

# Memorandum

Date: January 23, 2009

To: Anne Runnalls – Project Manager

From: Jason Moore – Project Geologist

Subject: **San Joaquin 1&2 – Anticipated Well Performance**

The well completion report (well report) for the existing, on-site agricultural irrigation well located near the southwest corner of the proposed San Joaquin Solar 1&2 Hybrid Power Plant (the Project) indicates that the well was drilled to a total depth of approximately 1,000 feet (ft) below ground surface (bgs) in 2006. The well was completed with 16-inch (in.) diameter steel casing, which was perforated by 0.070-in. diameter slots from 370 to 980 ft bgs with the exception of a blank interval between 858 and 939 ft bgs. A filter pack was placed from 40 to 1,000 ft bgs. The geologic materials encountered as reported on the well report ranged from clay to gravel, which is typical for alluvial sediments in the area.

Well tests were not reported on the well report, but according to the owner, in its current configuration, the well is normally pumped at a rate of about 1,400 gallons per minute (gpm) for extended periods of time to supply crops. The approximate depth to groundwater is 250 feet. No drawdown vs. time data is available for this well.

The water well driller's report (well report) for well number 21S/16E-4, located in the Project vicinity, indicates that the well was drilled to a total depth of approximately 1,000 ft bgs in 1970. The well was completed with 16-in. diameter casing, which was perforated by 0.125-in. diameter slots from 292 to 997 ft bgs. A filter pack was placed from 20 to 997 ft bgs. The geologic materials encountered as reported in the well report ranged from clay to gravel, which is comparable to the materials described in the Project's on-site agricultural irrigation well and typical alluvial sediments in the area.

Well test data summarized on the neighboring well report indicate a yield of 3,300 gallons per minute (gpm) with 55 ft of drawdown. It is likely that this test was conducted using airlift pumping equipment, which tends to indicate higher yields than are achievable using a vertical turbine pump. At the time of the test, the static water level was approximately 210 ft bgs.

The Project's on-site agricultural well is located near the southwest corner of Section 3, and well number 21S/16E-4 is located within Section 4 of the same township and range, therefore the two wells are located within about a mile of each other. These wells have comparable designs and encountered similar geologic materials; thus they will likely produce similar drawdown for a given yield. Average well yields for municipal and irrigation wells published by the California Department of Water Resources for the Pleasant Valley Subbasin range from 35 to 3,300 gallons per minute (gpm), with an average yield of 1,000 gpm. Based on the published range, and reported

performance of well number 21S/16E-4, wells in the vicinity of the site have the potential to produce yields above the average for the subbasin.

Under normal use, the on-site agricultural irrigation well is expected to generate drawdown comparable to the drawdown that other agricultural wells in the area are capable of producing. No site-specific geologic or hydrogeologic data have been identified that indicate drawdown from the well would substantially impact other groundwater users surrounding the site. Groundwater withdrawal by San Joaquin Solar 1&2 will produce groundwater drawdown within the aquifers penetrated by the well under the site and adjacent properties. Drawdown is expected to decrease at increased distances from the well used. Based on the significant distance to the nearest operational well, the expected drawdown would result in a negligible increase in the dynamic head and associated increase in pumping cost to neighboring well operators.

encl: Well Completion Report – On-Site Agricultural Irrigation Well  
Water Well Drillers Report – Well Number 21S/16E-4

ORIGINAL  
File with DWR

Page 1 of 1

Owner's Well No. MOURAN #1

Date Work Began 6/26/06, Ended 7/14/06

Local Permit Agency FRESNO COUNTY

Permit No. WP-0026516 Permit Date 3/27/06

STATE OF CALIFORNIA  
**WELL COMPLETION REPORT**

Refer to Instruction Pamphlet

No. **EO-38695**

DWR USE ONLY — DO NOT FILL IN

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

**GEOLOGIC LOG**

DEPTH FROM SURFACE		DESCRIPTION <i>Describe material, grain, size, color, etc.</i>
FL	FL	
0	8	BROWN TOP SOIL
8	217	BROWN CLAY - TRACE SAND
217	345	BROWN CLAY & 1/8" GRAVEL
345	386	BROWN CLAY
386	784	BROWN CLAY & GRAVEL
784	805	BROWN CLAY
805	928	BROWN CLAY & GRAVEL
928	1000	BROWN GRITTY CLAY

**WELL OWNER**

Name W T MOURAN

Mailing Address P.O. BOX 835  
COALINGA CA 93210

CITY STATE ZIP

**WELL LOCATION**

Address JAYNE AVE BY PRISON

City COALINGA CA 93210

County FRESNO

APN Book 085 Page 030 Parcel 57

Township 21 S Range 16 E Section 3

Latitude \_\_\_\_\_

**LOCATION SKETCH**

DEG. MIN. SEC. NORTH

WEST EAST

DEG. MIN. SEC. ACTIVITY

NEW WELL

MODIFICATION/REPAIR  
 Deepen  
 Other (Specify) \_\_\_\_\_

DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

PLANNED USES ( )  
 WATER SUPPLY  
 Domestic  Public  
 Irrigation  Industrial

MONITORING \_\_\_\_\_  
 TEST WELL \_\_\_\_\_  
 CATHODIC PROTECTION \_\_\_\_\_  
 HEAT EXCHANGE \_\_\_\_\_  
 DIRECT PUSH \_\_\_\_\_  
 INJECTION \_\_\_\_\_  
 VAPOR EXTRACTION \_\_\_\_\_  
 SPARGING \_\_\_\_\_  
 REMEDIATION \_\_\_\_\_  
 OTHER (SPECIFY) \_\_\_\_\_

**WATER LEVEL & YIELD OF COMPLETED WELL**

DEPTH TO FIRST WATER ? (Ft.) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL \_\_\_\_\_ (Ft.) & DATE MEASURED \_\_\_\_\_

ESTIMATED YIELD \_\_\_\_\_ (GPM) & TEST TYPE \_\_\_\_\_

TEST LENGTH \_\_\_\_\_ (Hrs.) TOTAL DRAWDOWN \_\_\_\_\_ (Ft.)

*May not be representative of a well's long-term yield.*

TOTAL DEPTH OF BORING 1000 (Feet)

TOTAL DEPTH OF COMPLETED WELL 980 (Feet)

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASING (S)				MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
		TYPE ( )	BLANK	SCREEN	CONDUCTOR				
0	40					STEEL	30	.250	
0	370					STEEL	16	.312	
370	858					STEEL	16	.312	.070 X 32
858	939					STEEL	16	.312	
939	980					STEEL	16	.312	.070 X 32

DEPTH FROM SURFACE	ANNULAR MATERIAL TYPE			
	FL	to	FL	TYPE
0	40			CE- MENT ( )
40	1000			BEN- TONITE ( )
				FILL ( )
				FILTER PACK (TYPE/SIZE)

- ATTACHMENTS ( )**
- Geologic Log
  - Well Construction Diagram
  - Geophysical Log(s)
  - Soil/Water Chemical Analysis
  - Other \_\_\_\_\_
- ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

**CERTIFICATION STATEMENT**

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME Farm Pump and Irrigation  
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

P.O. Box 1477  
ADDRESS Shafter CITY CA 93263 STATE ZIP

Signed [Signature]  
WELL DRILLER/AUTHORIZED REPRESENTATIVE

DATE SIGNED 07/13/06 C-57 LICENSE NUMBER 602148 C-57

ORIGINAL  
File with DWR

STATE OF CALIFORNIA  
THE RESOURCES AGENCY  
DEPARTMENT OF WATER RESOURCES  
WATER WELL DRILLERS REPORT

Do Not Fill In

No 52561

State Well No. \_\_\_\_\_  
Other Well No. 215/16E-4

(1) OWNER:  
Name WALDO W. WEETH AND WEETH RANCHES INC.

Address  
COALINGA, CALIFORNIA

(2) LOCATION OF WELL:  
County Fresno Owner's number, if any \_\_\_\_\_  
Township, Range, and Section 21 16 sec. 4  
Distance from cities, roads, railroads, etc. \_\_\_\_\_

(3) TYPE OF WORK (check):  
New Well  Deepening  Reconditioning  Destroying   
If destruction, describe material and procedure in Item 11.

(4) PROPOSED USE (check):  
Domestic  Industrial  Municipal   
Irrigation  Test Well  Other

(5) EQUIPMENT:  
Rotary   
Cable   
Other

(6) CASING INSTALLED:

STEEL:				OTHER:			
SINGLE <input checked="" type="checkbox"/>				DOUBLE <input type="checkbox"/>			
From ft.	To ft.	Diam.	Gage or Wall	Diameter of Bore	From ft.	To ft.	
0	997	16" x	5/16"	27 1/2"	0	997	

If gravel packed \_\_\_\_\_

Size of shoe or well ring: \_\_\_\_\_ Size of gravel: 3/8

(7) PERFORATIONS OR SCREEN:  
Type of perforation or name of screen \_\_\_\_\_

From ft.	To ft.	Perf. per row	Rows per ft.	Size in. x in.
292	997	16	2	1/8" x 2"

(8) CONSTRUCTION:  
Was a surface sanitary seal provided? Yes  No  To what depth 20 ft.  
Were any strata sealed against pollution? Yes  No  If yes, note depth of strata \_\_\_\_\_  
From \_\_\_\_\_ ft. to \_\_\_\_\_ ft.  
From \_\_\_\_\_ ft. to \_\_\_\_\_ ft.

(9) WATER LEVELS:  
Depth at which water was first found, if known 210 ft.  
Standing level before perforating, if known \_\_\_\_\_ ft.  
Standing level after perforating and developing 210 ft.

(10) WELL TESTS: Perless.  
Was pump test made? Yes  No  If yes, by whom? \_\_\_\_\_  
Yield: 3300 gal./min. with 35 ft. drawdown after \_\_\_\_\_ hrs.  
Temperature of water \_\_\_\_\_ Was a chemical analysis made? Yes  No   
Was electric log made of well? Yes  No  If yes, attach copy \_\_\_\_\_

(11) WELL LOG:

Formation: Describe by color, character, size of material, and structure	ft. to	ft.
sand & gravel	0	150
sandy clay	150	216
sand	216	260
sand & streaks clay	260	300
sandy gravel	300	325
gravel & streaks sand	325	348
gravel	348	375
gravel & sand	375	410
clay & sand	410	450
clay	450	500
sand & gravel	500	525
gravel & clay	525	550
gravel & clay	550	575
sand & clay	575	600
clay & gravel	600	650
gravel & streaks clay	650	675
clay & sand	675	700
hard sand	700	724
sand & streaks clay	724	756
sand	756	786
fine sand	786	800
hard sand & boulders	800	825
sand & stks clay	825	850
fine sand	850	880
hard fine sand	880	900
sand	900	925
sand & clay	925	950
hard sand, clay & rock	950	975
hard sand	975	987
clay	987	1000

WELL DRILLER'S STATEMENT:  
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME ROBERTSON BROS.  
(Person, firm, or corporation) (Typed or printed)

Address Rt. 3 Box 1060  
BAKERSFIELD, CALIF. 93307

[SIGNED] C. Robertson  
(Well Driller)

License No. 239627 Dated May 2, 1970

SKETCH LOCATION OF WELL ON REVERSE SIDE