

ATTACHMENT 1

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

- M E M O -

To: Steven I. Morse, Chief
South Bay Division

July 3, 1986
File No. 1114.17 (TJB)

From: *Thomas J. Berkins*
Thomas J. Berkins
Environmental Engineer

Subject: Guidelines for the Identification, Location, and Evaluation of
Potential Deep Well Conduits

PURPOSE

Per your request this memo proposes Division staff guidelines for requiring dischargers to identify, locate, and evaluate private and public wells which may be potential conduits for contamination to migrate from shallow aquifers to deep aquifers. The guidelines below are based on the investigations which we have required some companies in the City of Mountain View to follow in the course of their investigation to define the extent of pollution.

INTRODUCTION

Recent investigations by companies in Mountain View have detected volatile organic chemical (VOC) pollution in a number of deep (C aquifer) monitoring wells installed to a depth of 500 feet. The contamination of the deep aquifer apparently occurred via improperly abandoned private wells located within the shallow aquifer contamination plume. It is important to note that pollution from the shallow aquifer zones (less than 100 feet) has reached the deep C aquifer zone (greater than 200 feet) even though there is a relatively clean aquifer zone and a 20-30 foot thick aquitard in between the shallow and deep aquifers.

Thus, it is important to require a more extensive investigation of potential conduits at other sites, beyond simply relying upon the records of the Santa Clara Valley Water District (SCVWD). The scope of the investigation to be conducted at each site will depend on the extent of contamination (known and unknown), available information, and the degree of uncertainty.

TECHNICAL REPORT

The following steps outline the minimum effort which should be considered by dischargers in cases where active and inactive/improperly abandoned private wells are known to exist within and in the vicinity of the contamination plume.

I. IDENTIFICATION OF WELLS

A. Records and Map Search

Typically, sites located in the Santa Clara Valley have relied solely upon the records of the SCVWD to obtain information regarding the location and status of any known wells in the vicinity of a site. However, the SCVWD

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records are incomplete. Thus, the first step of the potential conduit investigation should involve a more thorough search of all available records and maps. The following sources of information should be utilized to gather all available data existing on potential conduits:

1. Santa Clara Valley Water District
 - a) active well printout
 - b) well location map
 - c) inactive well files
 - d) destroyed well files
 - e) abandoned well files
 - f) field canvas for Salt Water Intrusion Prevention Program
2. U. S. Geological Survey
 - a) library
 - b) Water Resources Division
3. California Department of Water Resources
4. "Ground Water in the Santa Clara Valley, California" - William O. Clark, 1924
5. Local well drillers
6. U. S. Department of Agriculture
7. Corps of Engineers
8. City and County offices

The information obtained from the various sources listed above should be compiled in a technical report. It would be useful to summarize the results of the records and map search in a table, including the following information:

- | | |
|---|------------------------------------|
| - well number | - owner |
| - source of information | - status |
| - water quality data | - condition |
| - water level data | - comments |
| - total depth | - period of usage |
| - screened interval(s) | - pumping rate |
| - gravel pack interval(s) | - accessibility |
| - sanitary seal | - location |
| - well construction method(s) | - casing (type, diameter(s), etc.) |
| - date installed | - date destroyed, if applicable |
| - top of casing elevation | - use (domestic, irrigation, etc.) |
| - pump information (type, capacity, depth, etc.) | |
| - log availability (driller's, lithologic, geophysical, and TV) | |

It would also be useful to list the wells by status, for example:

- a) wells officially listed as properly destroyed under a SCVWD permit
- b) active wells, including seasonal or standby wells
- c) inactive wells
- d) abandoned wells, location known but method of abandonment unknown
- e) abandoned wells, location unknown and method of abandonment unknown

B. AERIAL PHOTOGRAPHY SEARCH

Upon completion of the records and map search, a thorough search and review of historical aerial photographs should be conducted. Analysis of aerial photos has proven useful in identifying wells which were previously unknown (i.e., not found in the records or map search). The aerial photo search has also been shown to be useful in locating wells for which records were available but the well location was uncertain. Conducting the aerial photo search after the records search will enable one to better locate wells for which records exist but the location is uncertain. I recommend that all sites conducting the records and map search should also conduct the aerial photo review. The time and effort to be spent in this regard should be determined on a case-by-case basis.

Historical aerial photos should be obtained dating back to the period prior to residential and industrial development at the site. It is also important to obtain aerial photos taken intermittently over time (e.g., 1940, 1945, 1950, 1955, etc.). It would also be preferable to obtain aerial photos taken over a shorter time period during the period of residential growth in the area. Aerial photos with the smallest scale (i.e. greatest resolution) are obviously of much more use than larger scale photos. Oblique photos are very useful since they are usually taken from lower altitudes and therefore are in more detail for identifying wells, storage tanks, etc.

The following is a list of sources where aerial photos can be obtained or reviewed:

1. Local aerial surveyors (Aero-Geodetic and Pacific Aerial Surveys)
2. City and County Planning Departments
3. University's library, map room
 - a) U.C. Berkeley and U.C. Santa Cruz
 - b) Stanford University
 - c) University of Santa Clara
 - d) Whittier College, Geology Department, "Fairchild Collection"
 - e) San Jose State
4. U. S. Geological Survey, Western Mapping Center, Menlo Park
5. U. S. Department of Agriculture, Agriculture Adjustment Administration photos (these may be available at the University libraries)

6. Santa Clara Valley Water District
7. National Archives
8. Soil Conservation Service
9. Corps of Engineers

In general, the aerial photos obtained from the local aerial surveyors and the City/County files will have a greater resolution. However, the university libraries will have a larger collection and will probably cover a greater time period (i.e., photos prior to 1960). It should be understood that it may not be necessary to contact each of the above sources if adequate photo coverage (time period and resolution) can be obtained from one or two sources.

II. LOCATING AND GATHERING ADDITIONAL INFORMATION ON WELLS

A. Door-to-Door and Field Survey

It is likely that a majority of the information requested as part of the records and map search will not be available. In addition, it is also likely that the exact location of some wells will not be known. Thus, it probably will be necessary to conduct a more thorough investigation to determine the exact location of a well and also to gather additional data. A field survey and door-to-door survey are the only methods available to obtain this information. It should also be noted that door-to-door surveys have proven most useful in identifying wells which were not previously known to exist.

At a minimum, I recommend that a door-to-door survey be conducted of all residences, businesses, etc. located within the contamination plume (in all aquifers). It would also be prudent to expand the survey boundary (perhaps 1000 feet cross-gradient and 2500 feet downgradient of the known plume) to account for uncertainties associated with historical gradients and unknown extent of the plume.

The person conducting the survey should attempt to gather all the information requested as part of the records and map search (see page two). It may be useful to develop a form which could be given to each household/business, listing all the requested information. The survey form used in the City of Mountain View is attached for your reference. I recommend that all the information requested as part of the records and map search be included on the survey form. I also recommend taking a picture(s) of the well and/or well site when conducting the survey.

B. Metal Detector/Magnetometer

Based on the results of the door-to-door survey and aerial photo search it may be possible to identify the general location of a well. In certain cases, the use of a metal detector may prove useful in locating wells which

are covered over. The use of a metal detector was instrumental in locating improperly abandoned agricultural wells located under a concrete parking garage in Mountain View. An attempt should be made to uncover any well identified by the metal detector to the extent technically feasible.

The results of the door-to-door survey, including copies of any survey forms, should be documented in a technical report. A map showing the known and/or general location of all identified wells should also be provided.

III. EVALUATION OF POTENTIAL CONDUITS

Based on the results of the well identification and location program, it may then be appropriate to conduct an evaluation to determine a well's potential to act as a conduit. All wells located during the field survey that are found to be in a condition that is adequate for sampling and downhole inspection should be investigated. An attempt should be made to uncover any wells if the general location is known. An attempt should also be made to unplug wells (e.g., remove silt and/or surface concrete plugs which may be present) in order to conduct a proper investigation. Wells which have a potential to be a conduit should be investigated. It may be appropriate to conduct the following investigations on such wells:

1. borehole television inspection
2. natural gamma log
3. water quality and water level sampling

As part of the water quality sampling, the discharger may also want to consider time series sampling. It may also be appropriate to conduct "packer tests" for wells which are screened in more than one aquifer. Pumps which may be present in the wells should be removed to obtain access to the well for depth sounding, geophysical logging, TV inspection, water quality sampling and water level measurement, as appropriate.

Based on the results of the potential conduit evaluation it may be necessary to destroy certain wells. If the results of the evaluation indicate that a well is screened in a single discrete aquifer and is not contaminated it may be useful to utilize that well for future monitoring purposes. General criteria which may be used to decide whether to destroy a well include:

1. the well is located within the known contamination plume
2. groundwater at the well is contaminated
3. the well is screened and/or gravel packed in more than one aquifer
4. well depth

Similar to the identification and location portions of the potential conduit investigation, the results of the evaluation of potential conduits should be submitted in a technical report. The report should include all data, maps, logs, interpretation of logs, etc. In addition, the rationale for excluding any wells from a complete investigation and evaluation should also be provided.

ATTACHMENT 2

WELL SURVEY REQUEST

1. All requests for a District well survey must be made in writing.
2. Requests must reference the client that is being represented (case name and address.)
3. Requests must state the reason the information is needed.
4. If applicable, under what order is this request made?
 - a. United States Environmental Protection Agency
 - b. Regional Water Quality Control Board (include Site Clean-Up Order Number)
 - c. Department of Health Services (include the Remedial Action Order Docket Number)
 - d. Santa Clara Valley Water District Leaking Underground Storage Tank Oversight Program (LUSTOP)
5. Requests must specify how this information is going to be used.
6. A signed letter of confidentiality (Exhibit 1) must accompany the request.
7. Request must specify:
SITE ADDRESS
NEAREST CROSS STREETS
ASSESSOR'S PARCEL NUMBER
WELL SURVEY RADIUS
8. Your request will be accepted or rejected by our District Engineering Geologist, and usually takes from 3 - 5 working days to process. After your request is approved you will receive a District well survey which includes: copies of the USGS quadrangles of the study area and a printout of wells (**monitoring and production wells: active, inactive, properly destroyed, improperly destroyed, and cathodic protection wells**) within the study area. Please note that some destroyed wells, unregistered wells, etc., may not be contained in the map and printout of wells in the District well survey. As part of your well survey you will need to view Well Driller's Logs and the destroyed wells microfiche to identify additional wells that may be present in your study area. Also, you will need to consult other sources to complete your well survey.
9. **Appointment to view Well Driller's Logs.** Well Driller's Logs are on microfiche and are available for review at the District office. Please call for an appointment to view Well Driller's Logs after you receive your District well survey.
10. **Appointment to view information on destroyed wells.** Information on destroyed wells is contained on microfiche and is available for review at the District office. Please call for an appointment to view information on destroyed wells after you receive your District well survey.

ADDRESS LETTER TO:

Ms. Ellen P. Mody
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

CONTACT:

Ms. Barbara Murray
Water Production Analyst
(408) 265-2607 ext. 2312

EXHIBIT 1

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, California 95118

Information your Water District has on file regarding certain well data on private wells is required by this agency for a public purpose, namely:

This information is not readily available from other sources and is necessary to the purpose described.

The undersigned certifies that the confidentiality of any information made available to this agency will be carefully preserved and the same will in no event be disclosed to other persons where such disclosure would result in unfair competitive disadvantage to the taxpayer who supplied such information.

Name _____

Title _____

Agency _____

Approved:

DRAFT DATED 06/25/97

Adjacent Property Owner - Access Cooperation Request

<DATE>

DISTRIBUTION LIST

Subject: Property Access by the Parties Responsible for the Investigation and Cleanup of Petroleum Hydrocarbon and MTBE Pollution at _____

Dear _____:

The Santa Clara Valley Water District (District) is overseeing the investigation and cleanup of gasoline and the gasoline additives methyl-tert butyl ether (MTBE) and benzene, released from fuel underground storage tanks at the subject site. We do not know how far the contamination from those tanks has moved; however, it appears that the contamination may have moved to underneath your property.

The District is requiring <RP COMPANY> to investigate and clean up contaminated soil and groundwater at the site to prevent the gasoline, MTBE, and benzene contamination from spreading to other properties or to drinking water sources. To properly determine the extent of that contamination in groundwater, <RP COMPANY> must perform additional off-site investigation. Therefore, we may need your help in allowing access to your property by <RP COMPANY> to properly define the extent of contamination.

If you have any questions, please call me at the Camden Annex office at (408) 927-0710, extension 2665. Thank you for your cooperation.

Sincerely,

<CASEWORKER>

<CASEWORKER TITLE>

Leaking Underground Storage Tank Oversight Program

cc: LIA _____, with Distribution List

<RP CONTACT>, with Distribution List

<RP COMPANY>

<ADDRESS>

<CITY, STATE ZIP>

J. Crowley, <CASEWORKER>