

ATTACHMENT F

GROUNDWATER QUALITY AND QUANTITY
REVIEW FROM BIERMAN HYDROGEOLOGIC
SEPTEMBER 18, 2012

PLN040529

This page intentionally left blank.

BIERMAN



A Professional Company

Hydrogeologic Consulting & Water Resource Management
Office: (531) 858-8888 Cell: (531) 334-2237 E-Mail: bierman@hydrogeo.com
3153 Redwood Drive, Aptos, CA 95009

HEALTH DEPARTMENT
SEP 20 2012
ENVIRONMENTAL HEALTH

September 18, 2012

Monterey County Environmental Health Bureau
c/o: Patrick Treffry - REHS
1270 Natividad Road
Salinas, CA 93906

Subject: *Vasquez Property; PLN 040529 - Groundwater Quality and Quantity*

EXECUTIVE SUMMARY

Bierman Hydro-Geo-Logic (BHgl) has been contracted by the Vasquez's to; 1) review previous groundwater quality data and correspondence between MCEHB, 2) complete an up-dated round of groundwater sampling and laboratory analysis and, 3) prepare this letter with recommended Conditions Of Approval for MCEHB to consider for the Vasquez Property, PLN 040529, APN: 257-121-019. This report is not a Hydrogeological Investigation.

This letter provides additional information regarding; The wells construction, recent groundwater quality in relation to California Drinking Water Standards (DWS)¹, a summary of well##1, #2, #3 estimated source capacity, and summarized Point-of-Entry (POE) groundwater treatment system components in order to meet aforementioned State DWS.

SITE DESCRIPTION

The project, as shown on Figure 1 (attached) is located at 34735 Metz Road, outside the city of Soledad, California. The well field is located at an approximate elevation of 265-ft mean sea level (msl) just off the base of the valley floor and Salinas River. The site is located at the base of larger rolling hills backing up against Pinnacles National Monument. A Site Map is attached as Figure 2 and shows the well field, existing structures, existing septic tanks and leach-fields, proposed well easements to each parcel and proposed parcel lay-out each totaling 3.086 acres.

PROPOSED PROJECT

The Vasquez are proposing that MCEHB allow one parcel be split to form two parcels with a remainder parcel, such that, each parcel will be served by their own well based on the following primary Condition of Approvals (COAs):

1. Each parcel to have a minimum of 5,000 gallon raw water storage,
2. Each well to have Point-of-Entry (POE) groundwater treatment system,
3. Each parcel to have appropriate deed notifications notarized and submitted. Deed notifications to include (Well Easement, Fractured Hardrock Well, Groundwater Quality, POE Treatment System, reporting and maintenance),
4. Each parcel to provide quarterly reporting of pre-&-post groundwater treatment samples,
5. Each well to undergo updated source capacity testing per MCEHB guidelines and

¹ California Administrative Code, Title 22, Chapter 15, Article 4. Primary Standards - Inorganic Chemicals, Section 64431, Maximum Contaminant Levels - Inorganic Chemicals, May, 2009.

6. Each well “well-head” and surface seal upgraded to appropriate well head standards.

As BHgl understands, no water system is being proposed. Additional supplemental COAs, as needed, are mentioned below.

DATA REVIEW AND FIELD WORK

Based on site data and previous regulatory communications provided by Maureen Wruck Planning Consultants, LLC, field work completed on August 16, 2012 BHgl (which included well purging & groundwater sampling of wells #2, #3), and review of laboratory groundwater analytical results (attached) the following information regarding the wells is summarized below.

Well #1:

Well Construction - This well is sufficiently old such that a copy of the DWR Well Completion Report could not be found and/or was not provided to BHgl. As a supplemental COA, BHgl recommends video logging Well #1 to determine its construction and integrity to serve one single family dwelling. Depending on the video logging, it may be necessary to drill a new well with a deeper sanitary seal to reduce the nitrate contamination in the well. This could be implemented as an another supplemental COA.

Groundwater Quantity and Long-Term Source Capacity - Although the source capacity of this well is unknown, based on review of the other two wells “historic” pumping tests, this well (well #1) can also likely meet post-recovery pumping rate of 3gpm/connection. As stated above, a primary COA would be to complete updated source capacity testing as per MCEHB guidelines.

Groundwater Quality - As BHgl understands, the well is out-of service due to primary constituents² (arsenic and nitrate) concentrations that exceed State Maximum Contaminant Level (MCL) for drinking water, among other elevated secondary constituents³ (chloride, color, electrical conductance, iron, manganese, total dissolved solids). As a second supplemental COA, BHgl recommends an updated groundwater sample from this well to determine design parameters for a Point-of-Entry (POE) single-connection groundwater treatment system.

Well #2:

Well Construction - Based DWR Well Completion Report (attached) Well #2 was drilled in April, 2005 and is constructed with 5-inch diameter steel casing and is perforated in a granitic hardrock aquifer. The well is noted as being completed to a depth of 620 feet below ground surface and perforated from 440-620' below ground surface (bgs) with a sanitary seal to a depth of 400-ft bgs.

Groundwater Quantity and Long-Term Source Capacity - The source capacity of this well was determined to be 5.1 gallons per minute (2005 72-hour pumping test by Salinas Pump Co.) and therefore exceeds the post-recovery pumping rate of 3gpm/connection. As an aside, during the

² Primary constituents are contaminants that can cause significant adverse health effects for which local agencies can regulate and enforce.

³ Secondary constituents which are contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. Secondary constituents are non-enforceable; however, Environmental Protection Agency (EPA) recommends secondary standards in water systems but does not require systems to comply. Individual States and/or local counties may choose to adopt them as enforceable standards. Although MCHD does not enforce these standards, we recommend treating the secondary constituents to the recommended standards.

recent well purging and groundwater sampling of wells #2, #3, the wells (for how close in proximity they were and similar perforated interval) the wells did not appear to be hydrogeologically connected, although future source-capacity testing would verify this. As stated above, a primary COA would be to complete updated source capacity testing as per MCEHB guidelines.

Groundwater Quality - As BHgl understands the well is currently off-line due to fluctuating primary constituents (arsenic and fluoride) among other secondary constituents (chloride, color, electrical conductance, iron, manganese, total dissolved solids).

Based on recent groundwater analytical results⁴, nitrate and nitrite were not detected. Although arsenic was present at 6 parts per billion (ppb), historic and current fluctuating concentrations (2-6 ppb) remain below the States MCL of 10 ppb. On the contrary, fluoride concentrations were detected at 3.34 parts per million (ppm) exceeding the States MCL of 2 ppm. No historic concentrations for fluoride were provided. As stated above, a primary COA would be to have a satisfactory POE single-connection groundwater treatment system.

Well #3:

Well Construction - Based DWR Well Completion Report (attached) Well #3 was drilled in January, 2008 and is constructed with 5-inch diameter steel casing and is perforated in a granitic hardrock aquifer. The well is noted as being completed to a depth of 800 feet below ground surface and perforated from 360-460', 480-580' and 600-740' bgs with a sanitary seal to a depth of 340-ft bgs. As BHgl understands, the well is currently serving the structures at the site.

Groundwater Quantity and Long-Term Source Capacity - The source capacity of this well was never determined (pump test canceled because of water quality issues) although, as BHgl understands, the well is adequate to support a pumping rate of 3gpm/connection. As an aside, during the recent purging and monitoring, well #3 was being pumped at 6.5 gpm and had only 2.7 feet of drawdown after 2-hours of pumping, and although preliminary, suggests the well can support 3gpm/connection. As stated above, a primary COA would be to complete updated source capacity testing as per MCEHB guidelines.

Groundwater Quality - As BHgl understands the well is currently on-line as it appears to be the best producing well, although does have fluctuating primary constituents (arsenic and fluoride) among other secondary constituents (chloride, color, electrical conductance, iron, manganese, total dissolved solids).

Based on recent groundwater analytical results⁵, nitrate and nitrite were not detected. Although arsenic was present at 5 parts per billion (ppb), historic and current fluctuating concentrations (2-6 ppb) remain below the States MCL of 10 ppb. On the contrary, as with well #2, fluoride concentrations were detected at 3.19 parts per million (ppm) exceeding the States MCL of 2 ppm. Historic and current fluoride concentrations (3.19 to 3.5 ppm) are above the States MCL.

⁴ Monterey Bay Analytical Services (MBAS), Analytical Results, dated August 29, 2012, sampled August 16, 2012.
⁵ Monterey Bay Analytical Services (MBAS), Analytical Results, dated August 29, 2012, sampled August 16, 2012.

As stated above, a primary COA would be to have a satisfactory POE single-connection groundwater treatment system.

POINT-OF-ENTRY GROUNDWATER TREATMENT SYSTEM

Since no water system is proposed, and based on COA that each residence will have their own POE single-connection groundwater treatment system, BHgl has provided generic treatment system components which will consist of the latest technology to reduce and/or remove the elevated constituents of concern and other trace metals and secondary constituents in the groundwater for meeting State secondary DWS.

The below generic groundwater treatment system could accommodate the needs of each single family dwelling, with no treatment for irrigation use, as it would be cost prohibitive. The groundwater treatment system components per/parcel would include;

Point-of-Entry Treatment Components:

- One, 5,000 gallon Raw Water Storage Tank
- One, 2,000 gpd Ozone System,
- One, Spin-Down Filter (1-inch inlet/outlet) with manual or automatic flush,
- One, 1hp Feed Pump -220v (1-inch inlet/outlet)
- One, 20-inch big-blue 25-micron pleated filter,
- One, 20-inch, big-blue 5-micron pleated filter,
- One, 2-cubic foot, 45 grain Water Softener -110v (1-inch inlet/outlet) with brine tank and auto refill and backwashing,
- One, 2-cubic-foot Iron/Manganese Filter -110v (1-inch inlet/outlet) with carbon/potassium-permanganate and auto backwashing,
- One, 20-inch, big-blue 5-micron pleated filter,
- One, 1,5000 gpd 4-stage Reverse Osmosis (RO) Unit -220v with automatic drain and recycle valves and 0.5hp high pressure (220 psi) booster pump,
- One, 1,000 gpd Fresh Water Storage Tank,
- One, 1hp Variable Frequency Drive (220v) Constant Pressure Pump,
- One, 20-inch, big-blue reusable calcite neutralizer cartridge,
- One, 20-inch, big-blue carbon polish filter (6-months or 25,000 gallons)

All waste-brine from the treatment system unit (roughly 1.2 gpm during operation) will be discarded to the sanitary system/leach-field. The waste stream generated from the treatment system is considered negligible and will not have any significant impact to the leach-field or sanitary sewer system.

We recommend that pre-post treatment samples (for the main constituents of concern) be obtained monthly for the first 3 months to verify the treatment system is working appropriately. Based on the groundwater analytical results, additional filtration may be necessary to help extend the life of the RO unit. Following 3 consecutive rounds of groundwater analysis, the post treatment sampling frequency should be quarterly for two-years, and thereafter, determine effectiveness and frequency and either bi-annual or annual sampling.

Associated costs for the treatment system components are estimated at \$12,000. Installation costs are estimated at \$6,000. Quarterly sampling and reporting and annual maintenance is estimated at \$1,800-\$2,200.

SUMMARY AND CONCLUSIONS

Based on the information reviewed, it is likely that each well can each achieve a post-recovery pumping rate of 3 gpm/connection and be maintained as a long-term water supply. Due to the costs to implement source capacity testing, the Vasquez are requesting source capacity testing be demonstrated after MCEHB approves the split of one parcel to two parcels with a remainder parcel, such that, each parcel will have an individual well with point-of-entry single-connection groundwater treatment system and appropriate deed notifications.

This concludes our brief letter report on the Vasquez Property and its well field.

LIMITATIONS

Our service consists of professional opinions and recommendations based on the data compiled. *Bierman Hydrogeologic P.C.* bases the conclusions provided upon the tests and measurements, using accepted hydrogeologic principles and practices of the groundwater industry.

Additionally, conditions in water wells are subject to dramatic changes, even in short periods of time. The techniques employed in conducting pump testing may be subject to considerable error due to factors within the well and/or aquifer, which are beyond our immediate control or observation.

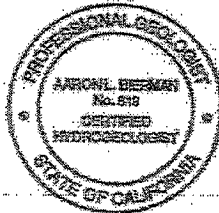
Therefore, the data included within this report are valid only as of the date and within the observational limitations of the test or installation conducted. The test conclusions are intended for general comparison of the well and/or aquifer in its present condition against known water well standards and/or guidelines. The analysis and conclusions in this report are based on information reviewed, and field-testing which are necessarily limited. Additional data from future work may lead to modification of the opinions expressed herein.

In accepting this report, the client releases and holds *Bierman Hydrogeologic, P.C.* harmless from liability for consequential or incidental damages arising from any different future pumping rate, calculated well yield or water quality that was expressed herein. Our report is not a guarantee of any water production rate, yield or water quality.

Respectfully submitted,

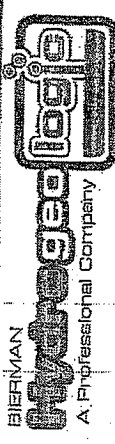
Aaron Bierman AB

Aaron Bierman
Certified Hydrogeologist #819





Scale in Feet


 BIERNAN
 A Professional Company
 Hydrogeologic Consulting & Water Resource Management

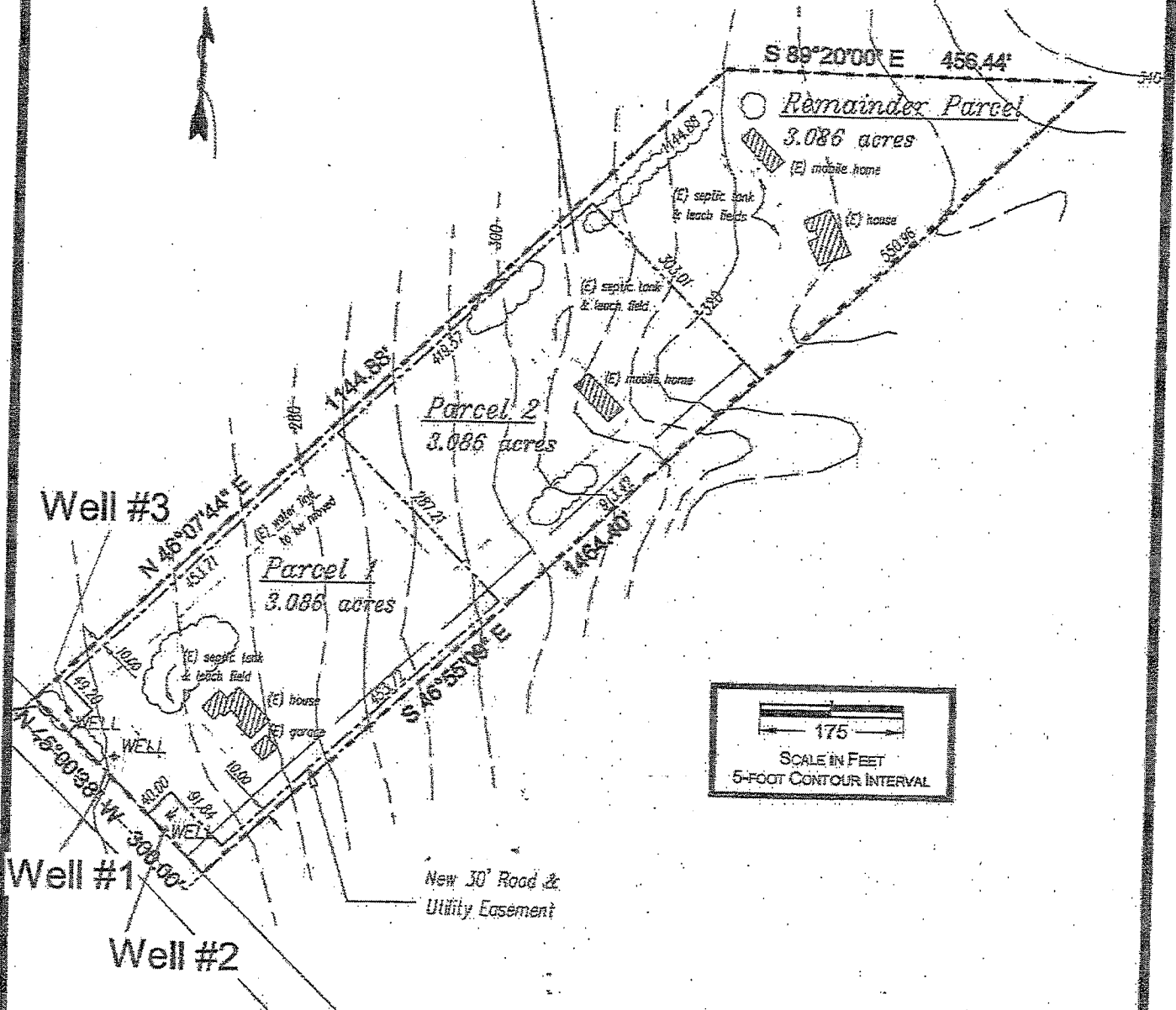
LOCATION MAP
 APN: 001-761-037
 Monterey County, California

FIGURE
1

By: A. Adams, June 14, 2012
 File: 001-761-037-01.dwg

Vasquez Subdivision

NORTH



Basemap from Maureen Wruck Planning Consultants, 21 West Alisal Street, Suite 11, Salinas, CA 93901.
Basemap scanned and re-scaled to fit this figure. Overlay by Bierman Hydrogeologic

BIERMAN
Hydrogeologic
A Professional Company
Hydrogeologic Consulting & Water Resource Management

SITE MAP
APN: 257-121-019
Monterey County, California

FIGURE
2
By: A. Bierman, September 12, 2012
VasquezFigures/Site Map_Fedmat

DUPLICATE
Driller's Copy

Page 1 of 1

Owner's Well No. VASQUEZ #2
Date Work Began 4/13/2005
Local Permit Agency MTRY CITY HEALTH DEPT
Permit No. 05-16437

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet No. **e020569**

DWR USE ONLY - DO NOT FILL IN

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/RS/Others

GEOLOGIC LOG Permit Date 5/16/2005

ORIENTATION (L) VERTICAL HORIZONTAL ANGLE (SPECIFY)

DEPTH FROM SURFACE

FL to FL

DRILLING METHOD ROTARY FLUID BENTONITE

DESCRIPTION Describe material, grain, size, color, etc.

0	1	TOP SOIL
1	6	SAND
6	105	BROWN SANDY CLAY
105	152	BLUE CLAY
152	385	D.G.
385	573	GRANITE
573	620	BROKEN GRANITE

WELL OWNER Name FERMIN VASQUEZ

Mailing Address 34735 METZ RD
SOLEDAD
CITY CA 93960

Address 34735 METZ RD WELL LOCATION STATE ZIP

City SOLEDAD CA 93960

County MONTEREY

APN Book 257 Page 121 Parcel 019

Township 12 S Range 5 E Section 7

Latitude 36 ' 89 ' 92 ' SEC. 121 ' 47 ' 73 ' NORTH

LOCATION SKETCH

DEG. MIN. SEC. 121 47 73

ACTIVITY (L) NEW WELL

MODIFICATION/REPAIR Deeper Other (Specify)

DESTROY (Describe Procedure and Material Under GEOLOGIC LOG)

PLANNED USES (L)

WATER SUPPLY Domestic Public Irrigation Industrial

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

Illustrate or Describe Distance of Well from Roads, Buildings, Ponds, Rivers, etc., and attach a map. Use additional pages if necessary. PLEASE BE ACCURATE & COMPLETE.

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER (FL) BELOW SURFACE 1

DEPTH OF STATIC WATER LEVEL (FL) & DATE MEASURED

ESTIMATED YIELD (GPM) & TEST TYPE

TEST LENGTH (Hrs) TOTAL DRAWDOWN (FL)

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

CASING (S)

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	TYPE (L)	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	440	11	STEEL	5		
440	620	11	STEEL	5		

ANNULAR MATERIAL

DEPTH FROM SURFACE	FL to FL	CEMENT	BENTONITE	FILL	FILTER PACK (TYPE/SIZE)
0	400	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
400	620				6 X 12

ATTACHMENTS (L)

- 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 SALINAS PUMP COMPANY
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

ADDRESS 21935 ROSEHART WAY

Signed [Signature] SALINAS CITY CA 93960

WELL DRILLER AUTHORIZED REPRESENTATIVE DATE SIGNED 05/23/05 STATE CA ZIP 93960

C-57 LICENSE NUMBER 515945

DUPLICATE
Driller's Copy

Page 1 of 2

Owner's Well No. WELL #3

Date Work Began 12/19/2007

Local Permit Agency MONTEREY COUNTY HEALTH DEPT.
Permit No. 07-11229

STATE OF CALIFORNIA
WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No. **e057414**

Ended 1/15/2008

Permit Date 11/20/2007

OWNER USE ONLY - DO NOT FILL IN

STATE WELL NO./SECTION NO.

LATITUDE

LONGITUDE

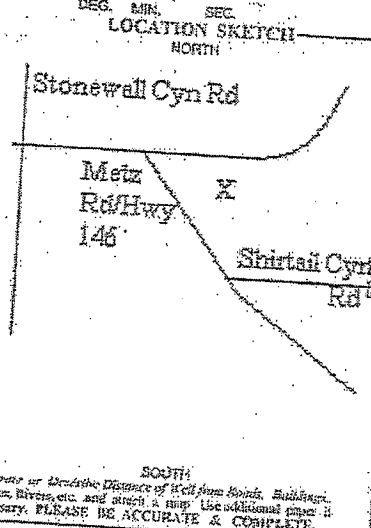
APN/RS OTHER

GEOLOGIC LOG

DEPTH FROM SURFACE ft. in. ft.	ORIENTATION (°) VERTICAL OR DRILLING METHOD	DESCRIPTION Describe material, grain, size, color, etc.	FLUID MUD
0	3	TOP SOIL	
3	122	BROWN SANDY CLAY	
122	174	BLUE CLAY	
174	291	BLUE SANDY CLAY	
291	442	D.G.	
442	506	GRANITE	
506	551	BROKEN GRANITE	
551	706	GRANITE	
706	710	BROKEN GRANITE	
710	775	GRANITE	
775	800	GRANITE	

WELL OWNER
Name FERMIN VASQUEZ
Mailing Address 34735 METZ RD
SOLEDAD CA 93960
City STATE ZIP

WELL LOCATION
Address 34735 METZ ROAD
City SOLEDAD CA 93960
County MONTEREY
APN Book 257 Page 121 Parcel 019
Township Range Section
Latitude



- WELL ACTIVITY (✓)
- NEW WELL
 - MODIFICATION/REPAIR
Deepen
Other (Specify)
 - DESTROY (Describe Procedure and Retain Under GEOLOGIC LOG)
 - PLANNED USES (✓)
WATER SUPPLY
Domestic
Irrigation
Pulse Irrigation
 - MONITORING
TEST WELL
CATHODIC PROTECTION
HEAT EXCHANGE
DIRECT FURN
INJECTION
VAPOR EXTRACTION
SPARGING
REMEDIATION
OTHER (SPECIFY)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER (ft) BELOW SURFACE 1

DEPTH OF STATIC WATER LEVEL 145.5 (ft) DATE MEASURED 1/21/2008

ESTIMATED YIELD 25 (GPM) & TEST TYPE PUMP

TEST LENGTH 6 (ft) TOTAL DRAWDOWN 1 (ft)

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

TOTAL DEPTH OF BORING 800 (Feet)

TOTAL DEPTH OF COMPLETED WELL 800 (Feet)

DEPTH FROM SURFACE		BORE-HOLE DIA. (Inches)	TYPE (✓)			MATERIAL GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
R	to FL		BLANK	SCREENS	COUPLER				
	0	360	10	✓	✓	STEEL			
	360	460	10	✓	✓	STEEL	5		
	460	480	10	✓	✓	STEEL	5	.188	
	480	580	10	✓	✓	STEEL	5	.188	
	580	600	10	✓	✓	STEEL	5	.219	
	600	740	10	✓	✓	STEEL	5	.219	

DEPTH FROM SURFACE			ANNULAR MATERIAL TYPE	
R	to FL	FL	CE-MENT	FILTER PACK (TYPE/SIZE)
	0	340	(✓)	(✓)
	340	600	(✓)	6 x 12

- ATTACHMENTS (✓)
- Geologic Log
 - Well Construction Diagram
 - Geophysical Logs
 - 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 **SALINAS PUMP COMPANY**
(PERSON, FIRM OR CORPORATION) (TYPED OR PRINTED)

ADDRESS **21935 ROSEHART WAY**

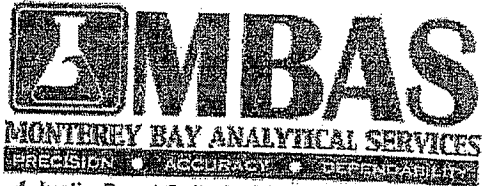
Signed _____ SALINAS CITY CA 93908

DATE SIGNED **09/03/08** STATE ZIP

WELL DRILLER/AUTHORIZED REPRESENTATIVE

515945 COST LICENSE NUMBER

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM



4 Justin Court Suite D, Monterey, CA 93940
831.375.MBAS

montereybayanalytical@usa.net
ELAP Certification Number: 2385

Wednesday, August 29, 2012

Hydrogeologic Consult & Water Resource
Aaron Bierman
3153 Redwood Dr
Aptos, CA 95003

Lab Number: AA91003

Collection Date/Time: 8/16/2012 12:00
Submittal Date/Time: 8/16/2012 12:20

Sample Collector: BIERMAN, A.
Sample ID

Sample Description: 34735 Metz Rd. Well #2

Analyte	Method	Unit	Result	Qual	PQL	MCL	Date Analyzed
Alkalinity, Total (as CaCO ₃)	2320B	mg/L	230		2		8/16/2012
Aluminum, Total	EPA200.8	ug/L	21		10	1000	8/17/2012
Antimony, Total	EPA200.8	ug/L	Not Detected		1	6	8/17/2012
Arsenic, Total	EPA200.8	ug/L	6		1	10	8/17/2012
Barium, Total	EPA200.8	ug/L	459		10	1000	8/17/2012
Beryllium, Total	EPA200.8	ug/L	Not Detected		1	4	8/17/2012
Bicarbonate (as HCO ₃ ⁻)	2320B	mg/L	281		10		8/16/2012
Bromide	EPA300.0	mg/L	3.46		0.10		8/16/2012
Cadmium, Total	EPA200.8	ug/L	Not Detected		0.5	5	8/17/2012
Calcium	EPA200.7	mg/L	59		0.5		8/23/2012
Carbonate as CaCO ₃	2320B	mg/L	Not Detected		10		8/16/2012
Chloride	EPA300.0	mg/L	1123		1	250	8/16/2012
Chromium, Total	EPA200.8	ug/L	7		2	50	8/17/2012
Color, Apparent (Unfiltered)	2120B	Color Units	30		3	15	8/16/2012
Copper, Total	EPA200.8	ug/L	Not Detected		4	1300	8/17/2012
Cyanide	QuikChem 10-204	ug/L	7		5	200	8/20/2012
Fluoride	EPA300.0	mg/L	3.34		0.10	2.0	8/16/2012
Hardness (as CaCO ₃)	2340B	mg/L	267		10		8/27/2012
Hydroxide	2320B	mg/L	Not Detected		5		8/16/2012
Iron	EPA200.7	ug/L	834		10	300	8/23/2012
Langlier Index (15 deg. C)	2330B		0.34				8/27/2012
Langlier Index (60 deg. C)	2330B		0.91				8/27/2012
Lead, Total	EPA200.8	ug/L	Not Detected		5	15	8/17/2012
Magnesium	EPA200.7	mg/L	29		0.5		8/23/2012
Manganese, Total	EPA 200.7	ug/L	153		10	50	8/23/2012
MBAS (Surfactants)	5540C	mg/L	Not Detected		0.05	0.50	8/16/2012
Mercury, Total	EPA200.8	ug/L	Not Detected		0.5	2	8/17/2012
Nickel, Total	EPA200.8	ug/L	Not Detected		10	100	8/17/2012

mg/L: Milligrams per liter (=ppm)

ug/L : Micrograms per liter (=ppb)

PQL : Practical Quantitation Limit

H = Analyzed outside of hold time

E = Analysis performed by External Laboratory; See External Laboratory Report attachments.

D = Method deviates from standard method due to insufficient sample for MS/MSD



MONTEREY BAY ANALYTICAL SERVICES
PRECISION • ACCURACY • RELIABILITY

4 Justin Court Suite D, Monterey, CA 93940
831.375.MBAS

montereybayanalytical@usa.net
ELAP Certification Number: 2385

Wednesday, August 29, 2012

Hydrogeologic Consult & Water Resource
Aaron Bierman
3153 Redwood Dr
Aptos, CA 95003

Lab Number: AA91003

Collection Date/Time: 8/16/2012 12:00
Submittal Date/Time: 8/16/2012 12:20

Sample Collector: BIERMAN, A.
Sample ID

Sample Description: 34735 Metz Rd. Well #2

Analyte	Method	Unit	Result	Qual	PQL	MCL	Date Analyzed
Nitrate as NO3	EPA300.0	mg/L	Not Detected		1	45	8/16/2012
Nitrite as NO2-N	EPA300.0	mg/L	Not Detected		0.10	1.00	8/16/2012
Odor Threshold at 60 C	2150B	TON	2		1	3	8/16/2012
o-Phosphate-P	EPA300.0	mg/L	Not Detected		0.10		8/16/2012
pH (Laboratory)	4500-H+B	pH (F)	7.9				8/16/2012
Potassium	EPA200.7	mg/L	5.5		0.1		8/23/2012
QC Anion Sum x 100	Calculation	%	90%				8/29/2012
QC Anion-Cation Balance	Calculation	%	2				8/29/2012
QC Cation Sum x 100	Calculation	%	93%				8/29/2012
QC Ratio TDS/SEC	Calculation		0.53				8/29/2012
Selenium, Total	EPA200.8	ug/L	18		2	50	8/17/2012
Silver, Total	EPA200.8	ug/L	Not Detected		10	100	8/17/2012
Sodium	EPA200.7	mg/L	738		0.5		8/23/2012
Specific Conductance (E.C)	2510B	umhos/cm	4050		1	900	8/16/2012
Sulfate	EPA300.0	mg/L	1		1	250	8/16/2012
Thallium, Total	EPA200.8	ug/L	Not Detected		1	2	8/17/2012
Total Diss. Solids	2540C	mg/L	2150		10	500	8/16/2012
Turbidity	180.1	NTU	3.6		0.05	5.0	8/16/2012
Zinc, Total	EPA200.8	ug/L	122		10	5000	8/17/2012

Sample Comments:

Report Approved by:

David Holland, Laboratory Director

mg/L: Milligrams per liter (=ppm)

ug/L: Micrograms per liter (=ppb)

PQL: Practical Quantitation Limit

H = Analyzed outside of hold time

E = Analysis performed by External Laboratory; See External Laboratory Report attachments.

D = Method deviates from standard method due to insufficient sample for MS/MSD



4 Justin Court Suite D, Monterey, CA 93940
831.375.MBAS

montereybayanalytical@usa.net
ELAP Certification Number: 2385

Hydrogeologic Consult & Water Resource
Aaron Bierman
3153 Redwood Dr
Aptos, CA 95003

Wednesday, August 29, 2012

Lab Number: AA91004

Collection Date/Time: 8/16/2012 12:00 Sample Collector: BIERMAN, A.
Submittal Date/Time: 8/16/2012 12:20 Sample ID

Sample Description: 34735 Metz Rd. Well #3

Analyte	Method	Unit	Result	Qual	PQL	MCL	Date Analyzed
Alkalinity, Total (as CaCO3)	2320B	mg/L	274		2		8/16/2012
Aluminum, Total	EPA200.8	ug/L	Not Detected		10	1000	8/17/2012
Antimony, Total	EPA200.8	ug/L	Not Detected		1	6	8/17/2012
Arsenic, Total	EPA200.8	ug/L	5		1	10	8/17/2012
Barium, Total	EPA200.8	ug/L	189		10	1000	8/17/2012
Beryllium, Total	EPA200.8	ug/L	Not Detected		1	4	8/17/2012
Bicarbonate (as HCO3-)	2320B	mg/L	334		10		8/16/2012
Bromide	EPA300.0	mg/L	1.67		0.10		8/16/2012
Cadmium, Total	EPA200.8	ug/L	Not Detected		0.5	5	8/17/2012
Calcium	EPA200.7	mg/L	24		0.5		8/23/2012
Carbonate as CaCO3	2320B	mg/L	Not Detected		10		8/16/2012
Chloride	EPA300.0	mg/L	696		1	250	8/16/2012
Chromium, Total	EPA200.8	ug/L	8		2	50	8/17/2012
Color, Apparent (Unfiltered)	2120B	Color Units	25		3	15	8/16/2012
Copper, Total	EPA200.8	ug/L	Not Detected		4	1300	8/17/2012
Cyanide	QuikChem 10-204	ug/L	Not Detected		5	200	8/20/2012
Fluoride	EPA300.0	mg/L	3.19		0.10	2.0	8/16/2012
Hardness (as CaCO3)	2340B	mg/L	101		10		8/27/2012
Hydroxide	2320B	mg/L	Not Detected		5		8/16/2012
Iron	EPA200.7	ug/L	330		10	300	8/23/2012
Langlier Index (15 deg. C)	2330B		0.07				8/27/2012
Langlier Index (80 deg. C)	2330B		0.65				8/27/2012
Lead, Total	EPA200.8	ug/L	Not Detected		5	15	8/17/2012
Magnesium	EPA200.7	mg/L	10		0.5		8/23/2012
Manganese, Total	EPA 200.7	ug/L	22		10	50	8/23/2012
MBAS (Surfactants)	5540C	mg/L	Not Detected		0.05	0.50	8/16/2012
Mercury, Total	EPA200.8	ug/L	Not Detected		0.5	2	8/17/2012
Nickel, Total	EPA200.8	ug/L	Not Detected		10	100	8/17/2012
Nitrate as NO3	EPA300.0	mg/L	Not Detected		1	45	8/16/2012
Nitrite as NO2-N	EPA300.0	mg/L	Not Detected		0.10	1.00	8/16/2012
Odor Threshold at 60 C	2150B	TON	1		1	3	8/16/2012
o-Phosphate-P	EPA300.0	mg/L	Not Detected		0.10		8/16/2012

mg/L: Milligrams per liter (=ppm)

ug/L : Micrograms per liter (=ppb)

PQL : Practical Quantitation Limit

H = Analyzed outside of hold time

E = Analysis performed by External Laboratory; See External Laboratory Report attachments.

D = Method deviates from standard method due to insufficient sample for MS/MSD



MONTEREY BAY ANALYTICAL SERVICES
PRECISION • ACCURACY • DEPENDABILITY

4 Justin Court Suite D, Monterey, CA 93940
 831.375.MBAS

montereybayanalytical@usa.net
 ELAP Certification Number: 2385

Wednesday, August 29, 2012

Hydrogeologic Consult & Water Resource
 Aaron Bierman
 3153 Redwood Dr
 Aptos, CA 95003

Lab Number: AA91004

Collection Date/Time: 8/16/2012 12:00
 Submittal Date/Time: 8/16/2012 12:20

Sample Collector: BIEMAN, A.
 Sample ID:

Sample Description: 34735 Metz Rd. Well #3

Analyte	Method	Unit	Result	Qual	PQL	MCL	Date Analyzed
pH (Laboratory)	4500-H+B	pH (H)	7.9				
Potassium	EPA200.7	mg/L	2.9		0.1		8/16/2012
QC Anion Sum x 100	Calculation	%	91%				8/23/2012
QC Anion-Cation Balance	Calculation	%	2				8/29/2012
QC Cation Sum x 100	Calculation	%	94%				8/29/2012
QC Ratio TDS/SEC	Calculation		0.54				8/29/2012
Selenium, Total	EPA200.8	ug/L	10		2	50	8/29/2012
Silver, Total	EPA200.8	ug/L	Not Detected		10	100	8/17/2012
Sodium	EPA200.7	mg/L	549		0.5		8/17/2012
Specific Conductance (E.C)	2510B	umhos/cm	2750		1	900	8/16/2012
Sulfate	EPA300.0	mg/L	1		1	250	8/16/2012
Thallium, Total	EPA200.8	ug/L	Not Detected		1	2	8/17/2012
Total Diss. Solids	2540C	mg/L	1485		10	500	8/16/2012
Turbidity	180.1	NTU	1.4		0.05	5.0	8/16/2012
Zinc, Total	EPA200.8	ug/L	14		10	5000	8/17/2012
Sample Comments:							

Report Approved by:

David Holland, Laboratory Director

mg/L: Milligrams per liter (=ppm)

H = Analyzed outside of hold time

D = Method deviates from standard method due to insufficient sample for MSMSD

ug/L: Micrograms per liter (=ppb)

E = Analysis performed by External Laboratory; See External Laboratory Report attachments.

PQL: Practical Quantitation Limit

This page intentionally left blank.