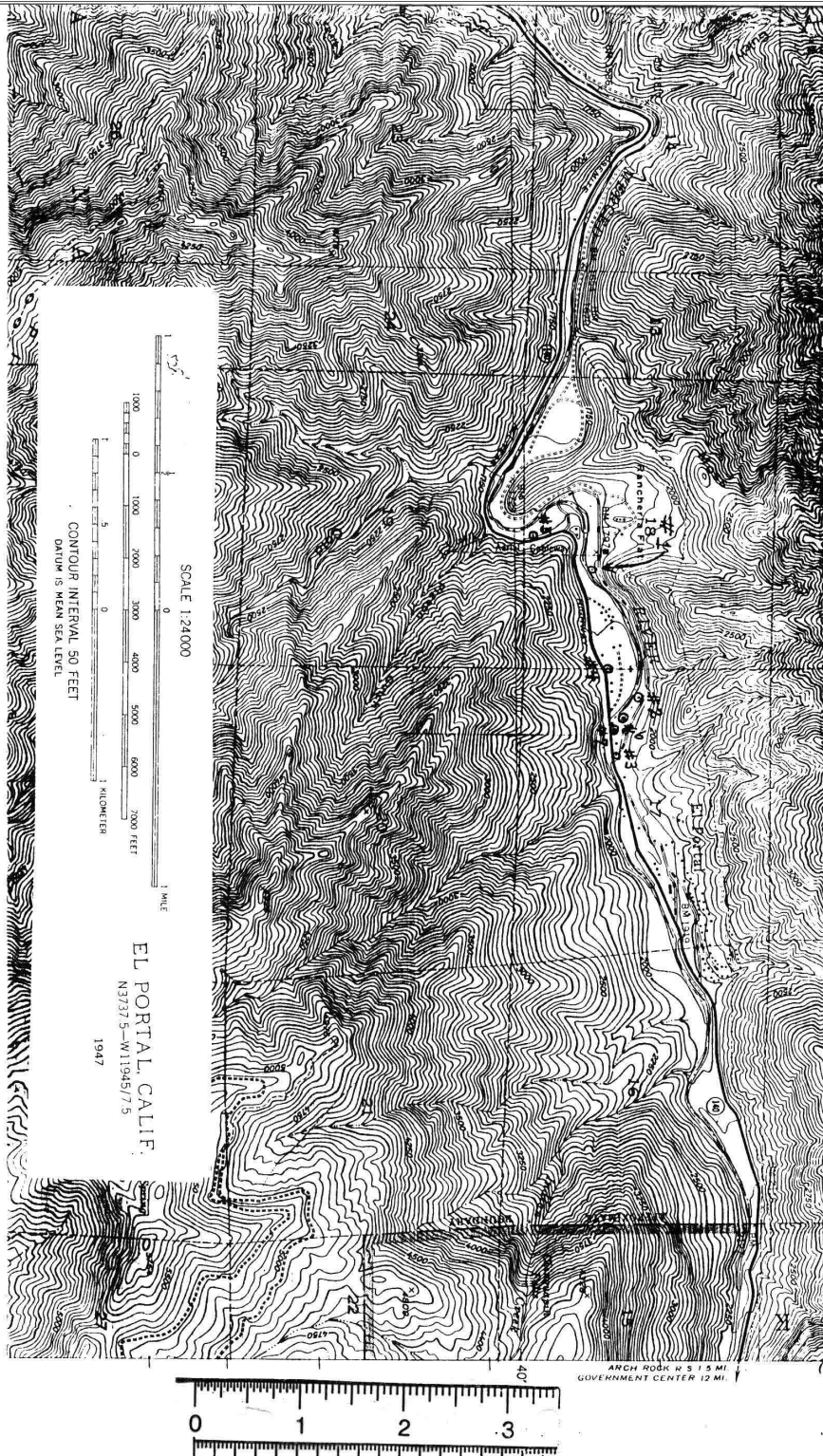
PERSON: William Werrell
ORGANIZATION: DEVA
ADDRESS:

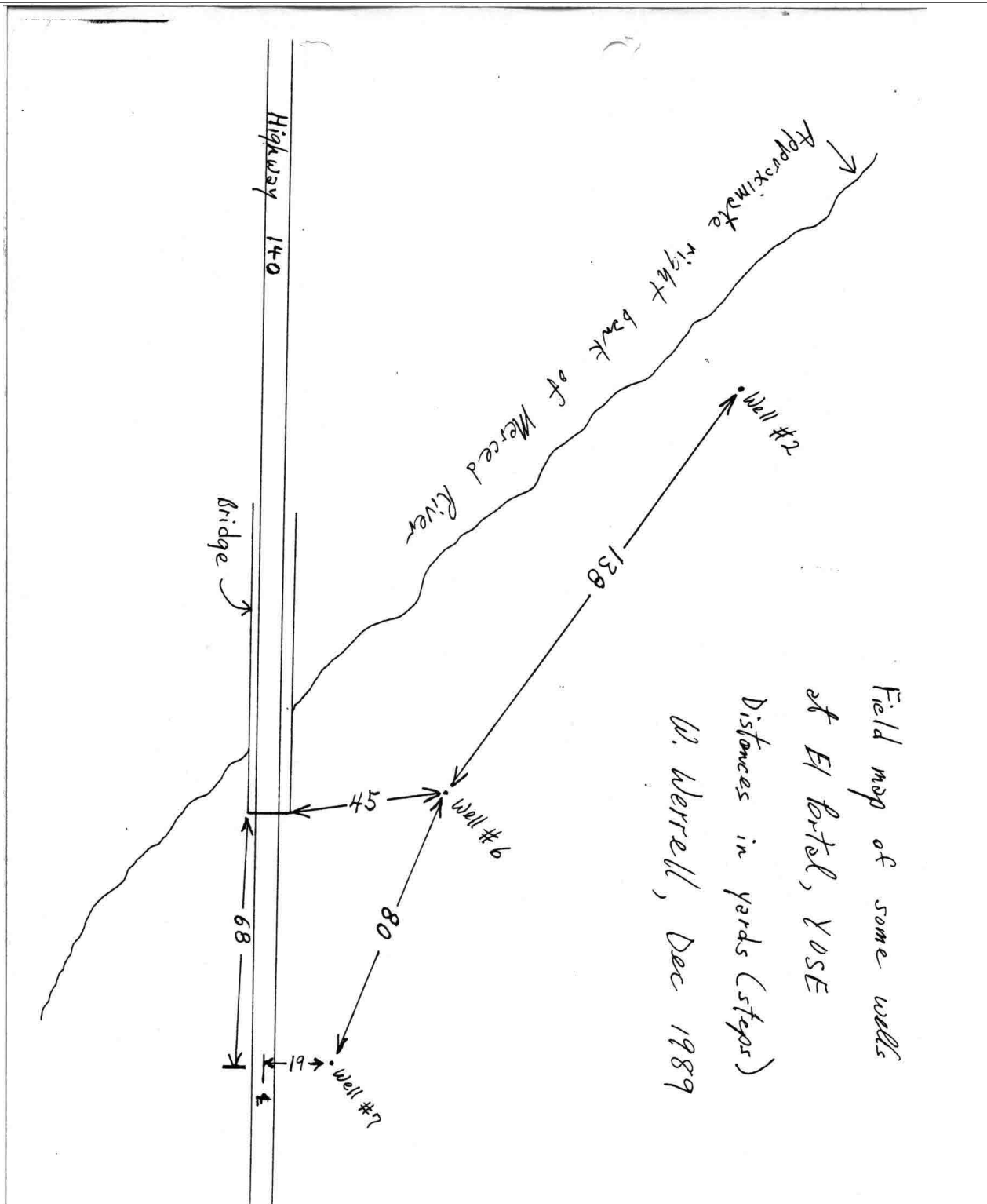
TELEPHONE: 619-786-3255

DISCUSSION: Bill's previous position was hydrologist with the Water Operations Branch of the Water Resources Division. In that capacity, Bill had provided technical assistance to Yosemite National Park, to find well locations, develop specs for drilling, conducting aquifer tests, and organizing information for wells. I asked Bill if he concurred with the conclusion that all the wells numbered 1-7 at El Portal tapped the underflow of the river. He said yes he did and that I could reference this telephone conversation in the water rights report. He said there is the possibility of a pretty good sized crevice that would bring in something in from the side. Its pretty subjective as to what it would produce relative to the Merced, but it is probably small relative to the Merced. The Merced is so large with a large supply of water, it is the dominant supply. Glacial flour has been sealing up the permeabilities, and there are problems drilling wells. Bill has recommended to DSC that the dig a deep ditch, fill it with sand, breach it, put well screen in and some casing, then get filtration from the river, and its permeable enough to let water in.

ACTION TO BE TAKEN:

COPIES TO:





Docket Information

Number of Documents in Docket 13

Documents Dated from 6/15/1947 to 6/26/1996

Docket Compiled: 7/29/2011