Dr. Daniels, this was sent in draft to US Ecology 12/7/95.

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| To Marisa Quinn | From SREE K |
| Co./Dept. USEN | Co. NDEP |
| Phone # | Phone # 687-9471 |
| Fax # 775/553-2742 | Fax # |

12/7/95, 6/4/96, 9/13/06, 11/4/06 letters

December 7, 1995

DANA LOCKWOOD
MANAGER ENVIRONMENTAL HEALTH AND SAFETY
AMERICAN ECOLOGY
5333 WESTHEIMER SUITE 1000
HOUSTON TX 77056-5407

RE: Conceptual Design of Cell 12

Dear Mr. Lockwood

The Division has considered the proposed alternative design for Cell 12 as presented by US Ecology in our meeting of December 1, 1995. An alternative design may be considered by the Administrator if it can be demonstrated that such a design is "equivalent", that is, (1) will prevent the migration of any hazardous constituent into the ground water or surface water at least as effectively as the liners and leachate collection and removal systems specified in 40 CFR 264.301(c); and (2) will allow detection of leaks of hazardous constituents through the top liner at least as effectively.

For the permeability criterion alone, a 5 millimeter GCL with a permeability of $3 \times 10^{-9}$ cm/sec is equivalent to three feet of compacted clay with a permeability of $1 \times 10^{-7}$ cm/sec. However, the GCL fails to be "equivalent" to a three-foot compacted clay liner with respect to the properties of adsorption capacity and puncture resistance. The Division is not dismissing the technical and practical advantages of GCLs or suggesting that a liner system that utilizes a GCL is inherently not "equivalent". However, a design that is not equivalent for all criteria (see Table 7.3, Summary of Equivalency Assessment, from Report of Workshop on Geosynthetic Clay Liners, by David Daniels) is not acceptable. An alternative design that utilizes a layer of compacted soil material of somewhat lesser thickness than three feet (e.g., 18 inches) in conjunction with a GCL would be considered, but a GCL alone does not satisfy the equivalency requirement.

Because the adsorption capacity and puncture resistant properties of an

acceptable alternative design would likely require the inclusion of a compacted soil layer of some kind, the 0.5:1 side slopes present an additional design problem for two reasons: (1) it is unlikely that a compacted soil liner could be constructed at this steep of a slope; and (2) it is questioned whether the GCL will support the tensile loading under these conditions. The use of such a steep side slope presents a difficult engineering challenge in meeting the current design standards. The Division is not convinced that an acceptable liner system can be designed and constructed or maintained at this slope, but will carefully evaluate a proposed solution which addresses our concerns.

In addition to the equivalency of the GCL to the CCL and the side slope issues, there are some additional concerns raised in the attached memorandum addressed to me from Cathe Pool. Among others, these include the floor slope and drainage system design. Once you have opportunity to review this letter and attachments, please contact me so we can further discuss.

Sincerely,

Jeffrey C. Denison, P.E.
Supervisor, RCRA Facilities Branch
Bureau of Waste Management

JCD

cc: Cathe Pool