STATE OF CALIFORNIA—RESOURCES AGENCY

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION
1111 JACKSON STREET, ROOM 6040
OAKLAND 94607

Phone: Area Code 415
464-1255

September 8, 1982

File No. 2199.9080A (RAS)pet

Commanding Officer
Western Division
Naval Facilities Engineering Command
P.O. Box 727
San Bruno, CA 94066

Attn: Code 405
Jim Washington

Dear Jim:

Attached are the comments I received from our State Board geologist with respect to several critical items in the proposed sanitary landfill closure and subsequent use. As you can see by the comments there are some significant technical questions than neither you or I anticipated that are still unresolved. It may be prudent for you to withhold award of any contracts until these matters are resolved as project specifications may change. Please give me a call at (415) 464-0699 when you and your consultant have had an opportunity to review and respond to the attached comments.

Sincerely,

ROBERT A. SAMANIEGO
Area Engineer

Attachment: SWRCB Comments on Landfill Closure Plan
cc: Richard Pantages
Alameda County Health

State of California

THE RESOURCES AGEN

Memorandum

To : Robert Samaniego
San Francisco Bay Regional Board

Date : AUG 2 6 1982

From : STATE WATER RESOURCES CONTROL BOARD

QUALITY CONTROL BOARD

Subject: Review of Site Study and Closure Plan, Class II-2 Site, Alameda NAS, Alameda County

I have reviewed the reports by Harding-Lawson Associates (HLA) entitled "Final Submittal, Sanitary Landfill Site Study, Naval Air Station, Alameda, California", March 1978, and "Sanitary Landfill Closure Plan, Naval Air Station, Alameda, California", June 6, 1980. The following are my general comments concerning the reports and also comments regarding your questions about specific aspects of the reports.

GENERAL COMMENTS

It was determined in the site study that the landfill overlies a shallow, unconfined aquifer. Subsurface flow through the site is generally from northeast to soutwest, and the water table is on the order of 2 to 10 feet beneath the surface. With waste materials extending to depths of about 20 feet, it is clear that most of the waste material is below the water table. Under these conditions, the site is in violation of Section 2551(d), Subchapter 15, Title 23, CAC, which specifies that wastes will not be placed below the highest anticipated ground water level. The closure plan would perpetuate this condition. This situation is somewhat more serious than with other Class II-2 sites in that unspecified amounts of unknown Group 1 wastes have been disposed in this site.

HLA proposes using material with permeabilities on the order of 1×10^{-6} cm/sec for the impervious portion of the cap. However, our requirement is that the material must have permeabilities no greater than 1×10^{-6} cm/sec (Section 2553.2(a)).

SPECIFIC COMMENTS

Site Study and Closure Plan

1. Validity of perimeter seepage calculations.

   Comment: There are several factors that bring the validity of the seepage calculations into question.

a. The flow rate was calculated using k=0.001 cm/sec instead of 0.01 cm/sec (Site Study, page 73). The higher value appears to be the correct value for a fast-draining, fine sand. Use of the higher coefficient would increase the discharge range to between 7,000 and 13,000 gpd instead of 700 to 1,300 gpd.

b. The use of an assumed coefficient of permeability (k) is questionable in this case. The k-values for sands can vary by several orders of magnitude, resulting in corresponding variations in discharge rates. Any proposal to deviate from applicable regulations that is based on the premise that enforcement of the regulations would not substantially improve conditions must be supported by data to which a high degree of confidence can be ascribed. Therefore, the use of an assumed k-value in these circumstances is not justified.

c. The discharge rate used for that portion of the site perimeter contiguous with the dredge spoil area was one-half of the rate used for the hydraulic sand fill and was based on the premise that the dredge spoils are less permeable than sand fill. However, the boring logs indicate the dredge spoils to be on the order of only 3 to 5 feet thick and are underlain by hydraulic sand fill. Further, cross-section B-B' (Closure Plan, Plate 3) shows the water table to be below the bottom of the dredge spoils. Under these conditions, it appears that most of the subsurface water in the dredge spoils area does not flow laterally through dredge spoils but flows in hydraulic sand fill. Therefore, it does not seem reasonable to use a reduced discharge rate around the perimeter of the dredge spoils area.

2. Concurrence with the recommended method to correct perimeter seepage.

Comment: Although the initial HLA report discussed six-alternative methods to correct perimeter seepage, the position taken in the Closure Plan appears to be that (a) there is too little seepage to be of concern, and (b) the quality of the leachate is not significantly different from the bay water; therefore, no seepage control is necessary.

There are several factors that suggest a need to prevent seepage from the site.

a. Of the 23 parameters tested on samples from monitoring wells (Site Study, Table 4), the concentrations of one or more of 15 parameters was found to exceed the concentrations found in bay water and off-site ground water in one or more wells.

b. HLA's calculated seepage rate through the sea wall is low by a factor of 10.

c. It might not be possible to install barriers after dredge spoils and retaining dikes were in place if, in the future, the quality of the leachate becomes worse.

Originally, HLA recommended construction of a subdrain collector around the northern and eastern site perimeters to prevent seepage. The collected water was then to be sprayed back on top of the fill area. However, there are problems with this approach. Spraying the leachate back on the fill could create a ground water mound that would provide an even greater driving force on seepage through the sea wall than now exists. Additionally, the collection system would have to be operated and maintained for as long as the leachate poses a threat to water quality.

The other five control measures discussed in the site study involved the emplacement of physical barriers. The barriers would be constructed along the western and southern site perimeters, which are contiguous with the bay. Barriers would be excluded from the portion of the perimeter bordered by the dredge spoils area. The exclusion of the barrier in the spoils area is not justified because the hydraulic sand fill underlying the dredge spoils is in hydraulic continuity with both the refuse fill and the sea wall (see Plate 3, Closure Plan).

Additionally, if only the western and southern perimeters are completely sealed, the site will still be under the influence of the local ground water regime. If the water table were to rise significantly, uplift pressures on the impermeable cap could destroy its integrity.

3. Use of the closed landfill as a dredge spoil dewatering area.

Comment: Use of the disposal site for dewatering dredge spoils is not recommended. The requirement for a 3-foot cap with at least 1 foot of material with a permeability of 10^{-6} cm/sec or less is predicated on the condition that the cap is contoured to drain thereby preventing a hydraulic head on the cap. The proposed use could impose heads of 10 to 14 feet initially and more if the height of the dikes are raised to accomodate more spoils. In addition, differential settlement of the fill could produce cracks in the cap and also result in depressions which would prevent drainage.

Failure of the impermeable cap could allow hydraulic continuity across the cap which would increase the head on the leachate thereby increasing the discharge of leachate at the sea wall. Also, uplift pressure, along the perimeter of the site in the area just outside of the dikes containing the dredge spoils could rupture the cap causing additional discharge. Further, if the site were to be used to dewater dredge spoils, the decanted water would be discharged to the storm drain on the eastern boundary of the site. However, the Closure Plan contains no supporting data to show that the waste water can meet the standards for the discharge of suspended sand, silt, and clay.

4. Stability of the rock sea wall.

Comment: The conditions used for the slope stability analysis discussed in the closure plan are not clear. It is not apparent whether the sea wall analysis included the load from proposed dredge spoils or whether it represents the sea wall's present stability. Neither is it clear whether there was an analysis of the ability of the present fill materials and/or bay mud to act as a stable foundation under the loads to be imposed by the proposed disposal of dredge spoils. Further, Section 2553.2(h) requires that the site be able to withstand the maximum credible earthquake without damage to the foundation or critical structures. HLA's use of only 0.1 g seismic acceleration in their analysis indicates that something much less than the maximum credible earthquake was used. Clarification of these aspects of the stability analysis is needed.

HLA's finding that the sea wall will probably fail under moderate seismic loading should not be minimized just because other structures around the bay will also fail. If the retaining structures at this site fail, waste may be discharged into the bay. Further, it should also be noted that with the additional loading imposed by dredge spoils, failure of the sea wall is more likely to occur from seismic loading than if the site were not loaded with spoils.

The use to which a closed disposal site is put should not carry with it an added threat to the integrity of the site.

5. Stability of dredge area dikes on stability of rock sea wall, proposed method of construction.

Comment: The consultant reports that analyses of the stability of the dredge area dikes and their effect on sea wall stability are satisfactory, but it was not stated what conditions were used for the analyses nor what safety factors were obtained. This information should be supplied by the consultant so that staff can have a full understanding of the implications of the proposed plan.

The method of constructing the dredge area dikes is not discussed in the report.

CONCLUSIONS

1. Use of the site to dispose of dredge spoils increases the risk of site failure by imposing hydraulic head on the final cover (cap), by increasing the risk and magnitude of differential settlement, and by increasing the sites susceptability to damage by static and seismic loading.

2. HLA's estimate of leachate discharge across the sea wall appears to be low by a factor of 10 due to using the wrong coefficient of permeability.

3. Estimating the coefficient of permeability on the basis of a visual description of the soil introduces the possibility of a large error in the leachate discharge calculations and is not appropriate for this project.

4. It is probably impractical, and possibly undesirable, to attempt to dewater the site to bring it into conformance with Subchapter 15 regulations requiring wastes to be above the highest anticipated elevation of the capillary fringe.

5. In light of No. 4 above, the next best alternative is to encapsulate the site.

RECOMMENDATIONS

1. Prohibit the use of the site to dispose of dredge spoils.

2. Encapsulate the site with a physical barrier completely surrounding the site and a conventional impermeable cap.

3. Discourage the use of sheet piling and injection-type barriers.

If you have any questions, please contact me at (916) 322-0205.

Bud Eagle
Senior Engineering Geologist
Division of Technical Services