Improving Public Health and Environmental Protection from the Proposed Morrow County C&DD Landfills

G. Fred Lee, PhD, DEE
G. Fred Lee & Associates, El Macero, California
gfredlee@aol.com www.gfredlee.com
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Abstract

In order to significantly improve public health, groundwater and surface water quality protection, the Morrow County proposed C&DD landfills applicant should be required to:

- Conduct sufficient additional hydrogeological investigations to be able to reliably predict (under plausible worst case conditions - most protective) the pathways for adjacent property groundwater pollution, when offsite groundwaters will likely be polluted and when surface water springs and streams in the area of the landfills will be polluted by landfill leachate that penetrates the landfill liners.
- Establish a proactive, comprehensive offsite water quality monitoring program of all offsite water supply wells, springs and surface water streams within four miles of the proposed landfills that will detect incipient groundwater and surface water pollution by landfill leachate.

Discussion

The proposed Washington Township and Harmony Township C&DD landfills will contain wastes that will generate leachate that will be a significant threat to pollute groundwaters and surface waters in the vicinity of the landfills. This leachate will contain chemicals that can cause groundwater consumed by humans and animals to be a health threat. In addition, leachate-polluted groundwater will contain chemicals that will cause taste and odors and make the leachate-polluted groundwater unusable for domestic and many other purposes, including as a water supply for animals.

The landfill applicant for these proposed landfills has proposed a compacted clay liner consisting of a two-foot-thick clay layer with a design permeability of 10^{-6} cm/sec. Leachate will penetrate this liner in a few months. The hydrogeology of the groundwaters underlying the proposed landfills is complex, with sand layers and fractured clay. The groundwater under the proposed landfills will carry leachate-polluted groundwater that develops under the landfill to groundwaters that underlie adjacent properties and to surface waters. At some time in the future, the groundwaters under adjacent properties will be polluted by chemicals in the landfill leachate. This will render the offsite groundwater a health threat and unusable for domestic and many purposes. Surface waters polluted by polluted groundwaters will be a threat to domestic water supplies and to aquatic life.

Need for Improved Hydrogeological Characterization. The complex hydrogeology underlying and in the area of the proposed landfills makes the transport of leachate-polluted groundwater to offsite areas difficult to assess/monitor. At this time the degree of characterization of the geological strata underlying the landfills is inadequate to predict potential pathways and the rate

of movement of leachate-polluted groundwater that will occur under the landfills to offsite areas. As part of providing an appropriate degree of offsite groundwater resource and public health protection, it is reasonable to require that a landfill proponent be required to characterize the hydrogeology of the landfills' areas sufficiently well so that reliable estimates of the direction, rate and degree of pollution of adjacent and nearby properties' groundwaters can be made. This information is essential to developing an appropriate groundwater monitoring system to detect when the leachate-polluted groundwater first reaches the point of compliance for groundwater monitoring down groundwater gradient from the landfills.

Morrow County Health Department, as part of consideration of permitting these landfills, should require that a much more comprehensive hydrogeological investigation be conducted at each landfill so that there is a reasonable degree of scientific certainty in predicting the potential pathways by which leachate-polluted groundwaters that occur at any location under the landfill liners can trespass under adjacent properties.

The hydrogeological investigation should also provide a plausible worst-case estimate of the concentrations of selected leachate chemicals that could occur at adjacent property lines and how fast leachate-polluted groundwater would reach the adjacent property lines.

Requiring this degree of hydrogeological characterization is in accord with the Morrow County Health Department's Mission of public health protection:

> *"MISSION*
> *The mission of the health department is to promote, protect and provide for the optimal personal and environmental health of the Morrow County General Health District."*

The proposed Washington Township and Harmony Township Landfills should not be permitted until the additional hydrogeological information is made available and independently reviewed for its technical adequacy and reliability. This information on the

- pathways for leachate-polluted groundwaters to move from under the landfills to offsite properties,
- when pollution of offsite groundwaters is expected to occur, and
- the potential concentrations that will occur under adjacent properties of various types of pollutants that are present in the expected leachate

is needed to determine whether either of the proposed landfills should be permitted. If they are permitted, then with this information the potentially impacted public, regulatory agencies and others would have a better understanding of the threat that these landfills represent to the groundwater resources under their property and the surface water resources of the area.

Offsite Groundwater Water Supply Well and Surface Water Monitoring. In addition to greatly improving the information on the hydrogeology of the landfill sites and the surrounding area, there is need to require that the landfill owner establish comprehensive offsite groundwater monitoring of all water supply wells within the sphere of influence of the proposed landfills. This sphere should be considered to be about four miles in any direction from the landfills. The purpose of this monitoring program would be to detect incipient pollution by landfill leachate of

existing water supply wells located on nearby properties. This approach is justified as part of providing improved public health and groundwater resource protection and assurance to the potentially impacted public that the landfill has not yet polluted their groundwater. It would provide a means of verifying the reliability of the predicted pollution of offsite groundwater.

In addition to the landfill compliance monitoring wells at the point of compliance for groundwater monitoring, additional groundwater monitoring wells should be developed along the most probable pathways for leachate-polluted groundwaters to move toward offsite properties. If leachate-polluted groundwater is detected in any compliance monitoring wells and/or the pathway monitoring wells, then the landfill owner should be required to begin groundwater remediation, likely through pump and treat of the leachate-polluted groundwaters. This remediation would be designed to stop further offsite movement of leachate-polluted groundwaters.

This monitoring program should be conducted quarterly for a broad range of parameters until a sufficient database has been developed so that the concentrations of the monitored parameters can be reliably predicted for the next quarterly monitoring. After one year of reliably predicting the results of the quarterly monitoring, the frequency of monitoring of offsite potentially impacted wells can be reduced to semiannually.

In order to protect surface water quality from pollution by landfill leachate, comprehensive monitoring of all springs and streams within five miles of the landfills should be required. This monitoring would provide an early warning of pollution of surface waters by landfill leachate.

This monitoring program should be funded by the landfill owner but carried out by third-party consultants that report the results to a Monitoring Committee consisting of the regulatory agencies, property owners and the landfill owner. This monitoring program should be conducted forever – i.e., as long as the landfill has the potential to generate leachate that can pollute groundwaters underlying the landfill.

The offsite well monitoring would be for all existing and any new water supply wells that are developed in the future. This approach is justified since current and future owners of properties adjacent to and near the landfill are entitled to continuing to have groundwaters under their property that are free of landfill leachate.

Monitoring of the characteristics of the leachate generated in each landfill should be expanded to include a broad range of potential pollutants that can be expected to be generated based on the characteristics of the C&DD wastes accepted at the landfills. The monitoring of groundwaters and surface waters should include a broad range of potential pollutants and potential transformation products. An expert panel would advise the Monitoring Committee on the parameters that should be included in the monitoring. The required monitoring parameters should be reviewed each year by the panel to determine if there are any new potential pollutants that should be added to the list of parameters.