

County of DeKalb
DeKalb County Board
c/o Clerk of DeKalb County
110 East Sycamore Street
Sycamore, IL 60178
Subject: Responses to Patrick Engineering Comments
Expansion of DeKalb County Landfill

Dear County Clerk,

Geo-Hydro, Inc. (GHI) has reviewed the responses provided to the DeKalb County Board by Patrick Engineering (PE) pertaining to GHI's comments on the siting application for the expansion of the DeKalb County landfill. PE's responses can be generally described as falling into two broad categories. In the first category, PE proposes that DeKalb County defer to the Illinois Environmental Protection Agency (IEPA) on two levels. The first level is to trust that the IEPA will at some point in the future require that Waste Management, Inc. (WMI) produce a complete and accurate application, one with all the information and analyses DeKalb County properly should have been provided for its review prior to making a Siting decision. The second level of deferral to the IEPA is to trust that IEPA decisions will be consistent with the decisions DeKalb County would have made to protect the public health, safety and welfare of DeKalb County citizens, had the County been given a complete and accurate Siting Application allowing it to make informed decisions. It is noted that this deferral to the IEPA precludes any opportunity for the Board to deny Siting approval to WMI. In the second category PE proposes that unless a recommendation or analysis is explicitly required by the county ordinance, the County cannot ask for it to assist the County's deliberation.

Neither of these proposals by PE withstands logical consideration. Illinois splits landfill siting and permitting authority and responsibility. The IEPA cannot approve a landfill site. It can only issue construction and operating permits and regulate the landfill's activities during construction, operation, and for a period after closure. Statute and regulation in Illinois provides only the DeKalb County Board the authority to approve or reject the siting application as protective or not protective of the public health, safety and welfare. Given this charge, we believe it appropriate that the County Board require submission of a complete and accurate application, as well as all requested information and evaluations the Board deems necessary to make its determination. The information and criteria necessary for permitting and for siting approval are, while significantly overlapping, different. For the DeKalb County Board to accept PE's proposals and to act on the basis of an application that contains outdated or missing information, relying on the hope that the stretched- thin resources of the Illinois EPA will identify and rectify the identified issues and correct them in a manner consistent with the Board's intent is effectively an abrogation of the Board's siting authority and responsibility. It is also a hope that need not be left to chance; we believe the Board can and should insist on these changes. It is within the authority of the DeKalb County Board to require the applicant to meet the Board's criteria to obtain approval of their siting request.

Each of Patrick Engineering's responses are discussed individually below:

Seismic Stability Evaluation

The siting application submitted to the DeKalb County Board states that the proposed landfill is not in a seismic impact zone. This assertion was outdated at the time of the hearings before the Board. The calculated seismic stability safety factors in the application were based on outdated expected peak horizontal acceleration values. GHI correctly pointed out that the increase in expected seismic acceleration from 0.8g to around 0.11g is non-trivial. **PE opines that it doesn't expect the increase will require significant redesign, but performed no analysis to support that expectation. No one has submitted the analysis required to evaluate the seismic stability of the proposed landfill design at the current expected peak acceleration, as required for a facility within a seismic impact zone. No one knows if, or the degree, there will need to be a redesign when the required analysis is done. But, a decision before that analysis is done means that the Board will have reached its decision by considering a facility with a potentially different design than the one before it. GHI is simply pointing out that for the DeKalb County Board to reach a valid decision on whether the facility is so designed as to be protective of the public health, safety and welfare, the actual design information must be included in the submittal before it and the public. Approval the application based on data and analyses that are known to be outdated and are under-predictive of the risk to the design is not protective of the public health, safety and welfare. Until such time as the required factor of safety can be demonstrated with the existing design or the design has been appropriately modified to achieve the required factor of safety, the application should be rejected.**

Long-Term Groundwater Consequences and Lack of a Groundwater Impact Assessment (GIA)

The response from PE to these comments seems to miss the point of GHI's original comments. PE's comments largely focus on groundwater impacts during the operating and post-closure periods of the permit. GHI agrees with PE that the inward gradient is protective against outward flow (but not outward diffusion), but only so long as the inward gradient exists.

GHI's original comments describe the eventual development of final equilibration of the landfill with the surrounding environment; a condition that will develop after the 30-year post closure care and monitoring period is over. Groundwater inflow through the liner and infiltration through the cap will begin to saturate the waste after the leachate collection system ceases to be operated. Leachate formed from the contact and interaction of this water and the waste will eventually saturate the waste to an equilibrium level, the level at which the amount of water flowing into the landfill through the cover liner equals the amount of leachate leaking from the landfill; i.e., a permanent outward gradient eventually replaces the temporary inward gradient touted by PE as being so protective.

If the landfill is successfully constructed as described in the siting application, the closed landfill will reach the final equilibrium condition, and the effects of outward flow from the landfill on local groundwater will become detectable only long after

IEPA-required monitoring of the site has ceased. Citizens of DeKalb County, and the Board, will be left to detect groundwater contaminants the hard way, through their drinking water supply wells.

The application includes no evaluation of the magnitude or impact of these equilibrium releases. IEPA does not consider or require evaluation the final equilibrium condition as part of its permitting process. (If built as represented in the siting application, the landfill will likely still have the inward gradient condition at the end of the period of concern to the IEPA.) Thus, an evaluation of the permanent, final relationship between the facility and the surrounding environment will only be done if it is required by DeKalb County as part of a demonstration that the facility is located, designed, and proposed to be operated so as to be protective of the public health, safety, and welfare beyond the period of concern to the IEPA. **The evaluation GHI recommends be performed sometimes is referred to as a groundwater impact assessment or GIA**

The IEPA will require the applicant to submit a type of GIA as part of its permit application. The GIA required by IEPA as part of WMI's permit application is a computer simulation that is required to calculate expected contaminant concentrations 100-feet from the waste boundary that should develop over the first 100 years following landfill closure, the period of interest in the IEPA permit. So long as the levels of contamination caused by the landfill do not exceed the standards assigned to the landfill within the period of interest, the permit is granted. **The assessment recommended by GHI goes beyond the assessment that IEPA will require for its permit. GHI recommends that DeKalb County has the applicant assess the final, permanent equilibrium condition, not just the interim condition of concern to the IEPA. Regardless of whether the county ordinance requires submittal of the IEPA permit GIA with the siting application, as discussed by PE, an evaluation of the final equilibrium condition is certainly appropriate and legitimate for consideration as part of a determination of protection of the public health, safety, and welfare by DeKalb County.**

There is no reason the Board cannot require submittal of an equilibrium GIA to support their deliberations. Nor is there restriction on the applicant that prevents submittal of such equilibrium GIA as part of the siting application. IEPA-type GIAs are routinely included in many Illinois siting applications where the applicants choose (or are required) to submit it. Asking the applicant to use that computer simulation as the template to evaluate the final equilibrium condition is not unduly burdensome and would allow the County the opportunity to understand impacts that are not of concern to, or part of, IEPA permit evaluation. **The DeKalb County Board should require the applicant submit the results of a GIA designed to evaluate the impacts to groundwater that will develop once the landfill reaches its final equilibrium condition as part of a demonstration of protection of the public health, safety, and welfare.**

Verification of HELP Modeling

GHI recommended that DeKalb County require that HELP model simulations of monthly leachate generation in each individual landfill cell be verified by cell-by-cell leachate production rates reported for both the operating and closed conditions. We did not, however, specify that historic data be used in that evaluation as inferred by PE in its

response comments. Clearly historical data must be input to HELP for design purposes. **However, GHI's recommended further use of HELP is for performance evaluation, not further design. Once the landfill is built as designed, HELP should be used with actual monthly rainfall records to calculate the amount of leachate that should be generated in each cell, based upon the design and operational status of the cell. We also recommended that the County require that the actual volume of leachate pumped from every individual open or closed landfill cell be reported on a monthly basis. Comparison of predicted to the actual leachate generation rates would provide an indication of whether individual cell liner and cover systems are functioning as planned and provide an early indication if a problem with the landfill liner has developed.**

Similarly, requiring collection and chemical analysis of leachate from each individual landfill cell on a semi-annual basis would provide an indication of how the in-place leachate control system is operating. Tracking the chemistry of leachate in each cell, in parallel with fluid production anomalies, would allow the County and WMI to identify unexpected changes that signal breaches or construction flaws in the landfill liner or cover systems and allow for timely implementation of remedial measures.

GHI did not suggest that piezometers be installed before filling each cell is complete. **GHI does recommend that the County require installation of piezometers within each completed cell in order to assure accurate measurement of leachate elevation. This is a low-cost and very effective method of monitoring any build-up of leachate in closed landfill cells that occurs in spite of leachate extraction.**

In the application, the County has been provided an unverified and uncalibrated simulation of the performance of the leachate extraction system and of liner and cover performances that document WMI's pre-construction estimate of the designed level of protection of the public health, safety and welfare. This recommendation expands that simulation technology to allow DeKalb County and WMI the ability to continually assess whether the landfill, as built and operated, demonstrates a comparable level of protection, and the opportunity to intervene proactively if a problem presents.

Site Characterization and Post-Construction Monitoring

GHI continues to recommend that the proposed groundwater monitoring system be evaluated, by adapting the model developed as part of the IEPA-type GIA, to determine if the location, depth, and spacing of monitoring points is sufficient for the post-construction hydrologic conditions. **The presence of significant vertical gradients between hydrogeologic units surrounding and beneath the proposed landfill indicate the potential for leachate migration to pass beneath the proposed monitoring points. The siting application does not contain a groundwater model capable of evaluating the effect of vertical gradients on three-dimensional migration of contaminants through the subsurface for this facility when constructed. The model required the IEPA GIA could be adapted to allow this potential to be assessed. Without this type of evaluation, the decision of the DeKalb County Board would necessarily be based on intuition and speculation that the monitoring points are appropriately placed. GIAs are routinely included in many Illinois siting applications, whether or not the**

siting authority requires it. The Board should not make a decision to approve the proposed landfill and associated monitoring system without benefit of all pertinent information and evaluations provided to other localities.

Extended Post-Closure Monitoring

In its responses to GHI's comments, PE stated, "...the Illinois EPA will not release the site from the 30-year post-closure care period until the operator can demonstrate that the landfill does not pose a risk to the groundwater." The response entirely misses the point of GHI's original comment and is somewhat misleading. The demonstration to which PE alludes is done with a computer projection based upon interim conditions at the landfill at the time of the demonstration and a lack of "risk" established by a projection of an acceptable level of contamination 100 feet from the waste, 100 years hence. GHI's original comments addressed the need for data representative of the final equilibration relationship of the landfill with the surrounding environment; a condition that will only develop after the 30-year post closure care period, after pumping of accumulating leachate ends and after permit-related groundwater monitoring is over.

If the landfill is successfully built and operated as WMI has proposed in the application, it will take many years beyond the 30-year post-closure care period for equilibrium groundwater conditions to be reached. Only then will the flow of contaminants add to the diffusion of contaminants from the landfill into groundwater and migrate away from the landfill. Neither DeKalb County nor the IEPA will have a way to identify and evaluate the contamination migrating from the landfill in the final condition without a requirement to extend groundwater monitoring significantly longer than the IEPA-permitted 30-year post-closure care period. Failure to require extended groundwater monitoring on the part of the DeKalb County Board could allow DeKalb County groundwater to be contaminated by the landfill with no system in place to detect its presence until it impacts a DeKalb County water supply well or it discharges to DeKalb County surface water. It is entirely within the siting authority of the DeKalb County Board to require extended groundwater monitoring to the point that equilibrium groundwater conditions are reached and those conditions can be assessed with observational data.

The above comments are submitted to the DeKalb County Board for consideration while evaluating the Site Location Application for expansion of the DeKalb County Landfill.

Sincerely,

Charles H. Norris Mark A. Hutson

Geo-Hydro, Inc. Geo-Hydro, Inc.

I hereby certify and affirm that the statements and information contained in these comments are true and complete to the best of my knowledge and belief, and that all work performed in the preparation of these materials was done by me or under my direct responsible supervision.

Charles H. Norris

April 9, 2010

Professional Geologist Date

196.001082, March 31, 2011

Illinois Professional Geologist Registration Number and Expiration

Geo-Hydro, Inc.

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