Drinking Water Source Assessment for Mocho Wells 1, 2 and 3 Well Field

prepared by EOA, Inc.
for Zone 7 Water Agency

June 29, 2001

EOA, Inc.

MEMORANDUM

TO: **Rhett Alzona, Zone 7 Water Agency**

FROM: **Jon Konnan, EOA, Inc.**

DATE: **June 29, 2001**

SUBJECT: **Drinking Water Source Assessment for Mocho Wells 1 – 3 Well Field**

This memo and the attached forms and map document the results of a source water assessment for Zone 7's Mocho Wells 1, 2 and 3 well field. EOA, Inc. (EOA) performed this assessment in accordance with the guidelines of the California Department of Health Service's (DHS's) Drinking Water Source Assessment and Protection (DWSAP) program.[1] The DHS's Division of Drinking Water and Environmental Management developed the DWSAP program to meet state and federal requirements to assess the vulnerability to contamination of California's drinking water sources.

A. SOURCES OF INFORMATION FOR ASSESSMENT

EOA obtained information for completing the assessment as follows:

1. Zone 7 staff provided EOA with much of the data used for the assessment, including well plans and specifications,[2] well location, construction and production data and hydrogeologic data.

2. On February 28, 2001, EOA drove through the area within the protection zones calculated as part of the assessment (see the attached drinking water source assessment map) to help identify Possible Contaminating Activities (Appendix K).

3. EOA obtained information from the Dublin San Ramon Services District's wastewater pretreatment program regarding activities carried out by businesses within the protection zones.[3]

4. EOA obtained information about underground and above-ground hazardous material/waste storage tanks from the Livermore – Pleasanton Fire Department (LPFD).[4]

5. EOA reviewed California Regional Water Quality Control, San Francisco Bay Region (Regional Board) contamination site data sets, as explained below.

6. EOA obtained information on contamination sites within the protection zones from the LPFD and the Alameda County Department of Environmental Health (ACDEH), as discussed below.

B. ASSESSMENT RESULTS

The required forms and drinking water source assessment map are attached. It should be noted that the Physical Barrier Effectiveness form (Appendix J) was completed for each of the

three wells in the well field. Since a score that fell in the "moderate" range was calculated for each well, the corresponding score of three was used for the well field vulnerability analysis form (Appendix M). The Inventory of Possible Contaminating Activities (Appendix K) is based on field observations and available historical data and regulatory agency records.

Recharge Area

The Drinking Water Source Location form (Appendix H) requests a general description of the recharge area, if known. Zone 7 provided the following description:

The Mocho Wells 1 – 3 well field is mainly recharged from subsurface inflow and may be recharged by injection of treated State Project water through the newly constructed Mocho Wells No. 3 and 4. Subsurface inflow is thought to occur both laterally and vertically in this sub-basin. Water in overlying aquifers "leaks" through semi-confining and discontinuous aquitards to replenish the deeper aquifers. The shallow aquifers in this area of the basin are recharged directly from losing streams (i.e., Arroyo Mocho and Arroyo Valle), rainfall and irrigation percolation, and subsurface inflow from adjacent sub-basins (i.e., Dublin and Camp Sub-basins).

Contamination Release Sites

Contamination release sites were identified for the assessment based on 1) Zone 7's toxic site database, which was provided electronically to EOA during November, 2000, 2) discussions with LPFD and ACDEH staff and 3) the following data sets downloaded from the Regional Board's web site during February, 2001:

- LUSTIS (Leaking Underground Storage Tank Information System)
- SLIC (Spills, Leaks, Investigations, and Cleanup)
- List of Sites with MTBE Contamination

Three sites, all petroleum fuel leak sites, were identified within the protection zones for the well field:

- 3192 Santa Rita Road
- 2000 Oakland Avenue
- Livermore – Pleasanton Fire Department Station No. 3

These sites comprise the Possible Contaminating Activities listed in the Appendix K and Appendix M forms as gas stations, known contaminant plumes and confirmed leaking tanks, and are described below:

<u>3192 Santa Rita Road</u>

This site was formerly occupied by Exxon; it is now a Valero gas station. Underground fuel tanks were removed from the site in 1987. Subsequent investigation revealed low levels of MTBE (up to 490 parts-per-billion) in the shallow groundwater beneath the site. The ACDEH is providing regulatory oversight for an ongoing investigation at the site. The main purpose of the investigation is to ensure that the aquifers used for municipal water supply are not impacted. Six monitoring wells have been installed, and a work plan for a seventh well has been completed. The seventh well will be placed between the site and the Mocho well field.[5]

2000 Oakland Avenue

Based on EOA's drive through of the area, the address 2000 Oakland Avenue currently does not exist. The Regional Board's LUSTIS database lists a site called "Heller Seasonings" at this address. The brief LUSTIS record, which was entered May 30, 1990, indicates that low levels (33 parts-per-billion) of benzene were detected in groundwater beneath the site. This same record indicates the site's LUSTIS status code is 1 ("leak confirmed: a lab report received confirming a leak/spill from a tank"). However, LPFD records indicate that there was never an underground tank there. The LPFD also informed EOA that the Heller Seasonings building was demolished and that the area is now residential.[6] The Regional Board[7], ACDEH[5] and Zone 7 informed EOA that they do not have any additional information about this site.

Livermore – Pleasanton Fire Department Station No. 3

This site is located at 3200 Santa Rita Road. The LPFD informed EOA that two 500-gallon underground fuel tanks, one gasoline and one diesel, were removed from the site in 1996. Although the tanks appeared in good condition, petroleum hydrocarbons were detected in the soil beneath the tanks, possibly due to leakage from the associated piping. Contaminated soil was excavated from the site and properly disposed of off-site. No further action was deemed necessary at the site.[6]

C. DISCUSSION

The three fuel leak sites identified above appear to be minor releases impacting only the shallow subsurface. 3192 Santa Rita is currently under investigation to ensure that this site does not impact the aquifers tapped by Zone 7's Mocho and Stoneridge wells. Based on the very limited and conflicting information that EOA found for 2000 Oakland Avenue, it appears likely that any release at this site was small and localized. It does not appear that the minor release at LPFD Fire Station No. 3 impacted groundwater.

It appears unlikely that any of the remaining Possible Contaminating Activities identified (Appendix K and Appendix M) could impact the water quality from the Mocho Wells 1 – 3 well field. A wide range of activities are included in these DHS forms such as dry cleaners, sewer collection systems, housing, parks, above-ground storage tanks and machine shops. Any potential releases from such activities would not likely be extensive, and would generally occur at or near the ground surface. Furthermore, these wells are screened 150 feet or more below the ground surface, and there are several relatively impermeable clay layers between the surface and the screened aquifers.

D. REFERENCES

1. Drinking Water Source Assessment and Protection (DWSAP) Program, Division of Drinking Water and Environmental Management, California Department of Health Services, January 1999 (revised April 1999 and January 2000).

2. Plans and Specifications for Construction of Mocho Wells No. 3 and No. 4, Zone 7 Water Agency, January 2000.

3. Dublin San Ramon Services District, information provided by Fernando Lomas, March 2001.

4. Livermore – Pleasanton Fire Department, information provided by Danielle Stefani, February, 2001.

5. Alameda County Department of Environmental Health, information provided by Scott Seery, February, 2001.

6. Livermore – Pleasanton Fire Department, information provided by Julie Wyman, March, 2001.

7. California Regional Water Quality Control Board, San Francisco Bay Region, information provided by Tom Geisler, March 2001.

Appendix H
Drinking Water Source Location

Public Water System Name: Zone 7 Water Agency System No.: 0110010 *7-digit integer*

Name of source: Mocho Well No. 1 Source No.: _____ *3-digit integer*

or PS Code: 03S/01E-09M02 M *15 characters*

State Well Number: 3S/1E 9M2

Date: 3-15-01 Name of person completing form: Jon Konnan, EOA, Inc.

LOCATION OF WELL: (decimal degrees)

Latitude: 37.68647 *10-digit signed decimal (2.6) sample: 41.209483* Longitude: -121.87682 *11-digit signed decimal (2.6) sample: -121.573421*

Horizontal Datum:
- ( ) NAD27 (preferred)
- ( ) NAD83
- (x) WGS84
- ( ) Other: _____ *7 characters*
- ( ) Unknown

DESCRIPTION:
(e.g., plant entrance, well, intake, center of facility, etc. *Limit 50 characters.*): well

METHOD OF DETERMINING LOCATION:
(If your method is not listed choose "other" and describe on next page)

❑ **USGS quadrangle (topographic map)**

Coordinates were determined:
- ( ) Digitally (computer assisted)
- ( ) Manually

Scale:
- ( ) 1:24,000 (7.5 minute series)
- ( ) 1:62,500 (15 minute series)
- ( ) 1:100,000 (1 x 1/2 degree series)
- ( ) Other: _____

Year of map publication: _____

Year of map photorevision: _____

☐ **Global Positioning System (GPS)**

Unit (manufacturer/model): Garmin GPS III

Grade of GPS unit:
- (x) Recreational (e.g., Garmin)
- ( ) Mapping (e.g., Trimble Geo Explorer)
- ( ) Survey (e.g., CORS, carrier-phase)

Differential correction:
- ( ) Yes
- (x) No

☐ **Other Method**
- ( ) Cadastral survey
- ( ) Parcel map
- ( ) Address matching
- ( ) PLSS System
- ( ) Other: _____
- ( ) Unknown

Accuracy, if known: +/- _____ meters

Scale of data source, if known: 1: _____

Appendix H
Drinking Water Source Location

Public Water System Name: Zone 7 Water Agency System No.: 0110010
7-digit integer

Name of source: Mocho Well No. 2 Source No.: _____
3-digit integer

or PS Code: 03S/01E-09M03 M
15 characters

State Well Number: 3S/1E 9M3

Date: 3-15-2001 Name of person completing form: Jon Konnan, EOA, Inc.

LOCATION OF WELL: (decimal degrees)

Latitude: 37.685120 Longitude: -121.876470
10-digit signed decimal (2.6) sample: 41.209483 *11-digit signed decimal (2.6) sample: -121.573421*

Horizontal Datum:
( ) NAD27 (preferred)
( ) NAD83
(x) WGS84
( ) Other: _____
7 characters
( ) Unknown

DESCRIPTION:
(e.g., plant entrance, well, intake, center of facility, etc. *Limit 50 characters.*): well

METHOD OF DETERMINING LOCATION:
(If your method is not listed choose "other" and describe on next page)

❑ **USGS quadrangle (topographic map)**

Coordinates were determined:
( ) Digitally (computer assisted)
( ) Manually

Scale:
( ) 1:24,000 (7.5 minute series)
( ) 1:62,500 (15 minute series)
( ) 1:100,000 (1 x 1/2 degree series)
( ) Other: _____

Year of map publication: _____

Year of map photorevision: _____

☐ **Global Positioning System (GPS)**

Unit (manufacturer/model): Garmin GPS III

Grade of GPS unit:
- (x) Recreational (e.g., Garmin)
- ( ) Mapping (e.g., Trimble Geo Explorer)
- ( ) Survey (e.g., CORS, carrier-phase)

Differential correction:
- ( ) Yes
- (x) No

☐ **Other Method**
- ( ) Cadastral survey
- ( ) Parcel map
- ( ) Address matching
- ( ) PLSS System
- ( ) Other: _____
- ( ) Unknown

Accuracy, if known: +/- _____ meters

Scale of data source, if known: 1: _____

Appendix H
Drinking Water Source Location

Public Water System Name: Zone 7 Water Agency System No.: 0110010
7-digit integer

Name of source: Mocho Well No. 3 Source No.: _____
3-digit integer

or PS Code: 03S/01E-09M04 M
15 characters

State Well Number: 03S/01E-09M04

Date: 3-15-2001 Name of person completing form: Jon Konnan, EOA, Inc.

LOCATION OF WELL: (decimal degrees)

Latitude: 37.6870272 Longitude: -121.8769969
10-digit signed decimal (2.6) sample: 41.209483 *11-digit signed decimal (2.6) sample: -121.573421*

Horizontal Datum:
( ) NAD27 (preferred)
( ) NAD83
(x) WGS84
( ) Other: _____
7 characters
( ) Unknown

DESCRIPTION:
(e.g., plant entrance, well, intake, center of facility, etc. *Limit 50 characters.*): well

METHOD OF DETERMINING LOCATION:
(If your method is not listed choose "other" and describe on next page)

☐ **USGS quadrangle (topographic map)**

Coordinates were determined:
( ) Digitally (computer assisted)
( ) Manually

Scale:
( ) 1:24,000 (7.5 minute series)
( ) 1:62,500 (15 minute series)
( ) 1:100,000 (1 x 1/2 degree series)
( ) Other: _____

Year of map publication: _____

Year of map photorevision: _____

☐ **Global Positioning System (GPS)**

Unit (manufacturer/model): Garmin GPS III

Grade of GPS unit:
- (x) Recreational (e.g., Garmin)
- ( ) Mapping (e.g., Trimble Geo Explorer)
- ( ) Survey (e.g., CORS, carrier-phase)

Differential correction:
- ( ) Yes
- (x) No

☐ **Other Method**
- ( ) Cadastral survey
- ( ) Parcel map
- ( ) Address matching
- ( ) PLSS System
- ( ) Other: _____
- ( ) Unknown

Accuracy, if known: +/- _____ meters

Scale of data source, if known: 1: _____

Appendix I

Delineation of Ground Water Protection Zones

Public water system: Zone 7 Water Agency ID No.: 0110010

Name of source: Mocho Wells 1 – 3 Well Field

ID No.: 03S/01E-09M02 M, 03S/01E-09M03 M and 03S/01E-09M04 M

Delineation date: February, 2001 Delineation conducted by: EOA, Inc.

Indicate the method used to delineate the zones:

__X__ Calculated Fixed Radius (Default) (Show calculations below)

_____ Modified Calculated Fixed Radius (Show calculations below and attach documentation for direction of ground water flow)

_____ More detailed methods
Type used (i.e., analytical methods, hydrogeologic mapping, modeling):

_____ Arbitrary Fixed Radius (For use only by or with permission of DHS—use minimum distances shown below)

Calculated Fixed Radius Equation

The equation for the calculated fixed radius (R) is $R_t = \sqrt{Q t / \pi \eta H}$

$R_t = R_2$, R_5, or R_{10} corresponding to t (Calculate R for each of three times of travel, TOT)

Q = maximum pumping capacity of well field (ft^3/year = gpm * 70,267): 9.8 X 10^7 (Zone 7's projected maximum annual production from well field)

t = time of travel (years), 2, 5 and 10 years

$\pi = 3.1416$

η = effective porosity (decimal percent) (If unknown, assume 0.2):
0.18

H = screened interval of well (feet) (If unknown, assume 10% of Q gpm, 10 ft minimum):
180 (average screen length for Mocho 1, 2 and 3 weighted by well capacity: Mocho 1 – 300 ft/2300 gpm, Mocho 2 – 200 ft/2300 gpm, Mocho 3 – 100 ft/4000 gpm). This is in accordance with the December 2000 Source Water Assessment and Protection Update newsletter prepared by the California Department of Health Services, Drinking Water Technical Programs Branch.

Calculated Fixed Radius Delineation Method (Default)

Using the equation presented above, calculate the size of zones for the appropriate aquifer setting of the source.

Porous Media Aquifer

Zone A (2 year TOT) R_2 = 1388 ft, minimum = 600 ft —use larger: 1388 ft
Zone B5 (5 year TOT) R_5 = 2194 ft, minimum = 1,000 ft—use larger: 2194 ft
Zone B10 (10 year TOT) R_{10} = 3103 ft, minimum = 1,500 ft—use larger: 3103 ft

Fractured Rock Aquifer

(Increase size of zones by 50%)

Zone A (2 year TOT) $1.5R_2$ = _____ft, minimum = 900 ft—use larger: _____ft
Zone B5 (5 year TOT) $1.5R_5$ = _____ft, minimum = 1,500 ft—use larger: _____ft
Zone B10 (10 year TOT) $1.5R_{10}$ = _____ft, minimum = 2,250 ft—use larger: _____ft

Modified Calculated Fixed Radius Delineation Method

In porous media aquifers, if the direction of ground water flow is known (see Section 6.2.3), the default zone circle may be shifted upgradient by $0.5R_t$. The upgradient and downgradient limits of the zone are determined below.

Zone A (2-year TOT)

upgradient distance = $1.5R_2$ = _____ft, minimum = 900 ft, use larger: _____ft
downgradient distance = $0.5R_2$ = _____ft, minimum = 300 ft, use larger: _____ft

Zone B5 (5-year TOT)

upgradient distance = $1.5R_5$ = _____ft, minimum = 1,500 ft, use larger: _____ft
downgradient distance = $0.5R_5$ = _____ft, minimum = 500 ft, use larger: _____ft

Zone B10 (10-year TOT)

upgradient distance = $1.5R_{10}$ = _____ft, minimum = 2,250 ft, use larger: _____ft
downgradient distance = $0.5R_{10}$ = _____ft, minimum = 750 ft, use larger: _____ft

Appendix J

Physical Barrier Effectiveness Checklist and Well Data Sheet - Ground Water Source

Public water system: Zone 7 Water Agency ID No.: 0110010

Name of source: Mocho Wells 1 – 3 Well Field

ID No.: 03S/01E-09M02 M, 03S/01E-09M03 M and 03S/01E-09M04 M

Assessment date: March, 2001 Assessment conducted by: EOA, Inc.

Complete DHS Well Data Sheet (attached) and include with Assessment Report

Directions:

1. Read through the form and collect the information needed to complete the form. (Hydrogeology, Soils, Presence of abandoned or improperly destroyed wells, Well construction and operation.)

2. Determine Parameter A, Type of Aquifer.
   - If the aquifer is confined, use the right-hand column, and evaluate only the parameters indicated for confined aquifers.
   - If the aquifer is unconfined, semi-confined, or the degree of confinement is unknown, or if the aquifer is fractured rock, use the left-hand column and evaluate only the parameters for unconfined aquifers.

3. For each parameter appropriate for the source, place a check in the box for the answer that most closely applies to that source. If more than one answer is possible, select the more conservative (i.e. lower points) answer. *[For example, if the depth to static water (Parameter D) has varied between 45 and 55 feet, choose answer 2 (20 to 50 feet).]*

4. Add the points in the column appropriate for the source and interpret the score as shown on the bottom of the last page.
   - Determine whether the source has a High, Moderate or Low Physical Barrier Effectiveness. Use this in the Vulnerability analysis. The higher the points, generally the more effective the source and site are to retarding the movement of contaminants to the water supply.

NOTE: If the source is located in fractured rock the source is considered to have a Low Physical Barrier Effectiveness, regardless of the point total. So, if Parameter B, Aquifer Material is 3, the remainder of the form does not need to be completed.

Physical Barrier Effectiveness (PBE) – Ground Water, page 1 of 2

Name of source: Mocho Well No. 1 ID No.: 03S/01E-09M02 M

PARAMETER	*POINTS*			
	Unconfined		Confined	
A. TYPE OF AQUIFER Confinement *(up to 50 points maximum)* choose one				
a. Unconfined, Semi-confined, Fractured Rock, Unknown	0	X		
b. Confined			50	
B. AQUIFER MATERIAL (Unconfined Aquifer) Type of materials within the aquifer *(up to 20 points maximum)* choose one				
1. Porous Media (Interbedded sands, silts, clays, gravels) with continuous clay layer minimum 25' thick above water table within Zone A	20	X		
2. Porous Media (Interbedded sands, silts, clays, and gravels)	10			
3. Fractured rock * (* Low Physical Barrier Effectiveness - no further questions required)	0			
C. PATHWAYS OF CONTAMINATION (All Aquifers) Presence of Abandoned or Improperly Destroyed Wells *(up to 10 points maximum)*				
1. Are they present within Zone A (2-year time of travel (TOT) distance)?				
a. Yes or unknown	0	X	0	
b. No	5		5	
2. Are they present within Zone B5 (2- to 5-year TOT distance)?				
a. Yes or unknown	0	X	0	
b. No	3		3	
3. Are they present within Zone B10 (5- to 10-year TOT distance)?				
a. Yes or unknown	0	X	0	
b. No	2		2	
D. STATIC WATER CONDITIONS (Unconfined Aquifer) Depth to static Water (DTW) = 92 feet *(up to 10 points maximum)* choose one				
1. 0 to 20 feet	0			
2. 20 to 50 feet	2			
3. 50 to 100 feet	6	X		
4. > 100 feet	10			
E. WELL OPERATION (Unconfined Aquifer) Depth to Uppermost Perforations (DUP) DUP = 150 feet; Maximum Pumping Rate of Well (Q) Q = 2300 gallons/minute; Length of screened interval (H) H = 300 feet				
[(DUP – DTW) / (Q/H)] = 7.6 *(up to 10 points maximum)* choose one				
1. < 5	0			
2. 5 to 10	5	X		
3. > 10	10			

Physical Barrier Effectiveness – Ground Water, page 2 of 2

Name of source: Mocho Well No. 1 ID No.: 03S/01E-09M02 M

PARAMETER	*POINTS*			
	Unconfined		Confined	
F. HYDRAULIC HEAD (Confined Aquifer) What is the relationship in hydraulic head between the confined aquifer and the overlying unconfined aquifer? (i.e. does the well flow under artesian conditions?) *(up to 20 points maximum)* choose one				
1. head in confined aquifer is higher than head in unconfined aquifer under all conditions			20	
2. head in confined aquifer is higher than head in unconfined aquifer under static conditions			10	
3. head in confined aquifer is lower than or same as head in unconfined aquifer			0	
4. unknown			0	
G. WELL CONSTRUCTION (All Aquifers) 1. Sanitary Seal (Annular Seal) Depth = 45 feet *(up to 10 points maximum)* choose one				
a. None or less than 20 feet deep	0		0	
b. 20 to 50 ft deep	6	X	10	
c. 50 ft or greater	10		10	
2. Surface seal (concrete cap) *(up to 4 points maximum)* choose one				
a. Not present or improperly constructed	0		0	
b. Watertight, slopes away from well, at least 2' laterally in all directions	4	X	4	
3. Flooding potential at well site *(up to 1 point maximum)* choose one				
a. Subject to localized flooding (i.e. in low area or unsealed pit or vault) or Within 100 year flood plain	0		0	
b. Not subject to flooding	1	X	1	
4. Security at well site *(up to 5 points maximum)* choose one				
a. Not secure	0		0	
b. Secure (i.e. housing, fencing, etc.)	5	X	5	
Maximum Points Possible	70		100	
POINT TOTAL FOR THIS SOURCE	47			

Physical Barrier Effectiveness SCORE INTERPRETATION

	Point Total		Effectiveness	
____	0 to 35	=	**Low**	(includes all sources in Fractured Rock)
X	36 to 69	=	**Moderate**	
____	70 to 100	=	**High**	

Physical Barrier Effectiveness (PBE) – Ground Water, page 1 of 2
Name of source: Mocho Well No. 2 ID No.: 03S/01E-09M03 M

PARAMETER	*POINTS*			
	Unconfined		Confined	
A. TYPE OF AQUIFER Confinement *(up to 50 points maximum)* choose one				
c. Unconfined, Semi-confined, Fractured Rock, Unknown	0	X		
d. Confined			50	
B. AQUIFER MATERIAL (Unconfined Aquifer) Type of materials within the aquifer *(up to 20 points maximum)* choose one				
4. Porous Media (Interbedded sands, silts, clays, gravels) with continuous clay layer minimum 25' thick above water table within Zone A	20	X		
5. Porous Media (Interbedded sands, silts, clays, and gravels)	10			
6. Fractured rock * (* Low Physical Barrier Effectiveness - no further questions required)	0			
C. PATHWAYS OF CONTAMINATION (All Aquifers) Presence of Abandoned or Improperly Destroyed Wells *(up to 10 points maximum)*				
4. Are they present within Zone A (2-year time of travel (TOT) distance)?				
a. Yes or unknown	0	X	0	
b. No	5		5	
5. Are they present within Zone B5 (2- to 5-year TOT distance)?				
a. Yes or unknown	0	X	0	
b. No	3		3	
6. Are they present within Zone B10 (5- to 10-year TOT distance)?				
a. Yes or unknown	0	X	0	
b. No	2		2	
D. STATIC WATER CONDITIONS (Unconfined Aquifer) Depth to static Water (DTW) = 98 feet *(up to 10 points maximum)* choose one				
5. 0 to 20 feet	0			
6. 20 to 50 feet	2			
7. 50 to 100 feet	6	X		
8. > 100 feet	10			
E. WELL OPERATION (Unconfined Aquifer) Depth to Uppermost Perforations (DUP) DUP = 250 feet; Maximum Pumping Rate of Well (Q) Q = 2300 gallons/minute; Length of screened interval (H) H = 200 feet				
[(DUP – DTW) / (Q/H)] = 13.2 *(up to 10 points maximum)* choose one				
4. < 5	0			
5. 5 to 10	5			
6. > 10	10	X		

Physical Barrier Effectiveness – Ground Water, page 2 of 2
Name of source: Mocho Well No. 2 ID No.: 03S/01E-09M03 M

PARAMETER	*POINTS*			
	Unconfined		Confined	
F. HYDRAULIC HEAD (Confined Aquifer) What is the relationship in hydraulic head between the confined aquifer and the overlying unconfined aquifer? (i.e. does the well flow under artesian conditions?) *(up to 20 points maximum)* choose one				
5. head in confined aquifer is higher than head in unconfined aquifer under all conditions			20	
6. head in confined aquifer is higher than head in unconfined aquifer under static conditions			10	
7. head in confined aquifer is lower than or same as head in unconfined aquifer			0	
8. unknown			0	
G. WELL CONSTRUCTION (All Aquifers) 5. Sanitary Seal (Annular Seal) Depth = 147 feet *(up to 10 points maximum)* choose one				
a. None or less than 20 feet deep	0		0	
b. 20 to 50 ft deep	6		10	
c. 50 ft or greater	10	X	10	
6. Surface seal (concrete cap) *(up to 4 points maximum)* choose one				
a. Not present or improperly constructed	0		0	
b. Watertight, slopes away from well, at least 2' laterally in all directions	4	X	4	
7. Flooding potential at well site *(up to 1 point maximum)* choose one				
a. Subject to localized flooding (i.e. in low area or unsealed pit or vault) or Within 100 year flood plain	0		0	
b. Not subject to flooding	1	X	1	
8. Security at well site *(up to 5 points maximum)* choose one				
a. Not secure	0		0	
b. Secure (i.e. housing, fencing, etc.)	5	X	5	
Maximum Points Possible	70		100	
POINT TOTAL FOR THIS SOURCE	**56**			

Physical Barrier Effectiveness SCORE INTERPRETATION

Point Total		Effectiveness	
_____0 to 35	=	**Low**	(includes all sources in Fractured Rock)
_X_ 36 to 69	=	**Moderate**	
_____70 to 100	=	**High**	

Physical Barrier Effectiveness – Ground Water, page 2 of 2
Name of source: Mocho Well No. 3 ID No.: 03S/01E-09M04 M

PARAMETER	*POINTS*			
	Unconfined		Confined	
F. HYDRAULIC HEAD (Confined Aquifer) What is the relationship in hydraulic head between the confined aquifer and the overlying unconfined aquifer? (i.e. does the well flow under artesian conditions?) *(up to **20** points maximum)* choose one				
9. head in confined aquifer is higher than head in unconfined aquifer under all conditions			20	
10. head in confined aquifer is higher than head in unconfined aquifer under static conditions			10	
11. head in confined aquifer is lower than or same as head in unconfined aquifer			0	
12. unknown			0	
G. WELL CONSTRUCTION (All Aquifers) 9. Sanitary Seal (Annular Seal) Depth = 267 feet *(up to **10** points maximum)* choose one				
a. None or less than 20 feet deep	0		0	
b. 20 to 50 ft deep	6		10	
c. 50 ft or greater	10	X	10	
10. Surface seal (concrete cap) *(up to 4 points maximum)* choose one				
a. Not present or improperly constructed	0		0	
b. Watertight, slopes away from well, at least 2' laterally in all directions	4	X	4	
11. Flooding potential at well site *(up to 1 point maximum)* choose one				
a. Subject to localized flooding (i.e. in low area or unsealed pit or vault) or Within 100 year flood plain	0		0	
b. Not subject to flooding	1	X	1	
12. Security at well site *(up to 5 points maximum)* choose one				
a. Not secure	0		0	
b. Secure (i.e. housing, fencing, etc.)	5	X	5	
Maximum Points Possible	70		100	
POINT TOTAL FOR THIS SOURCE	51			

Physical Barrier Effectiveness SCORE INTERPRETATION

Point Total		Effectiveness	
____ 0 to 35	=	**Low**	(includes all sources in Fractured Rock)
X 36 to 69	=	**Moderate**	
____ 70 to 100	=	**High**	

Physical Barrier Effectiveness (PBE) – Ground Water, page 1 of 2
Name of source: Mocho Well No. 3 ID No.: 03S/01E-09M04 M

PARAMETER	*POINTS*			
	Unconfined		Confined	
A. TYPE OF AQUIFER Confinement *(up to 50 points maximum)* choose one				
e. Unconfined, Semi-confined, Fractured Rock, Unknown	0	X		
f. Confined			50	
B. AQUIFER MATERIAL (Unconfined Aquifer) Type of materials within the aquifer *(up to 20 points maximum)* choose one				
7. Porous Media (Interbedded sands, silts, clays, gravels) with continuous clay layer minimum 25' thick above water table within Zone A	20	X		
8. Porous Media (Interbedded sands, silts, clays, and gravels)	10			
9. Fractured rock * (* Low Physical Barrier Effectiveness - no further questions required)	0			
C. PATHWAYS OF CONTAMINATION (All Aquifers) Presence of Abandoned or Improperly Destroyed Wells *(up to 10 points maximum)*				
7. Are they present within Zone A (2-year time of travel (TOT) distance)?				
a. Yes or unknown	0	X	0	
b. No	5		5	
8. Are they present within Zone B5 (2- to 5-year TOT distance)?				
a. Yes or unknown	0	X	0	
b. No	3		3	
9. Are they present within Zone B10 (5- to 10-year TOT distance)?				
a. Yes or unknown	0	X	0	
b. No	2		2	
D. STATIC WATER CONDITIONS (Unconfined Aquifer) Depth to static Water (DTW) = 95 feet *(up to 10 points maximum)* choose one				
9. 0 to 20 feet	0			
10. 20 to 50 feet	2			
11. 50 to 100 feet	6	X		
12. > 100 feet	10			
E. WELL OPERATION (Unconfined Aquifer) Depth to Uppermost Perforations (DUP) DUP = 315 feet; Maximum Pumping Rate of Well (Q) Q = 4000 gallons/minute; Length of screened interval (H) H = 100 feet; [(DUP – DTW) / (Q/H)] = 5.5 *(up to 10 points maximum)* choose one				
7. < 5	0			
8. 5 to 10	5	X		
9. > 10	10			

WELL DATA SHEET (Page 1)

Complete as much information as possible. Leave blank if information is not available, use N.A. if not applicable.
** Indicates items required for Source Water Assessment*
*** Indicates additional items required for assessments and Ground Water Rule*

	(separate multiple entries in field with semi-colon)	Actual, Estimated or Default?
DATA SHEET GENERAL INFORMATION		
System Name	Zone 7 Water Agency	
System Number	0110010	
Source of Information *(well log, DHS/County files, system, etc)*	Well log[1] and Zone 7 staff	
Organization Collecting Information *(DHS, County, System, other)*	Zone 7 Water Agency and EOA, Inc. (Zone 7's consultant)	
Date Information Collected/Updated	May-01	
WELL IDENTIFICATION		
* Well Number or Name	Mocho Well No. 1	
* DHS Source Identification Number (PS Code)	03S/01E-09M02 M	
DWR Well Log on File? ("YES" or "NO")	YES	
State Well Number (from DWR)	3S/1E 9M2	
Well Status (Active, Standby, Inactive)	Active	Actual
WELL LOCATION		
Latitude	37.68647	Estimated via GPS
Longitude	-121.87682	Estimated via GPS
Ground Surface Elevation (ft above Mean Sea Level)	340	Estimated
Street Address	2722 Santa Rita Rd.	
Nearest Cross Street	Sutter Gate Ave.	
City	Pleasanton	
County	Alameda	
* Neighborhood/Surrounding Area *(see Note 1)*	Re; Co	
Site plan on file? ("YES" or "NO")	YES	
DWR Ground Water Basin	Livermore - Amador Valley	
DWR Ground Water Sub-basin	Amador	
SANITARY CONDITIONS		
** Distance to closest Sewer Line, Sewage Disposal, Septic Tank (ft)	200	Estimated
Distance to Active Wells (ft)	600	Actual
Distance to Abandoned Wells (ft)	1140 ft-8H5	
Distance to Surface Water (ft)	1200	Actual
** Size of controlled area around well (square feet)	6500	Actual

WELL DATA SHEET (Page 2)

Complete as much information as possible. Leave blank if information is not available, use N.A. if not applicable.
** Indicates items required for Source Water Assessment*
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	(separate multiple entries in field with semi-colon)	Actual, Estimated or Default?
* Type of access control to well site *(fencing, building, etc)*	gated fence, locked building	
* Surface Seal? (Concrete slab)("YES", "NO" or "UNKNOWN")	YES	
* Dimensions of concrete slab: Length(ft)/ Width(ft)/ Thick(in)	15'x20'x6"	
* Within 100 year flood plain? ("YES", "NO" or "UNKNOWN")	NO	
* Drainage away from well? ("YES" or "NO")	YES	
ENCLOSURE/HOUSING		
Enclosure Type *(building, vault, none, etc.)*	concrete block building	
Floor material	concrete	
Located in Pit? ("YES" or "NO")	NO	
Pit depth (feet) (if applicable)	N.A.	
WELL CONSTRUCTION		
Date drilled	February - April 1964	Actual
Drilling Method	rotary	Actual
Depth of Bore Hole (feet below ground surface)	515	
Casing Beginning Depth/Ending Depth(ft below surface); 2nd Casing Beginning Depth/Ending Depth; 3rd Casing, etc.	0/45; 0/530	Actual
Casing Diameter (inches); 2nd Casing Diameter; 3rd Casing, etc.	30; 16	Actual
Casing Material; 2nd Casing Material; 3rd Casing, etc.	steel; steel	Actual
Conductor casing used? ("YES", "NO" or "UNKNOWN") *(See Note 2)*	YES	
Conductor casing removed? ("YES", "NO" or "UNKNOWN")	NO	
* Depth to highest perforations/screens (ft below surface) (or "UNKNOWN")	150	Actual
Screened Interval Beginning Depth/Ending Depth (ft below surface); 2nd Screened Interval Beg. Depth/Ending Depth; 3rd Screened Interval, etc.	150/270; 330/510	Actual
* Total length of screened interval (ft) *(default = 10% pump capacity in gpm)* (or "UNKNOWN")	300	Actual
* Annular Seal?("YES", "NO" or "UNKNOWN") *(See Note 3)*	YES	Actual
* Depth of Annular Seal (ft)	45	Actual
Material of Annular Seal *(cement grout, bentonite, etc.)*	cement	Actual
Gravel pack, Depth to top (ft below ground surface)	0	Actual
Total length of gravel pack (ft)	530	Actual
AQUIFER		
* Aquifer Materials *(list all that apply: sand, silt, clay, gravel, rock, fractured rock)*	sand, gravel, boulders, clay	Actual

WELL DATA SHEET (Page 3)

Complete as much information as possible. Leave blank if information is not available, use N.A. if not applicable.

** Indicates items required for Source Water Assessment*

*** Indicates additional items required for assessments and Ground Water Rule*

	(separate multiple entries in field with semi-colon)	Actual, Estimated or Default?
* Effective porosity (decimal percent) *(default = 0.2)* (or "UNKNOWN")	0.18	Estimated
* Confining layer (Impervious Strata) above aquifer? ("YES", "NO" or "UNKNOWN")	YES	Actual
Thickness of confining layer, if known (ft)	47 (uppermost clay layer)	Actual
Depth to confining layer, if known (ft below ground)	8	Actual
* Static water level (ft below ground surface)	92	Actual
Static water level measurement: Date/Method	Nov 2000/Power's well sounder	Actual
Pumping water level (ft below ground surface)		Actual
Pumping water level measurement: Date/Method		Actual
WELL PRODUCTION		
Well Yield (gpm)	2300	Actual
Well Yield Based On (i.e., pump test, etc.)	Pump Operation	Actual
Date measured		Actual
Is the well metered? ("YES" or "NO")		
Production (gallons per year)	201,480,000 (projected)[2]	Estimated
Frequency of Use (hours/year)	1460 (projected)[3]	Estimated
Typical pumping duration (hours/day)	zero to 24	Estimated
PUMP		
Make	Layne and Bowler	
Type	14 RM	
Size (hp)	300	
* Capacity (gpm)	2300	Estimated
Depth to suction intake (ft below ground surface)	228	Estimated
Lubrication Type	oil lubrication	
Type of Power: *(i.e., electric, diesel, etc.)*	electric	
Auxiliary power available? ("YES" or "NO")	YES	
Operation controlled by: *(i.e., level in tank, pressure, etc.)*	Operator Assessment of Demand, SCADA	
Pump to Waste capability? ("YES" or "NO")	YES	
Discharges to: *(i.e., distribution system, storage, etc:)*	Distribution System	

Complete as much information as possible. Leave blank if information is not available, use N.A. if not applicable.
** Indicates items required for Source Water Assessment*
*** Indicates additional items required for assessments and Ground Water Rule*

	(separate multiple entries in field with semi-colon)	Actual, Estimated or Default?

NOTES

1. Neighborhood/Surrounding Area (list all that apply): A= Agricultural, Ru = Rural, Re = Residential, Co = Commercial,
I = Industrial, Mu = Municipal, P = Pristine, O = Other
2. Conductor Casing - Oversized casing used to stabilize bore hole during well construction. Should be removed during installation of annular seal.
3. Annular Seal - Seal of grout in the space between the well casing and the wall of the drilled hole. Sometimes called "sanitary seal".

[1]Water Well Drillers Report filed with California Department of Water Resources.

[2]Gallons per year calculation (assumes well is pumped 2 months per year at 2300 gpm):

2300 gal/min * 60 min/hour * 24 hours/day * 365 days/year * (2/12) = 201,480,000

[3]Hours per year calculation (assumes well is pumped 2 months per year):

24 hours/day * 365 days/year * (2/12)= 1,460

WELL DATA SHEET (Page 1)

Complete as much information as possible. Leave blank if information is not available, use N.A. if not applicable.
** Indicates items required for Source Water Assessment*
*** Indicates additional items required for assessments and Ground Water Rule*

	(separate multiple entries in field with semi-colon)	Actual, Estimated or Default?
DATA SHEET GENERAL INFORMATION		
System Name	Zone 7 Water Agency	
System Number	0110010	
Source of Information *(well log, DHS/County files, system, etc)*	Well log[1] and Zone 7 staff	
Organization Collecting Information *(DHS, County, System, other)*	Zone 7 Water Agency and EOA, Inc. (Zone 7's consultant)	
Date Information Collected/Updated	May-01	
WELL IDENTIFICATION		
* Well Number or Name	Mocho Well No. 2	
* DHS Source Identification Number (PS Code)	03S/01E-09M03 M	
DWR Well Log on File? ("YES" or "NO")	YES	
State Well Number (from DWR)	3S/1E 9M3	
Well Status (Active, Standby, Inactive)	Active	
WELL LOCATION		
Latitude	37.68512	Estimated via GPS
Longitude	-121.87647	Estimated via GPS
Ground Surface Elevation (ft above Mean Sea Level)	340	Estimated
Street Address	2552 Santa Rita Rd.	
Nearest Cross Street	Sutter Gate Ave.	
City	Pleasanton	
County	Alameda	
* Neighborhood/Surrounding Area *(see Note 1)*	Re; Co	
Site plan on file? ("YES" or "NO")	YES	
DWR Ground Water Basin	Livermore - Amador Valley	
DWR Ground Water Sub-basin	Amador	
SANITARY CONDITIONS		
** Distance to closest Sewer Line, Sewage Disposal, Septic Tank (ft)	200	Estimated
Distance to Active Wells (ft)	700	Actual
Distance to Abandoned Wells (ft)	1130 ft-9P1,750 ft-8R1	
Distance to Surface Water (ft)	1900	Actual
** Size of controlled area around well (square feet)	14850	Actual
* Type of access control to well site *(fencing, building, etc)*	gated fence, locked building	

WELL DATA SHEET (Page 2)

Complete as much information as possible. Leave blank if information is not available, use N.A. if not applicable.
** Indicates items required for Source Water Assessment*
*** Indicates additional items required for assessments and Ground Water Rule*

	(separate multiple entries in field with semi-colon)	Actual, Estimated or Default?
* Surface Seal? (Concrete slab)("YES", "NO" or "UNKNOWN")	YES	
* Dimensions of concrete slab: Length(ft)/ Width(ft)/ Thick(in)	10'x12'x4"	
* Within 100 year flood plain? ("YES", "NO" or "UNKNOWN")	NO	
* Drainage away from well? ("YES" or "NO")	YES	
ENCLOSURE/HOUSING		
Enclosure Type *(building, vault, none, etc.)*	wood framed building	
Floor material	concrete	
Located in Pit? ("YES" or "NO")	NO	
Pit depth (feet) (if applicable)	N.A.	
WELL CONSTRUCTION		
Date drilled	completed February 1967	Actual
Drilling Method	rotary	Actual
Depth of Bore Hole (feet below ground surface)	615	
Casing Beginning Depth/Ending Depth(ft below surface); 2nd Casing Beginning Depth/Ending Depth; 3rd Casing, etc.	0/150; 0/575	Actual
Casing Diameter (inches); 2nd Casing Diameter; 3rd Casing, etc.	32; 18	Actual
Casing Material; 2nd Casing Material; 3rd Casing, etc.	steel; steel	Actual
Conductor casing used? ("YES", "NO" or "UNKNOWN") *(See Note 2)*	YES	
Conductor casing removed? ("YES", "NO" or "UNKNOWN")	NO	
* Depth to highest perforations/screens (ft below surface) (or "UNKNOWN")	250	Actual
Screened Interval Beginning Depth/Ending Depth (ft below surface); 2nd Screened Interval Beg. Depth/Ending Depth; 3rd Screened Interval, etc.	250/330; 450/570	Actual
* Total length of screened interval (ft) *(default = 10% pump capacity in gpm)* (or "UNKNOWN")	200	Actual
* Annular Seal?("YES", "NO" or "UNKNOWN") *(See Note 3)*	YES	Actual
* Depth of Annular Seal (ft)	147	Actual
Material of Annular Seal *(cement grout, bentonite, etc.)*	cement grout	Actual
Gravel pack, Depth to top (ft below ground surface)	0	Actual
Total length of gravel pack (ft)	575	Actual
AQUIFER		
* Aquifer Materials *(list all that apply: sand, silt, clay, gravel, rock, fractured rock)*	sand, gravel, boulders, clay	Actual

WELL DATA SHEET (Page 3)

Complete as much information as possible. Leave blank if information is not available, use N.A. if not applicable.
** Indicates items required for Source Water Assessment*
*** Indicates additional items required for assessments and Ground Water Rule*

	(separate multiple entries in field with semi-colon)	Actual, Estimated or Default?
* Effective porosity (decimal percent) *(default = 0.2)* (or "UNKNOWN")	0.18	Estimated
* Confining layer (Impervious Strata) above aquifer? ("YES", "NO" or "UNKNOWN")	YES	Actual
Thickness of confining layer, if known (ft)	23 (uppermost clay layer)	Actual
Depth to confining layer, if known (ft below ground)	18	Actual
* Static water level (ft below ground surface)	98	Actual
Static water level measurement: Date/Method	Nov 2000/Power's well sounder	Actual
Pumping water level (ft below ground surface)		Actual
Pumping water level measurement: Date/Method		Actual
WELL PRODUCTION		
Well Yield (gpm)	2300	Actual
Well Yield Based On (i.e., pump test, etc.)	Pump Operation	Actual
Date measured		Actual
Is the well metered? ("YES" or "NO")		
Production (gallons per year)	201,480,000 (projected)[2]	Estimated
Frequency of Use (hours/year)	1460 (projected)[3]	Estimated
Typical pumping duration (hours/day)	zero to 24	Estimated
PUMP		
Make	Layne and Bowler	
Type	14 TLC	
Size (hp)	250	
* Capacity (gpm)	2300	Estimated
Depth to suction intake (ft below ground surface)	229'	Estimated
Lubrication Type	oil lubrication	
Type of Power: *(i.e., electric, diesel, etc.)*	electric	
Auxiliary power available? ("YES" or "NO")	YES	
Operation controlled by: *(i.e., level in tank, pressure, etc.)*	Operator Assessment of Demand, SCADA	
Pump to Waste capability? ("YES" or "NO")	NO, Recirculates to GW Basin	
Discharges to: *(i.e., distribution system, storage, etc.)*	Distribution System	

WELL DATA SHEET (Page 4)

Complete as much information as possible. Leave blank if information is not available, use N.A. if not applicable.

** Indicates items required for Source Water Assessment*

*** Indicates additional items required for assessments and Ground Water Rule*

	(separate multiple entries in field with semi-colon)	Actual, Estimated or Default?

NOTES

1. Neighborhood/Surrounding Area (list all that apply): A= Agricultural, Ru = Rural, Re = Residential, Co = Commercial,
   I = Industrial, Mu = Municipal, P = Pristine, O = Other
2. Conductor Casing - Oversized casing used to stabilize bore hole during well construction. Should be removed during installation of annular seal.
3. Annular Seal - Seal of grout in the space between the well casing and the wall of the drilled hole. Sometimes called "sanitary seal".

[1]Water Well Drillers Report filed with California Department of Water Resources.

[2]Gallons per year calculation (assumes well is pumped 2 months per year at 2300 gpm):

2300 gal/min * 60 min/hour * 24 hours/day * 365 days/year * (2/12) = 201,480,000

[3]Hours per year calculation (assumes well is pumped 2 months per year):

24 hours/day * 365 days/year * (2/12)= 1,460

WELL DATA SHEET (Page 1)

Complete as much information as possible. Leave blank if information is not available, use N.A. if not applicable.
** Indicates items required for Source Water Assessment*
*** Indicates additional items required for assessments and Ground Water Rule*

	(separate multiple entries in field with semi-colon)	Actual, Estimated or Default?
DATA SHEET GENERAL INFORMATION		
System Name	Zone 7 Water Agency	
System Number	0110010	
Source of Information *(well log, DHS/County files, system, etc)*	Well plans[1] and Zone 7 staff	
Organization Collecting Information *(DHS, County, System, other)*	Zone 7 Water Agency and EOA, Inc. (Zone 7's consultant)	
Date Information Collected/Updated	May-01	
WELL IDENTIFICATION		
* Well Number or Name	Mocho Well No. 3	
* DHS Source Identification Number (PS Code)	03S/01E-09M04 M	
DWR Well Log on File? ("YES" or "NO")	YES	
State Well Number (from DWR)	03S/01E-09M04	
Well Status (Active, Standby, Inactive)	Inactive	
WELL LOCATION		
Latitude	37.6870272	Estimated via GPS
Longitude	-121.8769969	Estimated via GPS
Ground Surface Elevation (ft above Mean Sea Level)	340	Estimated
Street Address	Santa Rita Rd.	
Nearest Cross Street	Stoneridge Dr.	
City	Pleasanton	
County	Alameda	
* Neighborhood/Surrounding Area *(see Note 1)*	Re; Co	
Site plan on file? ("YES" or "NO")	YES	
DWR Ground Water Basin	Livermore - Amador Valley	
DWR Ground Water Sub-basin	Amador	
SANITARY CONDITIONS		
** Distance to closest Sewer Line, Sewage Disposal, Septic Tank (ft)	100	Estimated
Distance to Active Wells (ft)	500	Actual
Distance to Abandoned Wells (ft)	460-8H5	
Distance to Surface Water (ft)	700	Actual
** Size of controlled area around well (square feet)	1160	Actual
* Type of access control to well site *(fencing, building, etc)*	locked building	

WELL DATA SHEET (Page 2)

Complete as much information as possible. Leave blank if information is not available, use N.A. if not applicable.

** Indicates items required for Source Water Assessment*

*** Indicates additional items required for assessments and Ground Water Rule*

	(separate multiple entries in field with semi-colon)	Actual, Estimated or Default?
* Surface Seal? (Concrete slab)("YES", "NO" or "UNKNOWN")	YES	
* Dimensions of concrete slab: Length(ft)/ Width(ft)/ Thick(in)	((38'x25')+(15'x14'))x6"	
* Within 100 year flood plain? ("YES", "NO" or "UNKNOWN")	NO	
* Drainage away from well? ("YES" or "NO")	YES	
ENCLOSURE/HOUSING		
Enclosure Type *(building, vault, none, etc.)*	split-face block building	
Floor material	concrete	
Located in Pit? ("YES" or "NO")	NO	
Pit depth (feet) (if applicable)	N.A.	
WELL CONSTRUCTION		
Date drilled	August, 2000	Actual
Drilling Method	rotary	Actual
Depth of Bore Hole (feet below ground surface)	533	Actual
Casing Beginning Depth/Ending Depth(ft below surface); 2nd Casing Beginning Depth/Ending Depth; 3rd Casing, etc.	0/15; 0/103; -2/498	Actual
Casing Diameter (inches); 2nd Casing Diameter; 3rd Casing, etc.	48; 36; 20	Actual
Casing Material; 2nd Casing Material; 3rd Casing, etc.	steel; steel; stainless steel	Actual
Conductor casing used? ("YES", "NO" or "UNKNOWN") *(See Note 2)*	YES	
Conductor casing removed? ("YES", "NO" or "UNKNOWN")	NO	
* Depth to highest perforations/screens (ft below surface) (or "UNKNOWN")	315	Actual
Screened Interval Beginning Depth/Ending Depth (ft below surface); 2nd Screened Interval Beg. Depth/Ending Depth; 3rd Screened Interval, etc.	315/335; 355/410; 468/493	Actual
* Total length of screened interval (ft) *(default = 10% pump capacity in gpm)* (or "UNKNOWN")	100	Actual
* Annular Seal?("YES", "NO" or "UNKNOWN") *(See Note 3)*	YES	Actual
* Depth of Annular Seal (ft)	267	Actual
Material of Annular Seal *(cement grout, bentonite, etc.)*	sand/cement grout	Actual
Gravel pack, Depth to top (ft below ground surface)	267	Actual
Total length of gravel pack (ft)	233	Actual
AQUIFER		
* Aquifer Materials *(list all that apply: sand, silt, clay, gravel, rock, fractured rock)*	sand, gravel, clay, silt	Actual

Complete as much information as possible. Leave blank if information is not available, use N.A. if not applicable.

** Indicates items required for Source Water Assessment*

*** Indicates additional items required for assessments and Ground Water Rule*

	(separate multiple entries in field with semi-colon)	Actual, Estimated or Default?
* Effective porosity (decimal percent) *(default = 0.2)* (or "UNKNOWN")	0.18	Estimated
* Confining layer (Impervious Strata) above aquifer? ("YES", "NO" or "UNKNOWN")	YES	Actual
Thickness of confining layer, if known (ft)	49 (uppermost clay layer)	Actual
Depth to confining layer, if known (ft below ground)	0	Actual
* Static water level (ft below ground surface)	92 - 99	Actual
Static water level measurement: Date/Method	March 2001/pressure transducer	Actual
Pumping water level (ft below ground surface)	165	Actual
Pumping water level measurement: Date/Method	March, 2001/Transducer	Actual
WELL PRODUCTION		
Well Yield (gpm)	4000	Estimated
Well Yield Based On (i.e., pump test, etc.)	PUMP TEST	Actual
Date measured	February, 2001	Actual
Is the well metered? ("YES" or "NO")	YES	
Production (gallons per year)	350,400,000 (projected)[2]	Estimated
Frequency of Use (hours/year)	1,460 (projected)[3]	Estimated
Typical pumping duration (hours/day)	zero to 24	Estimated
PUMP		
Make	Floway	
Type	16 DKH	
Size (hp)	600	
* Capacity (gpm)	4900	Estimated
Depth to suction intake (ft below ground surface)	420	Estimated
Lubrication Type	Water Lubrication	
Type of Power: *(i.e., electric, diesel, etc.)*	Electric	
Auxiliary power available? ("YES" or "NO")	NO	
Operation controlled by: *(i.e., level in tank, pressure, etc.)*	Operator Assessment of Demand, SCADA	
Pump to Waste capability? ("YES" or "NO")	YES	
Discharges to: *(i.e., distribution system, storage, etc.)*	Distributiuon System	

Complete as much information as possible. Leave blank if information is not available, use N.A. if not applicable.
** Indicates items required for Source Water Assessment*
*** Indicates additional items required for assessments and Ground Water Rule*

	(separate multiple entries in field with semi-colon)	Actual, Estimated or Default?

NOTES

1. Neighborhood/Surrounding Area (list all that apply): A= Agricultural, Ru = Rural, Re = Residential, Co = Commercial,
I = Industrial, Mu = Municipal, P = Pristine, O = Other
2. Conductor Casing - Oversized casing used to stabilize bore hole during well construction. Should be removed during installation of annular seal.
3. Annular Seal - Seal of grout in the space between the well casing and the wall of the drilled hole. Sometimes called "sanitary seal".

[1]Plans and Specifications for Construction of Mocho Wells No. 3 and No. 4, Zone 7 Water Agency, January 2000.

[2]**Gallons per year calculation (assumes well is pumped 2 months per year at 4000 gpm):**

4000 gal/min * 60 min/hour * 24 hours/day * 365 days/year * (2/12) = 350,400,000

[3]Hours per year calculation (assumes well is pumped 2 months per year):

24 hours/day * 365 days/year * (2/12)= 1,460

Appendix K

Possible Contaminating Activities (PCA) Inventory Form

Ground Water Source

Public water system: Zone 7 Water Agency ID No.: 0110010

Name of source: Mocho Wells 1 – 3 Well Field

ID No.: 03S/01E-09M02 M, 03S/01E-09M03 M and 03S/01E-09M04 M

Inventory date: March 2001 Inventory conducted by: EOA, Inc. and Zone 7 Water Agency

Indicate PCAs pertinent to the drinking water source, its source area and protection zones, from the following tables, as applicable:

Commercial/Industrial (Table K-1) X

Residential/Municipal (Table K-2) X

Agricultural/Rural (Table K-3) N.A.

Other (required for all) (Table K-4) X

Is this for a ground water recharge area? NO. (If YES, also use Appendix D, Tables D-1 through D-4, as appropriate)

Attach map of Drinking Water Source with Zones A, B5 and B10 indicated, and buffer zones (if defined).

Attached

Proceed to appropriate checklist or checklists. Place a mark in the appropriate boxes. Example:

		X

Risk Ranking of PCAs (see Tables 7-2, 7-3, 7-4 and 7-5 for separate category lists), where VH = Very High Risk, H = High Risk, M = Moderate Risk, L = Low Risk

PCA Checklist Table K-1, page 1 of 2 COMMERCIAL/INDUSTRIAL						
PCA (Risk Ranking)	No PCA in zones	PCA in Zone A?	PCA in Zone B5?	PCA in Zone B10?	Unknown	Comments
Automobile-related activities						
Body shops (H)	X					If present, included below as repair shops.
Car washes (M)	X					
Gas stations (VH)				X		Valero gas station at 3192 Santa Rita Rd. (formerly Exxon, a fuel leak site).
Repair shops (H)				X		
Boat services/repair/ refinishing (H)	X					
Chemical/petroleum processing/storage (VH)	X					
Chemical/petroleum pipelines (H)		X	X	X		High-pressure fuel line along old SP line.
Dry cleaners (VH)			X	X		
Electrical/electronic manufacturing (H)	X					
Fleet/truck/bus terminals (H)	X					
Furniture repair/ manufacturing (H)				X		
Home manufacturing (H)	X					
Junk/scrap/salvage yards (H)	X					
Machine shops (H)		X				
Metal plating/ finishing/fabricating (VH)	X					
Photo processing/printing (H)		X	X			
Plastics/synthetics producers (VH)	X					
Research laboratories (H)	X					

PCA Checklist Table K-1, page 2 of 2						
COMMERCIAL/INDUSTRIAL						
PCA (Risk Ranking)	No PCA in zones	PCA in Zone A?	PCA in Zone B5?	PCA in Zone B10?	Unknown	Comments
Wood preserving/treating (H)	X					
Wood/pulp/paper processing and mills (H)	X					
Lumber processing and manufacturing (H)	X					
Sewer collection systems (H, if in Zone A, otherwise L)		X	X	X		
Parking lots/malls (>50 spaces) (M)		X	X	X		
Cement/concrete plants (M)	X					
Food processing (M)				X		
Funeral services/graveyards (M)	X					
Hardware/lumber/parts stores (M)				X		
Appliance/Electronic Repair (L)	X					
Office buildings/complexes (L)		X	X	X		
Rental Yards (L)	X					
RV/mini storage (L)	X					
Other (list)						

PCA Checklist Table K-2, page 1 of 2 RESIDENTIAL/MUNICIPAL						
PCA (Risk Ranking)	No PCA in zones	PCA in Zone A?	PCA in Zone B5?	PCA in Zone B10?	Unknown	Comments
Airports - Maintenance/ fueling areas (VH)	X					
Landfills/dumps (VH)	X					
Railroad yards/ maintenance/ fueling areas (H)	X					
Septic systems - high density (>1/acre) (VH if in Zone A, otherwise M)	X					
Sewer collection systems (H, if in Zone A, otherwise L)		X	X	X		
Utility stations - maintenance areas (H)	X					
Wastewater treatment and disposal facilities (VH in Zone A, otherwise H)	X					
Drinking water treatment plants (M)	X					
Golf courses (M)	X					
Housing - high density (>1 house/0.5 acres) (M)		X	X	X		
Motor pools (M)	X					
Parks (M)		X	X	X		
Waste transfer/recycling stations (M)	X					

PCA Checklist Table K-2, page 2 of 2						
RESIDENTIAL/MUNICIPAL						
PCA (Risk Ranking)	No PCA in zones	PCA in Zone A?	PCA in Zone B5?	PCA in Zone B10?	Unknown	Comments
Apartments and condominiums (L)		X	X	X		
Campgrounds/ Recreational areas (L)	X					
Fire stations (L)				X		LPFD Fire Station No. 3, a fuel leak site.
RV Parks (L)	X					
Schools (L)				X		
Hotels, Motels (L)			X			
Other (list)						

PCA Checklist Table K-4, page 1 of 3 OTHER ACTIVITIES						
PCA (Risk Ranking)	No PCA in zones	PCA in Zone A?	PCA in Zone B5?	PCA in Zone B10?	Unknown	Comments
NPDES/WDR permitted discharges (H)					X	
Underground Injection of Commercial/Industrial Discharges (VH)					X	
Historic gas stations (VH)					X	
Historic waste dumps/ landfills (VH)	X					
Illegal activities/ unauthorized dumping (H)					X	
Injection wells/ dry wells/ sumps (VH)	X					
Known Contaminant Plumes (VH)				X		3192 Santa Rita Rd. (formerly Exxon, a fuel leak site).
Military installations (VH)	X					
Mining operations - Historic (VH)	X					
Mining operations – Active (VH)	X					
Mining - Sand/Gravel (H)	X					
Wells – Oil, Gas, Geothermal (H)	X					
Salt Water Intrusion (H)	X					
Recreational area— surface water source (H)	X					

PCA Checklist
Table K-4 , page 2 of 3

OTHER ACTIVITIES

PCA (Risk Ranking)	No PCA in zones	PCA in Zone A?	PCA in Zone B5?	PCA in Zone B10?	Unknown	Comments
Underground storage tanks						
Confirmed leaking tanks (VH)				X		Tanks were removed from 3192 Santa Rita Rd. (formerly Exxon) and LPFD Fire Station No. 3.
Decommissioned - inactive tanks (L)					X	
Non-regulated tanks (tanks smaller than regulatory limit) (H)					X	
Not yet upgraded or registered tanks (H)					X	
Upgraded and/or registered - active tanks (L)				X		Valley Care Medical Center and Valero gas station at 3192 Santa Rita Rd. (formerly Exxon, a fuel leak site).
Above ground storage tanks (M)		X		X		AT&T, 2166 Rheem Dr. and Valero gas station at 3192 Santa Rita Rd. (formerly Exxon, a fuel leak site).
Wells – Water supply (M)		X				
Construction/demolition staging areas (M)	X					
Contractor or government agency equipment storage yards (M)		X				
Dredging (M)	X					
Transportation corridors						
Freeways/state highways (M)	X					
Railroads (M)	X					
Historic railroad right-of-ways (M)		X	X	X		
Road Right-of-ways (herbicide use areas) (M)		X	X	X		
Roads/ Streets (L)		X	X	X		

PCA Checklist Table K-4, page 3 of 3						
OTHER ACTIVITIES						
PCA (Risk Ranking)	No PCA in zones	PCA in Zone A?	PCA in Zone B5?	PCA in Zone B10?	Unknown	Comments
Hospitals (M)				X		
Storm Drain Discharge Points (M)					X	
Storm Water Detention Facilities (M)	X					
Artificial Recharge Projects						
Injection wells (potable water) (L)		X				Mocho Wells 3 and 4 (ASR).
Injection wells (non-potable water) (M)	X					
Spreading Basins (potable water) (L)	X					
Spreading Basins (non-potable water) (M)	X					
Medical/dental offices/clinics (L)		X	X	X		
Veterinary offices/clinics (L)			X	X		
Surface water - streams/ lakes/rivers (L)		X	X	X		
Wells – monitoring, test holes (L)		X	X	X		
Other (list)						

Appendix M

Vulnerability Analysis Procedures – Ground Water Source

The Vulnerability analysis incorporates the types of Possible Contaminating Activities (PCAs) identified in the inventory, their respective Risk Rankings, the Zone and the Physical Barrier Effectiveness determination. These factors are used to develop a prioritized listing of types of PCAs and to determine the types of PCAs to which the drinking water source is most vulnerable.

Public water system: Zone 7 Water Agency ID No.: 0110010

Name of source: Mocho Wells 1 – 3 Well Field

ID No.: 03S/01E-09M02 M, 03S/01E-09M03 M and 03S/01E-09M04 M

Assessment date: March, 2001 Assessment conducted by: EOA, Inc.

Vulnerability analysis steps:

1. For each type of PCA identified as existing in the protection zones, or as unknown, determine the number of PCA risk ranking points for that type of PCA. (If the risk ranking for a type of PCA has been modified, Appendix E should be attached). (*For example, Very High (VH) risk activities are 7 points.)*

2. For each type of PCA determine the zone in which it occurs (if zones are defined, or within the watershed if zones are not defined). Add the points associated with that zone to the PCA risk ranking points. If the type of PCA exists within more than one zone, repeat the process for each zone. (*For example, if a type of PCA exists in Zone A add 5 points. For a VH risk PCA in Zone A, the PCA Risk Ranking points + Zone points = 7 + 5 = 12 points.*)

3. Determine the Physical Barrier Effectiveness (PBE) for the drinking water source (from Appendix J). Add the points associated with that PBE to the PCA risk ranking and zone points. The total is the Vulnerability Score. (*For example, if the PBE is Low add 5 points. For a VH risk PCA in Zone A, the Vulnerability Score = PCA Risk Ranking points + Zone points + PBE points = 7 + 5 + 5 = 17 points.)*

4. Prioritize all types of PCAs by the Vulnerability Score, from the most points to the least. A sample form is shown below.

5. The drinking water source is vulnerable to all types of PCAs with a Vulnerability Score of **8** or greater. Refer to the Vulnerability Matrix below. The source is most vulnerable to the types of PCAs with the highest score.

6. **In addition, the Drinking Water Source is most vulnerable to all types of PCAs associated with a contaminant detected in the water source, regardless of Vulnerability Score.**

Mocho Wells 1- 3 Well Field

Prioritized List of Possible Contaminating Activities (PCAs)

Zone	Type of PCA	PCA Points VH = 7 M = 3 L = 1 H = 5	Zone Points A = 5 B10 = 1 Unknown = 0 B5 = 3	PBE Points L = 5 H = 1 M = 3	Vulnerability Score plus Zone points plus PBE points PCA points
A	Chemical/petroleum pipelines	5	5	3	13
B5	Dry cleaners	7	3	3	13
A	Machine shops	5	5	3	13
A	Photo processing/printing	5	5	3	13
A	Sewer collection systems (Com/Ind)	5	5	3	13
A	Sewer collection systems (Res/Mun)	5	5	3	13
A	Above ground storage tanks	3	5	3	11
B5	Chemical/petroleum pipelines	5	3	3	11
B10	Confirmed leaking tanks	7	1	3	11
A	Contractor or government agency equipment storage yards	3	5	3	11
B10	Dry cleaners	7	1	3	11
B10	Gas stations	7	1	3	11
A	Historic railroad right-of-ways	3	5	3	11
A	Housing - high density (>1 house/0.5 acres)	3	5	3	11
B10	Known contaminant plumes	7	1	3	11
A	Parking lots/malls (>50 spaces)	3	5	3	11
A	Parks	3	5	3	11
B5	Photo processing/printing	5	3	3	11
A	Road right-of-ways (herbicide use areas)	3	5	3	11
A	Wells - water supply	3	5	3	11
Unknown	Historic gas stations	7	0	3	10
Unknown	Underground injection of com/ind discharges	7	0	3	10
A	Apartments and condominiums	1	5	3	9
B10	Automobile repair shops	5	1	3	9
B10	Chemical/petroleum pipelines	5	1	3	9
B10	Furniture repair/manufacturing	5	1	3	9
B5	Historic railroad right-of-ways	3	3	3	9
B5	Housing - high density (>1 house/0.5 acres)	3	3	3	9
A	Injection wells (potable water)	1	5	3	9
A	Medical/dental offices/clinics	1	5	3	9
A	Office buildings/complexes	1	5	3	9
B5	Parking lots/malls (>50 spaces)	3	3	3	9
B5	Parks	3	3	3	9
B5	Road right-of-ways (herbicide use areas)	3	3	3	9
A	Roads/streets	1	5	3	9
A	Surface water - streams/lakes/rivers	1	5	3	9
A	Wells - monitoring, test holes	1	5	3	9
Unknown	Illegal activities/unauthorized dumping	5	0	3	8
Unknown	Non-regulated tanks	5	0	3	8
Unknown	Not yet upgraded or registered tanks	5	0	3	8
Unknown	NPDES/WDR permitted discharges	5	0	3	8
B10	Above ground storage tanks	3	1	3	7
B5	Apartments and condominiums	1	3	3	7
B10	Food Processing	3	1	3	7
B10	Hardware/lumber/parts stores	3	1	3	7

Appendix N

Checklist for Drinking Water Source Assessment – Ground Water Source

Public water system: Zone 7 Water Agency ID No.: 0110010

Name of source: Mocho Wells 1 – 3 Well Field

ID No.: 03S/01E-09M02 M, 03S/01E-09M03 M and 03S/01E-09M04 M

Assessment date: March, 2001 Assessment conducted by: EOA, Inc.

The following information should be contained in the drinking water source assessment submittal.

If another report that is the functional equivalent to the drinking water assessment (e.g., parts of a Ground Water Management Plan) is included in this assessment, the part of that report that fulfills the components of the source water assessment should be clearly indicated.

__X__ Source name, system name, source and system identification numbers, date of assessment, name of person and/or organization conducting the assessment (Appendix N, this form)

__X__ Assessment map with source location, source area (if known), and protection zones.

__X__ Drinking water source location coordinates and accuracy of method used (Appendix H or equivalent)

__X__ Delineation of protection zones (Appendix I or equivalent)

__X__ Drinking water Physical Barrier Effectiveness Checklist (Appendix J)

__X__ Well Data Sheet

__X__ Possible contaminating activities (PCA) inventory form (Appendix K).

_____ Possible contaminating activities evaluation (optional) (Appendix L)

__X__ Vulnerability ranking (Appendix M)

_____ Additional maps (optional) (e.g. local maps of zones and PCAs, recharge area maps, or maps indicating direction of ground water flow)

__X__ Means of Public Availability of Report (indicate those that will be used)

- __X__ Notice in the annual consumer confidence report* (minimum)
- __X__ Copy in DHS district office (minimum)
- _____ Copy in public water system office (recommended)
- _____ Copy in public library/libraries
- _____ Internet (indicate Internet address: _____)
- _____ Other (describe)

*The annual report should indicate where customers can review the assessments.

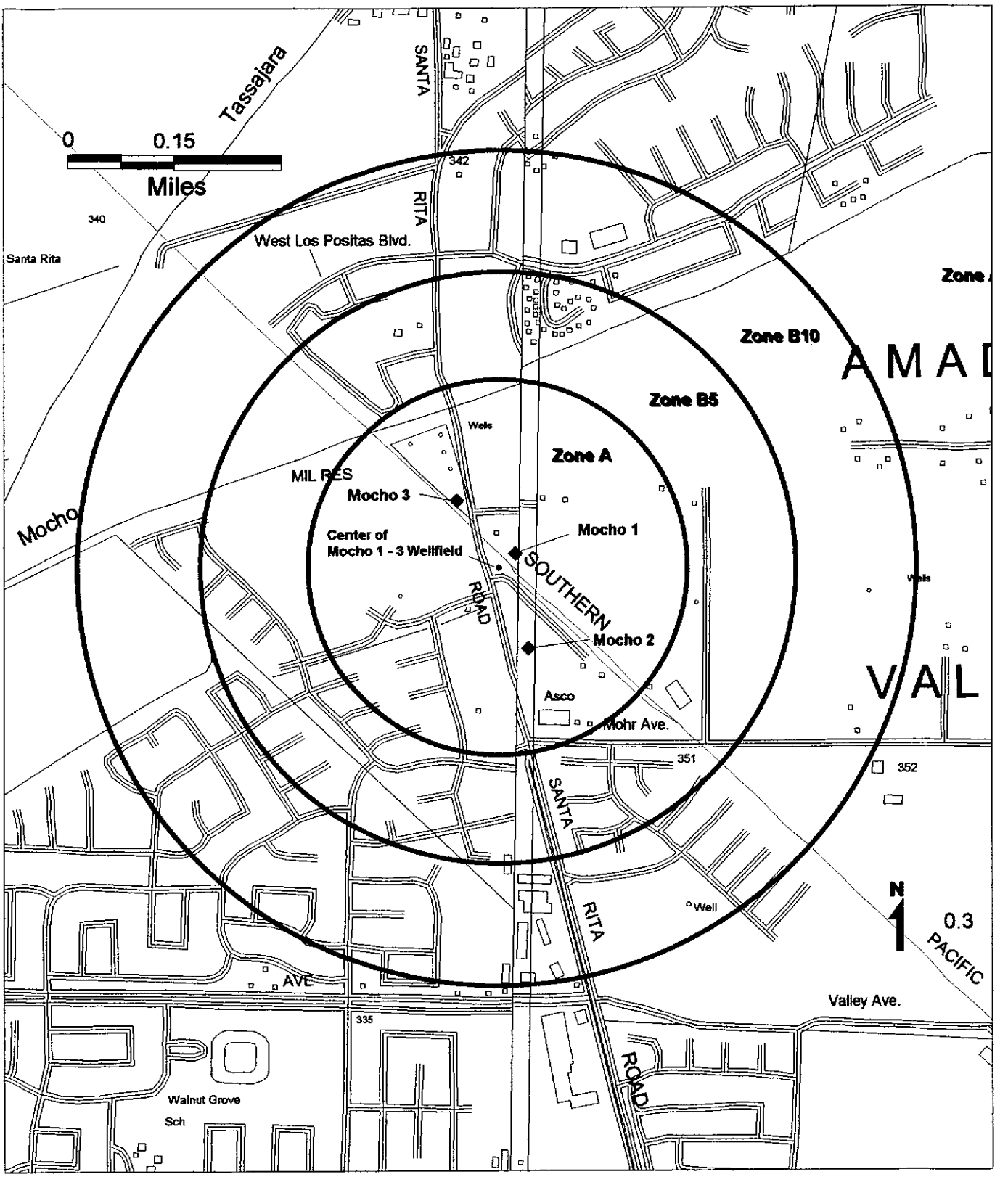
Mocho Wells 1- 3 Well Field

Prioritized List of Possible Contaminating Activities (PCAs)

Zone	Type of PCA	PCA Points VH = 7 M = 3 L = 1 H = 5	Zone Points A = 5 B10 = 1 Unknown = 0 B5 = 3	PBE Points L = 5 H = 1 M = 3	Vulnerability Score plus Zone points plus PBE points PCA points
B10	Historic railroad right-of-ways	3	1	3	7
B10	Hospitals	3	1	3	7
B5	Hotels	1	3	3	7
B10	Housing - high density (>1 house/0.5 acres)	3	1	3	7
B5	Medical/dental offices/clinics	1	3	3	7
B5	Office buildings/complexes	1	3	3	7
B10	Parking lots/malls (>50 spaces)	3	1	3	7
B10	Parks	3	1	3	7
B10	Road right-of-ways (herbicide use areas)	3	1	3	7
B5	Roads/streets	1	3	3	7
B5	Sewer collection systems (Com/Ind)	1	3	3	7
B5	Sewer collection systems (Res/Mun)	1	3	3	7
B5	Surface water - streams/lakes/rivers	1	3	3	7
B5	Veterinary offices/clinics	1	3	3	7
B5	Wells - monitoring, test holes	1	3	3	7
Unknown	Storm drain discharge points	3	0	3	6
B10	Apartments and condominiums	1	1	3	5
B10	Fire Stations	1	1	3	5
B10	Medical/dental offices/clinics	1	1	3	5
B10	Office buildings/complexes	1	1	3	5
B10	Roads/streets	1	1	3	5
B10	Schools	1	1	3	5
B10	Sewer collection systems (Com/Ind)	1	1	3	5
B10	Sewer collection systems (Res/Mun)	1	1	3	5
B10	Surface water - streams/lakes/rivers	1	1	3	5
B10	Upgraded and/or registered - active tanks	1	1	3	5
B10	Veterinary offices/clinics	1	1	3	5
B10	Wells - monitoring, test holes	1	1	3	5
Unknown	Decommissioned - inactive tanks	1	0	3	4

Note: PCAs with a vulnerability score of 8 or higher are shaded.

F:\ZN08\Zn08-04\reports\[mocho pca listings and well data sheets.xls]mocho 1-3 pca listing



Drinking Water Source Assessment Map
Zone 7 Water Agency Mocho Wells 1 - 3 Well Field
June 2001