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Mr. Javier Polanco, P.E.
Environmental Engineer
Solid Resources Processing and Construction Division
Bureau of Sanitation
Department of Public Works
City of Los Angeles
1149 South Broadway, Suite 800
Los Angeles, California 90015

Subject: **Response to City of Los Angeles Local Enforcement Agency (LEA) (SWIS No. 19-AA-0820) Comments on November 13 revisions to the October 9, 2009 submission titled "Response to City of Los Angeles Local Enforcement Agency (LEA) Revision IV, Volume IV of IV, Replacement, Amendment to Final Closure Plan, Lopez Canyon Sanitary Landfill, July 31, 2008."**

Dear Mr. Polanco:

This letter has been prepared by Geosyntec Consultants (Geosyntec) to address the second set of comments dated 27 January 2010 received from City of Los Angeles Local Enforcement Agency (LEA) regarding the document titled "Revision IV, Volume IV of IV, Replacement Amendment to Final Closure Plan, Lopez Canyon Sanitary Landfill, July 31, 2008." The remainder of this letter provides the LEA's comments in italics, followed by our corresponding response.

Comment #1:

The revised Table 2-2a and 2-2c submitted on November 13, 2009 which calculates the cumulative annual infiltration now correctly reflects the actual Disposal Area "C" deck and slope surface area, and correctly calculates the estimated "weighted average" values for the annual infiltration through the Title 27 Prescriptive Cover and the proposed alternative evapotranspirative soil cover. The LEA requires that each individual component of the overall alternative evapotraspirative soil cover (Disposal Area C - Deck, and Disposal Area C- Slopes) have to meet the corresponding component's performance of the prescriptive cover. In other words, the LEA requires the cumulative

annual infiltration through the alternative evapotranspirative cover of the Disposal Area C-Deck area be less than the value of the cumulative annual infiltration through the Title 27 prescriptive cover of the Disposal Area C-Deck, and that annual infiltration through the alternative evapotranspirative cover of the Disposal Area C-Slope area be less than the value of the cumulative annual infiltration through the Title 27 prescriptive cover of the Disposal Area C-Slope areas.

Response #1:

The infiltration amounts for Disposal Area C at the Lopez Canyon Sanitary Landfill (LCSL) were estimated using a one-dimensional computer model (UNSAT-H) developed by the United States Environmental Agency. A vegetation cover of approximately 45% and root depth of approximately 1.5 ft were used to model the proposed ET cover performance using UNSAT-H.

The infiltration rate estimated through the Title 27 Prescriptive cover for the deck and slopes of Disposal Area C are approximately 0.627 cm/year and 23.98 cm/year, respectively. The estimated infiltration rate through the ET soil cover for the deck and slopes of Disposal Area C are approximately 1.09 cm/year and 1.09 cm/year, respectively. The cumulative annual infiltration rate through the Title 27 Prescriptive cover for Disposal Area C is approximately 3,407,252 gallons, while the cumulative annual infiltration rate through the proposed ET soil cover is approximately 411,340 gallons both as estimated using the weighted average methodology.

Although the infiltration rates for the deck and slopes of Disposal Area C were estimated separately, the decks and slopes of Disposal Area C are part of the same waste disposal unit with the same leachate collection and landfill gas management system. In other words, percolation that infiltrates through the cover systems, whether it is through the deck or slopes of Disposal Area C, will end up in the same waste mass and eventually will be collected by the same leachate collection system.

Additionally, the observed minor difference in the estimated average annual infiltration rate of approximately 0.463 cm/year (i.e., 1.09 cm/year – 0.627 cm/year) or 0.18 inch/year between the Title 27 prescriptive and ET soil cover is considered to be fairly small and may be considered within the margin of error for the program.

A comparison of the overall performance of the ET soil cover and Title 27 prescriptive cover indicates that the proposed ET soil cover systems significantly outperforms the Title 27 prescriptive cover system. The ET soil cover significantly reduces the total infiltration

in excess of 2.9 million gallons/year when compared to the Title 27 prescriptive cover (i.e., 3,407,252 – 411,340 = 2,995,912 gallons).

Therefore, based on the cover systems performance modeling results and based on our previous experience with these types of cover systems, it is our professional opinion that a properly constructed 5-ft thick ET soil cover (with a minimum vegetative coverage of approximately 45% and root depth of approximately 1.5 ft) is a better cover than the Title 27 prescriptive cover for the final closure of Disposal Area C at the LCSL.

Comment #2:

The November 13, 2009 revision also corrected the value "Cumulative Annual Infiltration" rate for both the Title 27 Prescriptive Cover and the Evapotranspirative Cover in Table 2-2a and Table 2-2c which was previously incorrectly calculated by the simple addition of the individual component infiltration rates (e.g., infiltration rate for deck area and infiltration rate for slope area).

Response #2:

Comment noted. These revised tables will be inserted into the July 31, 2008 Replacement Amendment and resubmitted to the LEA and the Los Angeles Regional Water Quality Control Board.

Comment #3:

The Geosyntec Consultants revised calculations show that the "rooting depth" variable and the "percentage of vegetation coverage" variable of the proposed evapotranspirative cover needed to meet the equivalent performance of the Title 27 prescriptive cover has to be changed. The rooting depth in the model has been revised to be 4.5 feet (formerly 1.5 feet), and the percentage of vegetation cover is increased to 75% (formerly 45%).

Response #3:

The sensitivity analysis with variation in vegetative coverage and root depth were performed at the request of the Los Angeles LEA to assess the effect of vegetative coverage and root depth on the performance of the proposed ET soil cover. The sensitivity analysis results presented in our response letter dated 9 October 2009 were prepared for this purpose only and are not part of our recommendation for the modeled

ET design/construction. Based on our field observations, site conditions, and our previous experience at the site, vegetation cover of approximately 45% and root depth of approximately 1.5 ft is sufficient for the modeled ET soil cover performance for Disposal Area C at the LCSL.

These recommendations are additionally supported by the results of the final cover performance analysis and the results of three long-term cover performance monitoring programs for existing ET soil cover systems constructed using similar soil and vegetation types at the site (i.e., deck of Disposal Area AB+, Slopes of Disposal Areas A and AB+), which indicates that the existing ET soil cover systems meet and/or exceed Title 27 performance criteria. Additionally, decks and slopes of Disposal Areas A, and AB+ at the LCSL have been approved and successfully closed using ET soil cover.

Comment #4:

With the revised variables which reflect increased rooting depth and vegetation coverage, the UNSAT-H model now shows that the cumulative infiltration (gallons per year) for each of the components of the alternative evapotranspirative cover (alternative evapotranspirative cover for the Disposal Area C-Deck, and also for the alternative evapotranspirative cover of the Disposal Area C-Slope), will meet or exceed the performance of a Title 27 prescriptive cover design.

Response #4

See response to Comment # 3.

Comment #5

On the October 9, 2009 submission titled "Response to City of Los Angeles Local Enforcement Agency (LEA) Comments on "Revision IV, Volume IV of IV, Replacement, Amendment to Final Closure Plan, Lopez Canyon Sanitary Landfill, July31, 2008, please correct the "Response #1" to reflect the usage of consistent units, and delete (or correct) the incorrect statement that ".....the infiltration rate is less than the 3mm/year".

Response #5:

Topographical error noted and will be corrected by deleting the erroneous statement.

Comment #6:

The performance of the evapotranspirative cover is dependent upon significantly increased vegetation coverage and increased minimum root depth. Please review the current proposed/actual vegetation to make sure that they will provide the increase rooting depth. Please also provide a description of the methods/protocols that will be used to monitor the vegetation coverage and rooting depth. Also provide a description of the corrective actions to be taken if the rooting depth is not achieved.

Response #6:

Based on our previous experience, the results of the cover performance analysis, and our field observations, vegetative coverage of approximately 45% and root depth of 1.5 ft is sufficient for the performance of the proposed ET soil cover systems for Disposal Area C at the LCSL. Therefore, it is our professional opinion that the current proposed design for the ET soil cover remain as reflected in the Revision IV, Volume IV of IV, Replacement, Amendment to Final Closure Plan, for LCSL.

Please contact the undersigned at 714.969.0800 if you have any questions or require additional information.

Sincerely,

Yonas Zemuy
Engineer

Jeffrey G. Dobrowolski, P.E.
Associate

LIST OF REFERENCES

Geosyntec [1998a], "Alternative Final Cover Water Balance Analysis, Decks of Disposal Areas A, B, and AB+, Slopes of Disposal Areas A, and AB+, Lopez Canyon Sanitary Landfill, Lake View Terrace, California," Report prepared for Bureau of Sanitation, Resources Disposal, and Engineering Division, Department of Public Works, City of Los Angeles, April.

Geosyntec [1998b], "Alternative Final Cover, Water Balance Analysis, Decks of Disposal Areas A, B, and AB+, Slopes of Disposal Areas A, and AB+, Lopez Canyon Sanitary Landfill, Lake View Terrace, California," Report prepared for Bureau of Sanitation, Resources Disposal, and Engineering Division, Department of Public Works, City of Los Angeles, Revision 2, 13 November.

Geosyntec [2001], "Alternative Final Cover, Installation of Moisture Monitoring Stations, Slopes of Disposal Areas A and AB+, Lopez Canyon Sanitary Landfill, Lake View Terrace, California," Report prepared for Bureau of Sanitation, Solid Resources Engineering and Construction Division, Department of Public Works, City of Los Angeles, March.

Geosyntec [2002a], "Alternative Final Cover, Water Balance Model Calibration, Slopes of Disposal Area A and AB+, Lopez Canyon Sanitary Landfill, Lake View Terrace, California," Report prepared for Bureau of Sanitation, Solid Resources Engineering and Construction Division, Department of Public Works, City of Los Angeles, March.

Geosyntec [2002b], "Alternative Final Cover, Water Performance Evaluation, Slopes of Disposal Area A and AB+, Lopez Canyon Sanitary Landfill, Lake View Terrace, California," Report prepared for Bureau of Sanitation, Solid Resources Engineering and Construction Division, October.

Geosyntec [2004], "Final Report of Construction Quality Assurance Monitoring, Final Cover Construction, Deck of Disposal Area AB+, Lopez Canyon Sanitary Landfill, Lake View Terrace, California," Report prepared for Bureau of Sanitation, Solid Resources Engineering and Construction Division, Department of Public Works, City of Los Angeles, August.

Geosyntec [2007], "White Paper-Alternative Cover For Disposal Area C, Lopez Canyon Sanitary Landfill, Lake View Terrace, California," Report prepared for Bureau of Sanitation, Solid Resources Engineering and Construction Division, Department of Public Works, City of Los Angeles, August.

Geosyntec [2008a], "Revision IV, Volume IV of IV Replacement Amendment to Final Closure Plans, Lopez Canyon Sanitary Landfill, Lake View Terrace, California," Report prepared for Bureau of Sanitation, Solid Resources Engineering and Construction Division, Department of Public Works, City of Los Angeles, July.