

EOA, Inc.

REC'D
AUG 7 2000
ZONE 7. A.

MEMORANDUM

TO: Rhett Alzona, Zone 7 Water Agency

FROM: Jon Konnan, EOA, Inc.

DATE: August 7, 2000

SUBJECT: Drinking Water Source Assessment for Hopyard Well No. 9

Attached to this memo are the completed forms and assessment map for the source water assessment for Zone 7's recently installed Hopyard Well No. 9. This memo also contains important information about the assessment and should be submitted with the forms and map. The assessment was performed in accordance with the guidelines of the California Department of Health Services' (DHS's) Drinking Water Source Assessment and Protection (DWSAP) program.

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. All public water systems applying for a permit for a new drinking water source must submit a DWSAP assessment as part of the permit application. EOA performed this assessment in accordance with a DHS document dated January 1999 (revised April 1999 and January 2000) that describes the DWSAP program.

Information for completing the assessment was obtained as follows:

1. EOA obtained information from Zone 7, including a report you provided to us on the installation of Hopyard Well No. 9¹ and discussions with Zone 7 personnel.
2. On April 27, 2000, EOA drove around the area within the protection zones calculated as part of the assessment (see the assessment map) to help identify Possible Contaminating Activities.
3. EOA obtained information about underground and above-ground hazardous material/waste storage tanks from the Livermore - Pleasanton Fire Department.²
4. EOA obtained information from the Dublin San Ramon Services District's wastewater pretreatment program regarding the activities carried out by businesses within the protection zones.³
5. EOA reviewed California Regional Water Quality Control, San Francisco Bay Region (Regional Board) contamination site data sets, as explained below.

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 Hopyard well

field, of which Hopyard Well No. 9 is part of, is partially recharged by injection of treated State Project water through the ASR well Hopyard Well No. 6 and partially from subsurface inflow. 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). The specific contribution of each recharge component varies from year to year based on Zone 7's operation of Hopyard Well No. 6 and surface water facilities, and is a function of the available water supply and groundwater conditions.

Please note that the attached inventory of Possible Contaminating Activities (Appendix K) is believed to be accurate. However, its accuracy cannot be guaranteed because of limitations on what can be observed in the field and the accuracy of historical data and regulatory agency records.

Contamination release sites were identified for the assessment using a report provided by Zone 7⁴ and by reviewing the following data sets downloaded from the Regional Board's web page on May 2, 2000:

- LUSTIS (UST) DATABASE
- SLIC (Spills, Leaks, Investigations, and Cleanup Database)
- List of Sites with MTBE Contamination

One contamination site was identified within the protection zones in both the Zone 7 report and the above data sets (Exxon, 2991 Hopyard Rd). This one site accounts for three of the four activities with the highest Vulnerability Scores in the inventory of Possible Contaminating Activities (gas stations, known contaminant plumes and confirmed leaking tanks). The Alameda County Department of Environmental Health is currently overseeing the investigation and remediation of this site. Groundwater contamination from the site is believed to be confined to a shallow perched aquifer. Zone 7 is monitoring the investigation and has participated in its regulatory oversight. At Zone 7's request, Exxon has agreed to install sentinel wells between the site and Zone 7 production wells (including Hopyard Well No. 9). These wells will be designed to provide early warning if contamination from the site is moving towards the aquifers from which the production wells draw. It should be noted that there is some concern that City of Pleasanton production well No. 7 (currently inactive), which is located close to the 2991 Hopyard Rd. site, could act as a conduit to convey contaminants from the shallow aquifer to the deeper aquifer that Hopyard Well No. 9 is screened in.

It appears unlikely that any of the remaining Possible Contaminating Activities identified in the attached inventory could impact the water quality from Hopyard Well No. 9. Any releases from these activities are not likely to be extensive, and would generally occur at or near the ground surface. Hopyard Well No. 9 is screened more than 200 feet below the ground surface, and there are several clay layers between the surface and the aquifer it draws from.

If you have any questions, please contact me.

REFERENCES

1. Fugro West, Inc., *Summary of Operations Report, Well Site Evaluation Project, Phase II, Test Well Construction and Testing, Hopyard Well No. 9, Pleasanton, California (State Well Number 3S/1E-17D12)*, December 1999.
2. Livermore – Pleasanton Fire Department, information provided by Danielle Stefani, May 2000.
3. Dublin San Ramon Services District, information provided by Fernando Lomas, May 2000.
4. Zone 7 Water Agency, Water Resources Engineering, *Toxic Investigations Surveillance, DRAFT Quarterly Report, 1999 Water Year, July 1999.*

Appendix H

Drinking Water Source Location – Ground Water

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

Name of source: Hopyard Well No. 9 ID No.: 03S/01E-17D12 (Zone 7 ID)

Location date: April 2000 Source located by (name of person): Matthew W. Katen, Zone 7

Method of determining location:

USGS quad map (7.5 minute series, 1:24,000 scale), hand calculated

USGS quad map (7.5 minute series, 1:24,000 scale), computer calculated

Global Positioning System (GPS)

Unit (manufacturer/model): Garmin/GPS 3

Accuracy of GPS unit (+/- 50 ft.)

Other Method _____

Accuracy of method (+/- _____ ft.)

Location of well (decimal degrees): Latitude: 37.67856

Longitude: -121.89485

Physical description of location [Pertinent landmarks, address, or approximate address (cross streets, etc.)]: Pleasanton Sports Park adjacent to Pleasanton Canal, approx. 1100 ft. east of Hopyard Rd.

General description of recharge area, if known: please see attached transmittal memo.

NOTE: Indicate location of the well on the drinking water source assessment map. The map should also indicate locations of the source area and protection zones. (See other Appendices).

Appendix I

Delineation of Ground Water Protection Zones

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

Name of source: Hopyard Well No. 9 ID No.: 03S/01E-17D12 (Zone 7 ID)

Delineation date: April 2000 Delineation conducted by: Jon Konnan, 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 $R_t = \sqrt{Qt / \pi \eta H}$

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

Q = maximum pumping capacity of well

($\text{ft}^3/\text{year} = \text{gpm} \times 70,267$): 22836775 (based on pumping 3 months per year at 1300 gpm)

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):

65

Specific methods follow on next page

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)	$R_2 = 1115$ ft, minimum = 600 ft—use larger: <u>1115</u> ft
Zone B5 (5 year TOT)	$R_5 = 1763$ ft, minimum = 1,000 ft—use larger: <u>1763</u> ft
Zone B10 (10 year TOT)	$R_{10} = 2493$ ft, minimum = 1,500 ft—use larger: <u>2493</u> 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: Hopyard Well No. 9 ID No.: 03S/01E-17D12 (Zone 7 ID)

Assessment date: May 2000 Assessment conducted by: Jon Konnan, EOA, Inc.

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

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.

California Drinking Water Source Assessment and Protection Program

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

Source Name: Hopyard Well No. 9

Source No.: 03S/01E-17D12 (Zone 7 ID)

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 *	0			
(* Low Physical Barrier Effectiveness - no further questions required)				
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) = <u>54</u> 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 = <u>233.5</u> feet				
Maximum Pumping Rate of Well (Q) Q = <u>1300</u> gallons/minute				
Length of screened interval (H) H = <u>65</u> feet				
$[(DUP - DTW) / (Q/H)] =$ (up to 10 points maximum) choose one				
1. < 5	0			
2. 5 to 10	5	X		
3. > 10	10			

California Drinking Water Source Assessment and Protection Program

Physical Barrier Effectiveness – Ground Water, page 2 of 2

Source Name: Hopyard Well No. 9

Source No. 03S/01E-17D12 (Zone 7 ID)

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 <u>under all conditions</u>		20
2. head in confined aquifer is higher than head in unconfined aquifer <u>under static conditions</u>		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 = <u>198.5</u> 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
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	51	

Physical Barrier Effectiveness SCORE INTERPRETATION

<u>Point Total</u>	<u>Effectiveness</u>
<u> </u> 0 to 35 =	Low (includes all sources in Fractured Rock)
<u> </u> X 36 to 69 =	Moderate
<u> </u> 70 to 100 =	High

* Assumes post-construction conditions

Appendix K

Possible Contaminating Activity (PCA) Inventory Form

Ground Water Source

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

Name of drinking water source: Hopyard Well No. 9 ID No. 03S/01E-17D12 (Zone 7 ID)

Inventory date: April/May 2000 Inventory conducted by: Jon Konnan, EOA, Inc. and Zone 7

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? YES/NO NO X (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).

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

California Drinking Water Source Assessment and Protection Program

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					
Car washes (M)	X					
Gas stations (VH)		X				
Repair shops (H)		X				
Boat services/repair/ refinishing (H)	X					
Chemical/petroleum processing/storage (VH)	X					
Chemical/petroleum pipelines (H)					X	
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				
Plastics/synthetics producers (VH)	X					
Research laboratories (H)	X					

California Drinking Water Source Assessment and Protection Program

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)						

California Drinking Water Source Assessment and Protection Program

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					

California Drinking Water Source Assessment and Protection Program

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		
Campgrounds/ Recreational areas (L)	X					
Fire stations (L)	X					
RV Parks (L)	X					
Schools (L)			X	X		
Hotels, Motels (L)	X					
Other (list)						

California Drinking Water Source Assessment and Protection Program

PCA Checklist						
Table K-3, page 1 of 2						
AGRICULTURAL/RURAL						
PCA (Risk Ranking)	No PCA in zones	PCA in Zone A?	PCA in Zone B5?	PCA in Zone B10?	Unknown	Comments
Grazing (> 5 large animals or equivalent per acre) (H in Zone A, otherwise M)	X					
Concentrated Animal Feeding Operations (CAFOs) as defined in federal regulation ¹ (VH in Zone A, otherwise H)	X					
Animal Feeding Operations as defined in federal regulation ² (VH in Zone A, otherwise H)	X					
Other Animal operations (H in Zone A, otherwise M)	X					
Farm chemical distributor/ application service (H)	X					
Farm machinery repair (H)	X					
Septic systems – low density (<1/acre) (H in Zone A, otherwise L)	X					
Lagoons / liquid wastes (H)	X					
Machine shops (H)	X					
Pesticide/fertilizer/ petroleum storage & transfer areas (H)	X					
Agricultural Drainage (H in Zone A, otherwise M)	X					
Wells - Agricultural/ Irrigation (H)	X					

California Drinking Water Source Assessment and Protection Program

PCA Checklist						
Table K-3, page 2 of 2						
AGRICULTURAL/RURAL						
PCA (Risk Ranking)	No PCA in zones	PCA in Zone A?	PCA in Zone B5?	PCA in Zone B10?	Unknown	Comments
Managed Forests (M)	X					
Crops, irrigated (Berries, hops, mint, orchards, sod, greenhouses, vineyards, nurseries, vegetable) (M)	X					
Fertilizer, Pesticide/Herbicide Application (M)	X					
Sewage sludge/biosolids application (M)	X					
Crops, nonirrigated (e.g., Christmas trees, grains, grass seeds, hay, pasture) (L) (includes drip-irrigated crops)	X					
Other (list)						

3. Concentrated Animal Feeding Operation: Animal Feeding Operation (requires NPDES permit) with greater than:

If pollutants discharged (directly or indirectly) to navigable waters	If pollutants not discharged
300 slaughter or feeder cattle	1,000 slaughter or feeder cattle
200 mature dairy cows	700 mature dairy cows
750 swine	2500 swine
150 horses	500 horses
3000 sheep or lambs	10,000 sheep or lambs
16,500 turkeys	55,000 turkeys
9,000 laying hens or broilers (liquid manure system)	30,000 laying hens or broilers (liquid manure system)
1500 ducks	5000 ducks
300 animal units	1000 animal units

4. Animal Feeding Operation: lot or facility where animals (other than aquatic) have been or will be stabled or confined and fed or maintained for total of 45 days or more in any 12 month period.

California Drinking Water Source Assessment and Protection Program

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)						
Known Contaminant Plumes (VH)		X				
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					

California Drinking Water Source Assessment and Protection Program

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				
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				
Above ground storage tanks (M)		X				
Wells - Water supply (M)		X	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					
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

California Drinking Water Source Assessment and Protection Program

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				
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					
Veterinary offices/clinics (L)	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: Hopyard Well No. 9 ID No.: 03S/01E-17D12 (Zone 7 ID)

Assessment date: May 2000 Assessment conducted by: EOA, Inc. and Zone 7 Water Agency

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 L 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. 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.

Inventory of Possible Contaminating Activities
Page 1

Zone	Type of PCA	PCA Points	Zone Points	PBE Points	Vulnerability Score
		VH = 7 H = 5 M = 3 L = 1	A = 5 B5 = 3 B10 = 1 Unknown = 0	L = 5 M = 3 H = 1	PCA points plus Zone points plus PBE points
B5	Schools	1	3	3	7
B10	Construction/demolition staging areas	3	1	3	7
B5	Sewer collection systems (Com/Ind)	1	3	3	7
B5	Office buildings/complexes	1	3	3	7
B10	Parking lots/malls (>50 spaces)	3	1	3	7
B5	Sewer collection systems (Res/Mun)	1	3	3	7
B10	Housing - high density (>1 house/0.5 acres)	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	Surface water - streams/lakes/rivers	1	3	3	7
B5	Wells - monitoring, test holes	1	3	3	7
Unknown	Storm drain discharge points	3	0	3	6

Inventory of Possible Contaminating Activities

Zone	Type of PCA	PCA Points	Zone Points	PBE Points	Vulnerability Score
		VH = 7 H = 5 M = 3 L = 1	A = 5 B5 = 3 B10 = 1 Unknown = 0	L = 5 M = 3 H = 1	PCA points plus Zone points plus PBE points
A	Apartments and condominiums	1	1	3	5
B10	Sewer collection systems (Com/Ind)	1	1	3	5
B10	Office buildings/complexes	1	1	3	5
B10	Sewer collection systems (Res/Mun)	1	1	3	5
B10	Schools	1	1	3	5
B10	Roads/streets	1	1	3	5
B10	Surface water - streams/lakes/rivers	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 *

Appendix N
Checklist for Drinking Water Source Assessment – Ground Water Source

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

Name of source: Hopyard Well No. 9 ID No.: 03S/01E-17D12 (Zone 7 ID)

Assessment date: May 2000 Assessment conducted by EOA, Inc. and Zone 7 Water Agency

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.

- 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)
- Assessment map with source location, source area (if known), and protection zones
- Drinking water source location coordinates and accuracy of method used (Appendix H or equivalent)
- Delineation of protection zones (Appendix I or equivalent)
- Drinking water Physical Barrier Effectiveness Checklist (Appendix J)
- Well Data Sheet
- Possible contaminating activity (PCA) inventory form (Appendix K)
- Possible contaminating activities evaluation (optional) (Appendix L)
- 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)
- Means of Public Availability of Report (indicate those that will be used)
 - Notice in the annual consumer confidence report* (minimum)
 - 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.

