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State of North Carolina
Department of Environment, Health, and Natural Resources
Division of Solid Waste Management
P.O. Box 27687 · Raleigh, North Carolina 27611-7687

James G. Martin, Governor
William W. Cobey, Jr., Secretary

William L. Meyer
Director

October 30, 1989

Mr. Barry Nelson
Chief Hydrogeologist
Engineering Techtonics, P.A.
P.O. Box 11846
Winston-Salem, N.C. 27106

RE: Monitoring Well Construction At The Alamance County Landfill
(Permit #01-01)

Dear Mr. Nelson,

In reference to your letter of October 19, 1989, I am rather surprised that you seem to have forgotten the content of our second telephone conversation and are now reiterating the arguments you made in our initial conversation. My letter to Mr. Ernest Perry of September 12, 1989, which was based on the inaccurate well records available to me at that time, is a reasonable response based upon that data.

These Well Construction Records indicate that three of the wells have no bentonite seal or other seal capable of isolating the targeted hydraulically conductive zone for monitoring or capable of preventing the potential spread of contamination in the fractured bedrock. For well MW-2 the Well Construction Record indicates that the casing ends at a depth of 28 feet, which according to the drilling log is in a soil layer two feet above competent bedrock. Two of the wells constructed are open wells which are clearly prohibited in our "North Carolina Water Quality Monitoring Guidance Document for Solid Waste Facilities" (refer to page 1, paragraph 1).

Regarding point 2 of your letter, on what basis do you infer from our well schematic diagram that our method "employs drilling of the borehole through the regolith and the bedrock in a single step"? The well schematic merely shows what we expect the end product to look like, not what techniques are utilized to achieve this type of well construction. As we agreed in our second telephone conversation, a two step drilling operation (such as that described in your letter) is desirable for wells constructed in consolidated formations in order to prevent the possible spread of contamination during well installation.

Our office is very much aware of the differences in possible well construction techniques in bedrock and porous media. Acceptable monitoring well design may or may not vary with different types of geologic media depending upon the hydrogeological setting, well depth, and the type and purpose of the ground-water monitoring to be conducted. Open wells in fractured bedrock are often acceptable for drinking water wells and for some monitoring wells, as I am quite sure Don Link and other representatives of the Division of Environmental Management would attest. From a purely technical standpoint, wells properly constructed in this manner may be suitable in certain hydrogeologic settings.

However, since these monitoring wells were installed to a depth of 30 feet into bedrock, rather than 15 feet into bedrock (as specified in the June 1, 1988, letter from Sharon Myers of our office to Mr. Ernest Perry of the Alamance County Health Department), these wells fail to isolate a limited hydraulically conductive zone. As stated in my September 12 letter, this not only makes the well relatively ineffective for monitoring purposes, but also introduces the possibility for the spread of contamination. In order to establish consistency and introduce further control in isolating conductive zones in many highly varied hydrogeologic settings, there has been a general consensus among Federal and State regulatory agencies in requiring fully encased monitoring wells in both porous and consolidated media in most situations.

The Solid Waste Permit for Alamance County, dated May 16, 1989, clearly states in condition 6, sections b and e, that well installation shall conform to the "DHS well standard" (typical well schematic diagram) and "to specifications outlined in the N.C. Water Quality Monitoring Guidance Document for Solid Waste Facilities." Both of these documents clearly call for a fully encased well with a well screen set in a sand/gravel envelope and having a protective bentonite seal. Permit condition 6 is specifically emphasized in the cover letter addressed to the Alamance County Manager that accompanied the Solid Waste Permit. The June 1, 1988, letter from our office to Mr. Ernest Perry also clearly specifies screened wells for the deeper bedrock wells.

To summarize, our office is thoroughly experienced with construction techniques of monitoring wells in both consolidated and unconsolidated media. While our office is aware of the technical feasibility of utilizing open wells in certain situations, it is the carefully considered policy of this office to require fully cased and screened wells even in consolidated bedrock. This provides a degree of consistency in well construction that assists in the comparison of analytical data for different wells. Difficulties associated with the purging and sampling of open wells are eliminated. It also enables the isolation of a particular hydraulically conductive zone. And the potential for the spread of possible contamination is greatly reduced.

Although the corrected well construction data mitigates **some** of the concern regarding the potential spread of contaminants, the open wells still have the potential to conduct contaminantion to other fractures in the bedrock. In view of the technical considerations, the previously established permit conditions, and the established policy of the Solid Waste Section as clearly stated in the "Guidance Document" and repeatedly expressed in Correspondence with Alamance County, our office continues to support the position in my letter of September 12, 1989. However, as we discussed in our second telephone conversation, rather than abandoning the deep wells, our office will authorize the retrofitting of these two open wells to bring them into compliance with our well construction specifications. Please contact me if you have any questions on approved methods for retrofitting these wells.

Sincerely,

Bobby Lutfy
Hydrogeologist
Solid Waste Section

cc: Ernest Perry
Bill Meyer
J. Gordon Layton
Jim Coffey
Terry Waddell
Don Link