BRUNSING ASSOCIATES, INC.
1607 Industrial Way, Belmont, CA 94002
(415) 637-0170 FAX (415) 637-1196

90 DEC 38 AM 10: 41

December 27, 1990

29.5

Mr. Paul Smith
Alameda County Department of Environmental Health
Hazardous Waste Program
80 Swan Way, Rm. 200
Oakland, CA 94621

RE: INFORMATION REQUESTED ON DECEMBER 6, 1990
PACIFIC SUPPLY COMPANY
OAKLAND, CALIFORNIA

Dear Mr. Smith:

This correspondence is intended to provide you with the information that you requested during a December 6, 1990 telephone conversation with me concerning the Pacific Supply Company site located in Oakland, California. During that conversation, you indicated that you disagreed with the Brunsing Associates, Inc. (BAI) assessment of the groundwater gradient. I concurred with your assessment and, consequently, I submitted to you a revision indicating that the groundwater gradient may have two directional components. In additional, I also sent you Appendix F and a revised Figure 8.

I have enclosed with this correspondence a copy of the calculations which BAI used to determine the groundwater velocity (Dupuit Forchheimer theory) which you requested during our December 6, 1990 telephone conversation.

I believe I have sent you all that was requested. I apologize that it has taken so long to get you these calculations. If there is anything else that I can provide or discuss with you, please call me at (415) 637-0170.

Sincerely,

Michael E. Velzy
Project Engineer

Enclosure: Calculations With Dupuit Forchheimer Equation

BRUNSING ASSOCIATES, INC.

BY VP Date 1/24/89 Subject PACIFIC SUPPLY, CORNING / DETERMINATION OF ON-SITE GROUNDWATER VELOCITY Sheet No. 1 of 3

Chkd By GE Date 1/25/89 Project No. 029

Pacific Supply Co. 1/24/89

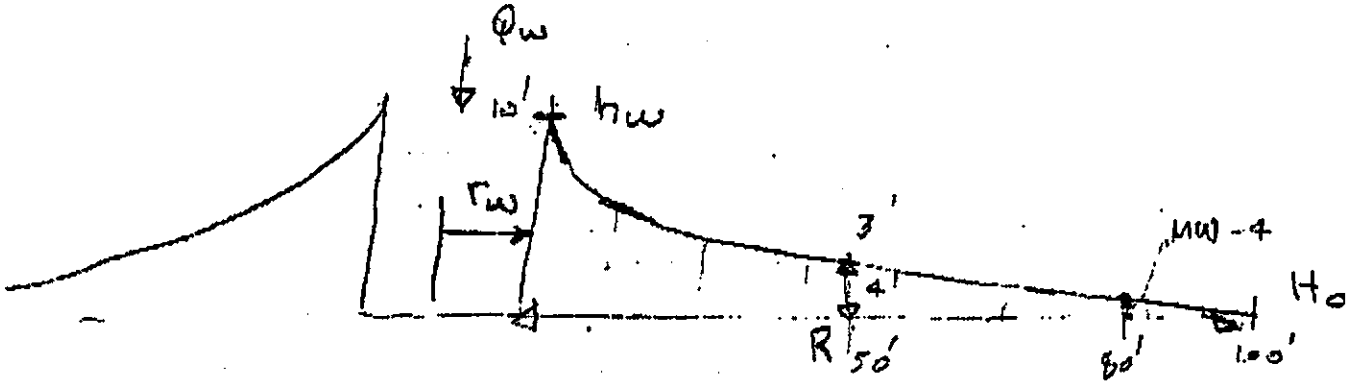
surface area over which leakage can occur. ac
Area of well = 20'x10' = 200 ft² ≡ r_w = 8 ft ≈ 2 m
Hydraulic conductivity ~ 10^{-4} cm/sec to 10^{-6} cm/s

Use the Dupuit Forchiemer Assumption.

$$Q = 2\pi r h q_r = 2\pi r h K \frac{dh}{dr}$$

or

$$H_o^2 - h_w^2 = \frac{Q_w}{\pi K} \ln\left(\frac{R}{r_w}\right)$$

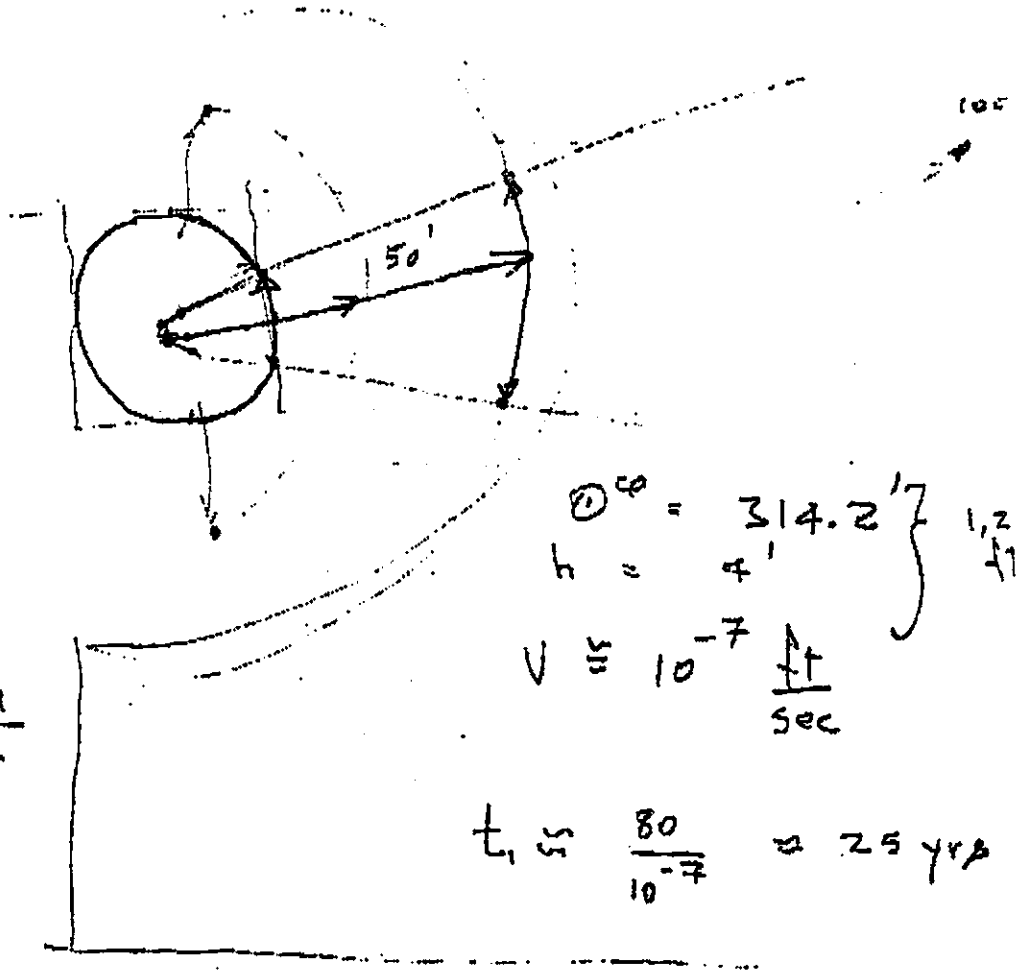


$$Q_w = \pi k (H_o^2 - h_w^2) / \ln\left(\frac{R}{r_w}\right) = -0.1 \text{ gpm} = -2.2 \times 10^{-4} \text{ cfs}$$

$R \simeq 3000 \Delta h K^{1/2} = 0.9$ m with $K = 10^{-6}$ cm/sec

say $R = 5$ m for $K \equiv 5 \times 10^{-5}$ cm/sec

BY VP Date 1/24/89 Subject PACIFIC SUPPLY COMPANY Sheet No. 2 of 3
Chkd By GE Date 1/25/89 DETERMINATION OF ON-SITE GROUNDWATER VELOCITY Project No. 029



$$V_r = K \frac{dh}{dr}$$

① $K = 314.2'$ } 1,2 ft
$h = 4'$

$V = 10^{-7} \frac{ft}{sec}$

$t_1 = \frac{80}{10^{-7}} = 25 \text{ yrs}$

$t_2 = 10 \text{ yrs}$

$$H_o^2 - h^2 = (H_o - h_w)^2 \frac{\ln(R/r)}{\ln(R/r_w)}$$

$H_o = 10'$, $h_w = 7'$, $R = 100'$, $r = 80'$, $r_w = 3'$

$$h = \pm\sqrt{100 - \frac{\ln(0.8)}{\ln(12.5)}} \approx 3'$$

BRUNSING ASSOCIATES, INC.

By VP Date 1/24/89 Subject PACIFIC SUPPLY COMPANY — DETERMINATION OF ON-SITE GROUNDWATER VELOCITY Sheet No. 3 of 3

Chkd By GE Date 1/25/89 Project No. 029

1. clay where gradient is not easily definable
2. highest WL the north & south ends of property line - lower near the tank - sewer leak
3. For contaminant to migrate the on-site to MW-4 would take ~ 25 yr - 30 yrs.
4. For contaminants to migrate from yellow car to MW-4 would take ~ 10 yrs
5. For contaminant to migrate from CFL to MW-1 would take ~ 3 yrs.
6. For contaminant to migrate from on-site tank to MW-1 would take about 5 yrs
7. Traffic on-site
8. Peat layer at MW-4

REFERENCE:

FREEZE, R.A. & CHERRY, J.A., 1979, GROUNDWATER PRENTICE HALL, INC., N.J. pp. 188-189.