217/524-3300

OWNER/OPERATOR
Clinton Landfill, Inc.
Attn: Mr. Ron L. Edwards
P. O. Box 9071
Peoria, Illinois 61612-9071

Re: 0390055036-- DeWitt County
Clinton Landfill 3
Log No. 2008-054
Permit File

Dear Mr. Edwards:

This will acknowledge receipt of your permit application that includes a proposal to redesign the approximately 22.5 acres in the southwest corner of the above referenced landfill. The referenced permit application is dated February 1, 2008 and was received by the Illinois EPA on February 5, 2008.

Your permit application is denied.

You have failed to provide proof that granting this permit would not result in violations of the Illinois Environmental Protection Act (Act). Section 39(a) of the Act [415 ILCS 5/39(a)] requires the Illinois EPA to provide the applicant with specific reasons for the denial of permit. The following reasons are given:

1. Page 29 through 31 describe the site geology (Upper and Lower Radnor Sand and Organic Soil) based on borings and isopleths contained in another application (Log No. 2005-070), which was previously approved. The minimal requirements for a GIA require documentation of all input as part of the application. Such documentation of the site geology and site hydrogeology for the development of the conceptual model (e.g., borings, isopleths, and cross-sections) must be contained in the application.
2. Regarding the Upper Radnor Sand, the application states that it has a limited lateral extent, and will be "…removed from the landfill floor perimeter as shown on Drawings Nos. P-EX1 and P-EX2 (submitted previously under Log No. 2005-070). As stated above, a new GIA was not performed on this unit." Along with the cross-sections and isopleths, Drawings P-EX1 and P-EX2, documenting the removal of the Upper Radnor Sand, must be provided as part of this application. Please note, if the Sand is removed from beneath the landfill, but still exists adjacent to the sidewall, it still must be modeled.
3. The Agency does not concur with the wells used for the gradient calculations in the Lower Radnor Sand. EX-4 should be substituted for EX-15, based upon flow

direction. Further, the Agency could not duplicate the gradient calculations between EX-7 and EX-15. Agency calculations between EX-4 and EX-7 indicate a mean of .009, as opposed to the mean of .007 provided in Table 812.314-9. However, since the model used a more conservative gradient of .01, no change to the model will be required. The calculations and Table should be updated.

4. The Agency does not concur with the gradient calculated for Upper Radnor Sand. Wells EX-22S and EX-23S should be used for the calculations, rather than EX-21S and EX-23S. Except for 1 quarter, EX-22S is not perpendicular to the potentiometric lines, whereas, G22S is always in the direct line of flow. Further, EX-22S to EX23S yields a more conservative result, (e.g., 0.011 for the first quarter, as opposed to the calculated .0078). The calculations and Table should be updated.

5. The Agency does not concur with the gradient calculated for Organic Soil. Wells EX-14 and EX-20 should be used for the calculations, rather than EX-24 and EX-20. EX-24 to EX-20 is not perpendicular to the potentiometric lines. Further, EX-14 to EX20 yields a more conservative result. The calculations and Table should be updated. Also, this change will affect horizontal Darcy Velocity in the model.

6. The conceptual potentiometric map for the Lower Radnor Sand groundwater flow direction, which determines landfill length in the model was based on 2003-2007 groundwater level averages. This data was not provided. Groundwater flow is shown to be to the west southwest. However, 3 of the 4 current (2007) potentiometric maps show the flow to the southwest. This difference is significant in terms of how landfill length is developed, as the current data would indicate a landfill length along a diagonal from the northeast corner to the southwest corner. This would yield a greater landfill length, than what is currently conceptually represented.

7. The information provided in Attachment 13 is not adequate documentation for layer thicknesses input into the models. Only calculations (division of volumes) were provided in this attachment; there was no information as to how the volumes were derived. If modeling was used to determine the volumes, the following information must be included: all model input and output, as well as discussion and documentation of all model input.

8. The application (pages 32 and 33) states that the average thicknesses of the Lower Radnor Sand and Organic Soil are 2.8 feet and 3.42 feet, respectively, based on boring data submitted in a previous application 2005-070. This information must be provided with the application.

9. The application states that site-specific total porosities were developed by laboratory testing. These laboratory test results should be provided in this application.

10. The applicant states that the mean total porosity for the recompacted clay liner is 0.288 and this value is input into the model. Similarly, the measured total porosity for the Barry Clay of 0.286 was input to the model. There is no justification for these input: page 35 states (and the Agency agrees) that effective

porosity is less than total porosity. The model requires effective porosity input. Therefore, porosity input should be a fraction of the total porosity.

11. It cannot be determined if an effective porosity of 0.05 for the Lower Radnor Sand is representative. There is no section in this application that provides a detailed discussion of the site-specific geology, so it is unknown how much, if any, silt is in this sand unit. As no cross-sections are provided, it cannot be determined from the few boring logs included with the application what units are represented at what depth. Assuming that the Lower Radnor Sand unit is primarily sand, the effective porosity of 0.05 is too low. "Contaminant Transport in Groundwater" a chapter by Mercer and Waddell in Handbook of Hydrology, Maidment (1993), indicates an effective porosity for sand is 0.2. Other sources indicate a range from 0.1 to 0.55.

12. The application is not consistent in the description of the witness zone design: in the conceptual model (Attachment 13) it is described as geocomposite, yet in the Attachment 14 calculations and HELP modeling a geonet is represented. In the Drawings (e.g. D8, the notations indicate that either geocomposite or geonet will be used). The scenario modeled is the only design that would be allowed by permitting. The application must specify the materials to be used in liner design and that scenario must be represented in calculations and modeling.

13. Calculations for seepage through the liner in Attachment 14 yield a seepage rate, 1.42 x 10-7 m/y, that is approximately 3 orders of magnitude too low. The conceptual model assumes a constant head for the life of the facility + post-closure + 70 years. The most conservative seepage rate from that period of time must be used, and is usually based on seepage from the cumulative maximum leachate head from the 100 year period. The Attachment 14 calculations fail to take this into consideration: The Step 2 ymax (the daily maximum) of 0.0003 in. (0.00001 m.) cannot be used to represent the entire modeling period, as it has been used in Step 3 to develop the seepage rate. In Step 2, it first must be demonstrated that the daily max is static for active life and the 30 year post-closure period while leachate is actively removed. If so, then head for the 70 year period after closure must be calculated (e.g., .00001 m x 365 d + .00001 m x 365 d x 70 y = .26 m). If the daily max from the active life and post-closure period is not static, any additional accumulation greater than .00001 (for the active life and 30 year post-closure period) must be added to the .26 m. This value of (.26 m or greater) would then be used in Step 3 to develop seepage. (If leachate is to be extracted for the entire modeling period, financial assurance for 100 years after closure must be provided.)

14. At this time, the Agency cannot agree to the horizontal Darcy velocities calculated for the Lower Radnor Sand and Organic Soils until gradient questions are resolved.

15. The Agency does not concur with the calculated "transverse" dispersivities for the following reasons: Gelhar should be used to determine transverse and vertical dispersivities, not 20% of the horizontal; vertical dispersivity is represented in the model, not transverse; and, vertical Darcy velocity is so low, that vertical dispersivity will be diffusion dominated.

16. Although the correct equation was used calculating hydrodynamic dispersion, there are questions regarding gradient and effective porosity in the Lower Radnor Sand, and gradient in the Organic Soil. If changes are made to these parameters, resulting in different horizontal Darcy velocities, hydrodynamic dispersion will have to be recalculated.

17. The Agency does not concur with the vertical dispersion. Vertical velocities are so low, vertical dispersion will be diffusion dominated. Further, vertical dispersivity was incorrectly determined. The vertical dispersion coefficient should reflect the diffusion coefficient.

18. If the facility will be accepting PCBs at concentrations up to 500 mg/L (500,000 ug/L), 500,000 ug/L should be represented in the model, not 100 ug/L. The normalized leachate concentrations, multiplied by 500,000 ug/L, then compared to the AGQS in the revised models.

19. The model input for vertical velocity in the Sand units of both models is set to "0". There is no discussion within the text justifying this input. Vertical velocity should be consistent throughout the model layers unless it can be shown that an upward gradient exists.

20. Well spacing model input: For the Radnor Sand, dispersivity per Gelhar (1992) was said to be 44 ft and transverse dispersivity of 20 % of this value is 9 ft. These values are extremely high and unsupported by the sited document (Gelhar, 1992). Based on Gelhar text and Figure 3, horizontal dispersivity for 50 feet (15 m) is approximately 1 meter or 3 feet. Transverse dispersivity should be an order of magnitude less, or .3 feet. However, dispersivity should be determined by the entire flow length considered (50 feet + sidewall + distance to MAPC wells = 80 m). Based on 80 m and Gelhar, for the Radnor Till, horizontal and transverse dispersivity should be approximately 10 ft and 1 ft respectively. For the Organic Soil, they should be 7 ft and .7, respectively.

21. The application proposes to monitor only the 811 list, stating that the G1 list is representative of liner failure. This is true for only the MSW units, not the CWU. PNAs and PCBs are representative of the CWU waste, but are only proposed for monitoring if they are detected in leachate. This is not appropriate. The application should propose a monitoring schedule for the following parameters of concern in the downgradient CWU unit wells: PCBs, Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthrene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Pentachlorophenol, Dibenzo(a,h)anthracene, Fluoranthrene, Ideno (1,2,3-cd)pyrene, Phenanthrene and Pyrene.

22. Review of the potentiometric maps, particularly the Lower Radnor Sand, indicate that the following wells should be included in the CWU phasing plan: G52M, G52D, G52R, G53M, G53D and G53R.

23. The final water volume from the 8th intermediate cover run was not input as the initial water content in the 30 year closure run for all layers. Specifically, Layers 12 and 14 from the last intermediate cover run correspond to Layers 10 and 12 in the 30 year closure run; however, the final water volume from the 8th intermediate

run were not reflected as the initial soil water content in the 30 year closure run. This should be revised and the 30 year closure and 70 year post-closure period models should be re-run.

24. The 70 year post-closure period HELP runs could not be completely reviewed. It appears that it was a 2-sided document that was only copied as 1-sided (e.g., every other page is missing).

25. During the final 70 years, the leachate collection system is not operational; however, in the 70 year post-closure period HELP run, the lateral drainage layer, 14, is still active. (The page showing the input for the other lateral drainage layer, 10, is missing; however, it would appear from the daily values report that it had been converted to a vertical percolation unit.) Drainage layer 14 should be converted to a vertical percolation unit and the model re-run.

Within 35 days after the date of mailing of the Illinois EPA's final decision, the applicant may petition for a hearing before the Illinois Pollution Control Board to contest the decision of the Illinois EPA, however, the 35-day period for petitioning for a hearing may be extended for a period of time not to exceed 90 days by written notice provided to the Board from the applicant and the Illinois EPA within the 35-day initial appeal period.

Should you wish to reapply or have any questions regarding this application, please contact Imran Syed or Gwenyth Thompson at 217/524-3300.

Sincerely,

Stephen F. Nightingale, P.E.
Manager, Permit Section
Bureau of Land

SFN:IMS

cc: George L. Armstrong, P.E., PDC Technical Services, Inc.