



California Regional Water Quality Control Board

Santa Ana Region



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Secretary for
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Protection

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Arnold Schwarzenegger
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MCAS EL TORO
SSIC NO. 5090.3.A

January 30, 2004

Base Realignment and Closure
Attn: Mr. F. Andrew Piszkin, P.E.
BRAC Environmental Coordinator
7040 Trabuco Road
Irvine, CA 92618

COMMENTS ON DRAFT FINAL TECHNICAL MEMORANDUM, UNSAT-H MODELING FOR SITE 2 AND SITE 17 LANDFILL COVERS, FORMER MARINE CORPS AIR STATION, EL TORO

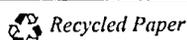
Dear Mr. Piszkin:

We have reviewed the above referenced document, dated December 2003, which we received on December 17, 2003. As you know, the vegetation is a key aspect of the control of infiltration of water into refuse at landfills with engineered alternative/evapotranspiration cover systems. Please be aware that we have not received your vegetation plan for the final cover at Landfill Sites 2 and 17. Therefore, all comments provided to you in this letter are subject to revision, pending your submittal of an acceptable vegetation plan.

We have the following comments:

- **Section 1.2.3 Proposed Landfill Cover, Page 1-2:** This section states that the landfill cover will be compacted to "about" 90 percent of maximum dry density. This statement should read compacted to a "minimum" of 90 percent of maximum dry density, as stated in Section 4.1 Conceptual Model.
- **Section 1.2.3 Proposed Landfill Cover, Page 1-2:** This section states that *the configuration includes a 4 ft thick ET layer overlying a 2 ft thick foundation layer consisting of existing soil cover.* However, Figure 4-1 shows a 1-ft thick foundation layer. Furthermore, contrary to the statement in Section 1.2.3, which indicated that the foundation layer will consist of existing soil cover, Figure 4-1 shows the foundation layer consisting of soil and selected waste. In addition, the reference to selected waste is unclear and requires clarification.
- **Section 2 BORROW SOURCE EVALUATION, page 2-1:** This section evaluates various borrow sources, including the mix of on-site soils. We are unfamiliar with the Loam soil borrow source area, and it has not been evaluated previously as a source. If this soil is proposed as a borrow source, then actual laboratory results are required to establish its suitability as landfill cover material.

California Environmental Protection Agency



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Also, mixing of soils to formulate a soil mixture suitable as final cover is very difficult, and often yields an inconsistent product during the various experimental efforts at blending. Your contractor experienced this during your own on-site trials, when the on-site and other soils were found to be difficult to blend. Therefore, if any further mixing of soil is proposed, a pilot project must be completed to ensure that the mixing methods can yield soils comparable to the characteristics of the soils defined in your model. During the construction, tight controls shall be placed on construction quality assurance.

- **Section 3.3.3 Selection of UNSAT-H Boundary Conditions, Page 3-3:** States that the upper boundary condition can either be a flux or constant head. The next sentence of your text indicates that a constant flux boundary was chosen. Please clarify.
- **Section 4.1 Conceptual Model, Page 4-1:** The data from slender wheat grass is used in the model as a surrogate for coastal sage. It is our understanding from discussions during meetings with your staff and contractors that you plan to vegetate the cover with a mixed population of coastal sage and wheat grass. However, we have not received a vegetation plan for Sites 2 and 17. If you plan to use two different plant species to vegetate the final cover, the input parameters for both species should be used, in the correct planting proportions, when running the model. As you know, we have previously informed you that Regional Board files include actual measured infiltration values for an alternative cover vegetated with coastal sage. You are welcome to review these records if they would be useful to you in calculating the input parameters.
- **Section 4.2 Climatic Analysis and Model Input Parameters, Page 4-1:** A 10-year climatic period is chosen for the model; our preference is for a longer time interval that includes a wider range of weather conditions. Your selected data are based on Earthinfo disc files that contain data only through 1993 (Table 4-1, Note). By selecting this time interval for applicable data, you ignore the data for the recent years, which includes the El Nino event of 1997-98. As you may recall, we specifically advised you to include this climatic event in your model to represent the worst-case scenario for infiltration of precipitation. Also, as a MCAS, the El Toro site must have had its own weather station. Are there any records from the on-site weather station that are available for your use?
- **Section 4.3.4 Input Parameters, Page 4-6:** Table 4-3 shows the Van Genuchten soil input parameters for the modeled soils (except for the state Prescriptive Cover and Loam soil). The α value selected for modeling infiltration through the state prescriptive cover does not correlate with the acceptable value for this factor, as discussed in the literature; in fact, your α value is a factor of 10 to 100 times larger. The model must be run with the correct α input parameter for the state prescriptive cover before comparing the modeled performance to that of the other proposed covers.
- **Table 4-3: Summary of Van Genuchten Soil Characterization Values, Page 4-6:** The United States Environmental Protection Agency, Region 9 Remedial Project Manager has informed us that their reviewer also questions the α input parameter used

for the state prescriptive barrier layer. These input parameters are listed as coming from a previous (draft version) technical memorandum. Unfortunately, we are unable to locate our copy of this memorandum, which was submitted in 1998, to ascertain the source of this parameter. Therefore, we are unable to evaluate the α parameter's validity, thus bringing into question the validity of your modeling results for the state prescriptive cover. It should be noted that modeling the state prescriptive cover for these sites is inappropriate. We have already stated that we would not accept a state prescriptive cover equivalent performance goal for these sites. We have consistently stated the performance goal (essentially zero infiltration through the landfill cover) that is appropriate for the proposed alternative cover.

- **Section 6 DISCUSSION**, Page 6-1: *"This modeling demonstrates that any of the modeled soils would meet the substantive requirement for the engineered alternative to the state prescriptive...."* It must be noted that only soils LF099, LF100, LF102, and soils meeting the permeability criteria for the state prescriptive cover were modeled. In addition, your modeling of the state prescriptive cover was based on at least one incorrect parameter, (see description in previous comment, above) and needs to be corrected. Therefore, the determinations made in this section are invalid at this time.

27 CCR 20080(b) allows for engineered alternatives that meet the prescriptive standard, such as a monolithic/ evapotranspiration cover. However, 27 CCR 20080(a)(1) states that Regional Boards may impose more stringent design requirements to accommodate regional and site-specific conditions. We have repeatedly informed the Navy and its contractors that our performance standard for leakage/flux/infiltration from the bottom of a monolithic cover into the engineered foundation layer is (essentially) zero. The only scenario in which the model predicted an acceptable performance was the LF-102 blend of 50 percent clay and 50 percent sand.

This cover leakage or flux performance standard is currently required for all major municipal solid waste landfill closure covers in our region. With the exception of one geographic/climatic area, we no longer accept a state prescriptive cover in our region. It has been demonstrated that monolithic covers can be feasibly and economically designed and constructed to meet our performance standard of essentially zero.

- **Appendix A Geotechnical Laboratory Results:** The laboratory Residual Volumetric Water Content values (θ_r) used for soil samples LF100 and LF 102 are set at 0.0. Therefore, all soil types must be modeled with $\theta_r=0.0$.

You have proposed to mix soils to achieve your design criteria. As a reminder, we believe you have missed an opportunity in this phase of modeling to evaluate soil blends of clay and sand other than the soil mixes previously modeled, or other soil sources that do not require mixing. However, since you will be addressing the comments listed above, you still have the opportunity to reconsider your choice of soil mixture, conduct the appropriate modeling, and submit the results for our review.

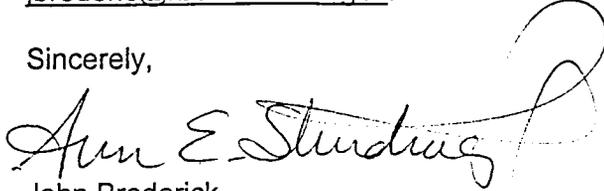
Mr. F. Andrew Piszkin, P.E.

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January 30, 2004

For any questions, please call me at (909) 782-4494, or send e-mail to jbroderic@rb8.swrcb.ca.gov.

Sincerely,



John Broderick
SLIC/DoD Section

for:

cc (via e-mail):

Ms. Nicole Moutoux, US EPA, Region 9
Mr. Rafat Abbasi, DTSC, Office of Military Facilities
Ms. Content Arnold, NAVFACENGCOM, Southwest Division

California Environmental Protection Agency