

Navy Groundwater

N00221_000146
MARE ISLAND
SSIC NO. 5090.3.A

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

Phone: Area Code 415
464-1255



SAN FRANCISCO BAY REGION
1111 JACKSON STREET, ROOM 6040
OAKLAND 94607

February 10, 1986
File No. 2129.2011B(LWT)

Capt. H. R. Fraunfelder
Public Works Officer
Department of the Navy
Mare Island Naval Shipyard
Vallejo, CA 94592

Dear Capt. Fraunfelder:

We have reviewed the information you submitted dated October 28, 1985 in response to the Regional Board Cleanup and Abatement Order (CAO) No. 85-019. The information relates to the completion of Tasks a, b, and c in the CAO. As you recall, the CAO was issued to require the Navy to address groundwater monitoring program deficiencies noted in the Regional Board's ISD Evaluation Report dated June 26, 1985.

Task b of the CAO required the Navy to revise their Groundwater Quality Assessment Program outline. The outline submitted is adequate at the present time. However, since an assessment program depends greatly on site hydrogeology, the outline will probably need further revisions as the hydrogeology is better defined.

Tasks a and c of the CAO were not completed satisfactorily. They will be discussed separately.

Task a: Groundwater Monitoring Well Certification

Task a of the CAO required the Navy to "certify that all existing monitoring wells are designed to maintain the integrity of the borehole, to enable sampling at depths where appropriate aquifer flow zones exist, and to prevent contamination of samples and the groundwater... This certification should be accompanied by information not previously submitted regarding well construction and completion." The major deficiencies in completion of this task are as follows:

- 1) The CAO required that all existing monitoring wells be investigated. Only the 12 ISD wells were addressed.
- 2) The missing information regarding groundwater well construction noted in the Regional Board's June 1985 ISD Evaluation Report and required by the CAO is still absent.

February 10, 1986

The proposed scope of work (September 4, 1985) reviewed at a meeting on September 13, 1985 between the Navy and my staff included review of "previous groundwater monitoring systems" and redevelopment of "all existing wells." It seems from this that not only was the work required by Task a of the CAO not completed, but that the work proposed by the Navy has not been completed.

Of the work that has been done, the Navy found that well pairs 14, 15, and 16 yielded murky water, filter sand material was found in well 15S, and well 16D had an obstruction. Based on this, the Navy should properly destroy and seal wells 15S and 16D. The findings for wells 14S, 14D, 15D, and 16S indicate that they are not properly constructed (filter sand not capable of filtering out fine particles from the formation) and thus would not be certifiable. These wells should not be destroyed at the present time however, but should continue to be sampled until more is learned about the hydrogeology of the site to determine replacement locations for these four wells. Similarly, replacement wells for 15S and 16D may wait until more is learned about the hydrogeology.

Regarding the ten wells installed by Kleinfelder & Associates in 1983, uncertainties about whether the Navy's 12 ISD wells are adequate to monitor the landfill dictates that the ten 1983 wells be kept in the monitoring well system. The work completed by the Navy for these ten wells under Task a of the CAO consisted only of upgrading with new steel locking caps. The Navy should determine if any of these wells are also yielding murky groundwater samples and need to be redeveloped, or have any other problems which would interfere with sampling in the future.

For well pairs 11, 12 and 13, we find that because of the lack of construction details previously discussed in the Regional Board's June 1985 ISD evaluation---method of drilling, method of well construction, filter sand grain size, filter sand depths, and quality assurance procedures used---none of these wells can be considered certifiable. This is of course also true for all the other wells (the ten 1983 wells, and well pairs 14, 15 and 16). Although wells pairs 11, 12, and 13 are presently yielding clear groundwater samples, without knowing where the filter sand is in relation to the formation, it will be very difficult to fit these wells into the hydrogeologic picture that the Navy must generate to demonstrate adequacy of any monitoring well system.

It is certain that replacement wells for all 22 wells will be needed. However, since questions have been raised about the adequacy of the locations of existing wells, it would be inappropriate at the present time to install replacement wells near these locations. Instead, the Navy should direct their efforts into defining the geology and hydrogeology of the site. After this is done, locations of replacement wells can be evaluated.

February 10, 1986

Task c: Hydrogeologic Investigation Proposal

Task c of the CAO required the Navy to propose a "detailed ... [plan] and time schedule for a hydrogeologic investigation of the site." The investigation should be capable of determining "the in-situ permeability of the geologic material under the landfill" and of evaluating the "adequacy of the locations of the 12 ISD wells for immediate detection of hazardous waste migration." Our comments on the Navy's proposal are as follows:

- 1) There was insufficient discussion of the assumptions, criteria, or methods to be used in testing and evaluating the site hydrogeologic conditions.
- 2) There was no discussion of the quality control/quality assurance procedures that will be used.
- 3) The proposed schedule was too vague. The proposal said that "the hydrogeologic investigation, excluding the evaluation of seasonal influences on groundwater gradient, will be completed within 45 days ..." Does this mean that the field work will be completed or that a preliminary report will be completed?
- 4) It is proposed that a file review will be "conducted to obtain all available documentation of the landfill area" "to evaluate the hydrogeologic characteristics of the saturated zone soils." We encourage the Navy to proceed with this. However, the Navy should expand the scope of the objective of this review to incorporate the unsaturated zone and to evaluate both the geology as well as the hydrogeology of the site. Also, the information contained in the files may not be totally complete and interpretations of the same geologic formation may vary from one study to another. So, the Navy should supplement the file review with soil borings to fill in informational gaps and to confirm and clarify previous findings.
- 5) The CAO required that "pump tests, and if feasible, surface geophysical measurements and/or other methods [be used] to determine the in-situ permeability ... and to determine the adequacy of the locations of the existing 12 ISD wells ..." In addition, the Regional Board's June 1985 evaluation recommended that pump tests be used to determine hydraulic interconnection between the wells. The Navy proposes to perform slug and packer tests in lieu of pump tests, stating that pump tests using the ISD wells "will likely not be very informative or useful." While this may be true, we feel that slug and packer tests, although acceptable for measuring the horizontal permeability in the immediate vicinity of the well, may not be able to determine the corresponding vertical permeability and will certainly not determine the extent of hydraulic interconnection between the monitoring wells.

February 10, 1986

- 6) The 14-hour period proposed to determine tidal effects on groundwater gradient is too short.
- 7) The barometric effects on groundwater gradient was not addressed in the proposal.

In general, we feel that the Navy's hydrogeologic investigation proposal is insufficient to meet the objectives stated in the CAO and the Regional Board's June 1985 ISD evaluation--determine in-situ permeability, both horizontal and vertical, of the geologic material under the landfill; determine adequacy of existing groundwater monitoring well locations for immediate detection of hazardous waste migration from the landfill; and determine groundwater gradient of the site along with tidal, seasonal, barometric, and dredged spoils disposal effects on the gradient.

The Navy must ammend its proposal to address the comments noted above, and at a minimum, include the following:

- 1) A more complete discription and discussion of the rationale for proposed sampling and testing methods along with quality control procedures.
- 2) A more detailed time schedule showing completion of different phases of the field work, and completion and submittal of the preliminary report and of the final report after the seasonal effects on groundwater gradient has been determined.
- 3) Soil borings to obtain continuous soil cores to confirm and further define the geologic conditions at the site.
- 4) Pump tests. This may involve installation of observation wells.
- 5) Continuous monitoring of groundwater levels for at least 30 days to determine tidal influences.
- 6) A plan to monitor the barometric influences on groundwater gradient.

We would like to meet with the Navy and their consultants to discuss the details of the above list. If possible, we would like to schedule this meeting sometime for the week of February 17, 1985.* Please call Ms. Lila Tang of my staff to schedule this meeting.

Please be aware that under Section 13304 of the California Water Code, the Board may request the Attorney General to take additional enforcement action against the Navy for the above noted violations of Tasks a and c of CAO No. 85-019. A recommendation for further enforcement action in this matter is presently being considered. Your committment to promptly address these deficiencies will be part of this consideration.

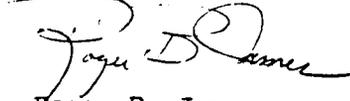
* Meeting is scheduled for 2/28/85 at 1000
(FRANZ, Ms. Lila Tang, room of 2/10/85 and from
of 2/18/85).

Capt. Fraunfelder, Mare Island
page 5

February 10, 1986

If you have any questions, please call Ms. Tang at (415)464-0990.

Sincerely,



Roger B. James
Executive Officer

cc: Andy Hicks, DOHS/TSCD
Mark Kamiya, EPA
Barbara Walsh, EPA
Gaylon Lee, SWRCB
Ralph Lee, MINSY
Aqua Terra Technologies