

Guidance on the Evaluation of the Potential Impacts of a Proposed Landfill

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The typical approach followed in developing a new municipal solid waste (MSW) landfill for urban areas is to attempt to locate the new landfill for the municipal solid wastes in a rural area where there is limited population and financial resources to conduct a comprehensive review of the proposed impacts of the landfill. While it is possible to develop truly protective landfills, federal, state and local landfilling regulations do not require that a landfill be located, designed, operated, closed and receive postclosure monitoring and maintenance to protect those within the potential impact zone of the landfill for as long as the wastes will be a threat to public health and the environment. Typically, the proposed landfill is of minimum (or near-minimum) allowed siting and design in order to reduce the cost of landfilling to those who generate the wastes, thereby imposing the impacts of the landfill on those who live/work/use the area near the landfill.

The US Department of Agriculture (USDA) has recognized the problems with landfills not protecting the interests of the rural community and has developed a Water and Environment Solid Waste Management Grant program that is designed to develop information to

- *“Reduce or eliminate pollution of water resources in rural areas”* by landfills and to
- *“Improve planning and management of solid waste sites in rural areas.”*

Information on this program is available at

<http://www.usda.gov/rus/water/SWGMG.htm#Contact%20Information>.

Presented herein is guidance on evaluating the potential impacts of landfills.

Justified NIMBY

While landfill developers and those in urban areas often characterize the opposition to a proposed landfill by the rural communities as “NIMBY” (not in my backyard), a critical review of the current approach for developing new landfills or landfill expansions shows that the current review/permitting process results in a justified NIMBY approach being adopted by those potentially impacted by the landfill. The authors have encountered situations where some urban landfill developers will claim that their proposed landfill will be protective of public health and the environment and that those in rural areas should not oppose the development of the proposed landfill. If the landfill is truly protective of those within the sphere of influence of the landfill it should be possible to locate the landfill within the urban area where the wastes are primarily generated.

It is the authors’ experience that there are few individuals who would welcome the siting of a landfill adjacent to their property or areas of activity. Essentially everyone becomes a “NIMBY” when they have learned that a landfill is proposed in their area. This is

justified, since landfills typically are adverse to the health, groundwater resources and interests of those within the sphere of influence of the landfill. This sphere can extend several miles from the landfill.

The adverse impacts of landfills are well-recognized; in response to this situation Lee and Jones-Lee have developed

“Flawed Technology of Subtitle D Landfilling of Municipal Solid Waste,” Report of G. Fred Lee & Associates, El Macero, CA, December (2004). Updated January (2007). This review is available at <http://www.members.aol.com/apple27298/SubtitleDFlawedTechnPap.pdf>.

This Lee and Jones-Lee review provides a discussion of the potential impacts of landfills, in the section of the paper on “Justified NIMBY.” This section summarizes the potential adverse impacts of MSW and other types of landfills. These impacts are listed in Table 1.

Table 1
Adverse Impacts of “Dry Tomb” Landfills on Adjacent/Nearby Property Owners/Users

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- public health, economic and aesthetic aspects of groundwater and surface water quality
 - methane and VOC migration - public health hazards, explosions and toxicity to plants
 - illegal roadside dumping and litter near landfill
 - truck traffic
 - noise
 - dust and wind-blown litter
 - odors
 - vectors, insects, rodents, birds
 - condemnation of adjacent property for future land uses
 - decrease in property values
 - impaired view
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From Lee et al. (1994) and Lee and Jones-Lee (2007).

The Lee and Jones-Lee (2007) Flawed Technology review presents information on the characteristics of each of these impacts. Lee and Jones-Lee also discuss how to address/eliminate the justified NIMBY issues by proper landfill siting/location, design, operation, closure and postclosure care for as long as the wastes in the landfill are a threat. While NIMBY issues can be readily addressed, typically the needed changes in landfill development are not implemented due to the increased cost that would occur for urban and other MSW generators. As a result, urban and other MSW generators are able to impose landfills on rural communities and thereby dispose of their garbage initially at cheaper than real cost, where the impacts and real costs are passed on to those within the sphere of influence of the landfill and future generations through adverse impacts on their health, loss of groundwater resources and ultimately paying the “superfund”-like costs for cleanup of the landfill-polluted groundwaters.

Health Effects of Landfills. MSW landfills release odors, which are not only a nuisance, but can also be adverse to the health of those who live/work near MSW landfills and other hazardous chemical sites. Lee and Jones-Lee have developed a review of these issues in

“Association between Hazardous Chemical Sites and Illness,” Report of G. Fred Lee & Associates, El Macero, CA, January (2007). This review is available at <http://www.members.aol.com/annejlee/HazChemSites-Illness.pdf>.

Other papers and reports on the impacts of landfills and their appropriate development, operation, closure and postclosure care are available on Drs. G. Fred Lee and Anne Jones-Lee’s website, www.gfredlee.com, in the Landfills-Groundwater section, <http://www.gfredlee.com/plandfil2.htm>.

Groundwater Pollution Issues. Today’s minimum design Subtitle D (municipal solid waste) landfills with a single composite liner will eventually pollute groundwaters by landfill leachate (garbage juice) at landfills that are hydraulically connected to underlying groundwaters. This pollution will be caused by the eventual inevitable failure of the single composite liner, which will allow hazardous and otherwise deleterious chemicals to be released from the MSW landfill. In addition, if the polluted groundwaters discharge to surface waters, then the landfill can pollute surface waters as well, rendering them unusable for domestic water supply, as well as adverse to fish and other aquatic life in the surface waters. Further, the allowed groundwater monitoring systems used for these types of landfills are highly unreliable in detecting groundwater pollution by landfill leachate before offsite/adjacent properties’ groundwater is polluted. Lee and Jones-Lee, in

“Improving Public Health and Environmental Protection from Inadequately Developed Landfills,” which is available at <http://www.members.aol.com/annejlee/ImprovProt-LF.pdf>,

have described a groundwater monitoring program that will improve groundwater quality protection for those who have domestic, farm and other wells located within several miles of a landfill.

Inadequate Buffer Lands. The active-life (while wastes are still being deposited) releases from landfills that contribute to trespass of odors, hazardous chemicals, dust, noise, view impairment, etc., are largely addressable if the landfill developer is required to acquire adequate buffer lands between where wastes are deposited and adjacent property lines. Often at least one mile and in some settings two or more miles of buffer lands are needed to adequately dissipate the odors, etc., so that they are not detectable at adjacent property lines.

Inadequate Postclosure Funding. One of the most significant deficiencies in current landfilling regulations is that the federal (US EPA) and most states’ landfilling regulations do not require assured postclosure funding for monitoring, maintenance and eventual groundwater cleanup from pollution by a closed (no longer accepting wastes) “dry tomb”-type landfill for as long as the wastes in the landfill will be a threat to cause

groundwater pollution. In today's landfills that conform to US EPA Subtitle D minimum regulations, the wastes in the landfill will be a threat to cause groundwater pollution, effectively forever, yet minimum postclosure funding is typically required for only 30 years. The federal (and typically state) landfilling regulations do not require that those whose wastes are placed in a landfill provide the funding (through the cost of their waste disposal) that will be needed to adequately monitor and maintain the landfill containment structure and the groundwater monitoring systems for as long as the wastes in the landfill will be a threat.

Some areas, such as California, have explicit regulations that require postclosure funding for monitoring and maintenance of the landfill for as long as the wastes in the landfill will be a threat. However, while this requirement has been in the California regulations since the 1970s, there are no funding mechanisms in place to assure that those whose wastes are placed in the landfill adequately fund the postclosure monitoring and maintenance of the landfill. Basically, this funding is, by default, passed on to future generations, where there is no assurance that the funds will be available when needed.

Recently, Drs. G. Fred Lee and Anne Jones-Lee, in their

“Comments on the CIWMB Staff Efforts to Gain Assured Postclosure Funding for Landfills for as Long as the Wastes in the Landfill Are a Threat to Public Health and the Environment,” Comments Submitted to California Integrated Waste Management Board by G. Fred Lee & Associates, El Macero, CA, January (2007), which is available at <http://www.members.aol.com/annejlee/CIWMBPostCloseFund.pdf>,

have discussed the importance of ensuring that adequate postclosure funding be developed by those who generate the wastes that are placed in a landfill for as long as those wastes represent a threat. They point out that this is especially important for privately developed landfills, where the viability of a private company to provide postclosure funding, effectively forever, is appropriately of concern. While public-agency-developed landfills will normally not be allowed to “walk away” from the landfill, declare bankruptcy, etc., to avoid postclosure monitoring and maintenance of the landfill for as long as the wastes are a threat, it should be recognized that there are questions about whether the public agencies responsible for the landfill will in fact be willing to support postclosure care of a landfill that was developed and closed many years ago by past residents of the area. Of concern is that the potential impacts of failing to provide adequate postclosure monitoring and maintenance will not be adverse to those within the urban areas where the wastes were primarily originally generated. This is another major factor in a justified NIMBY by those who want to protect groundwater resources from the impact of a landfill in rural areas.

Obtaining Reliable Information on Impacts of Landfills

Rural communities and individuals that are concerned about the potential impacts of a proposed landfill are at a significant disadvantage in participating in the landfill review board deliberations and permitting hearings, etc. Typically, landfill developers are well financed and are able to hire attorneys and consultants that only discuss the landfill from

the developer's perspective, while failing to adequately discuss the potential impacts of a landfill on those within the sphere of influence of the landfill. Lee and Jones-Lee developed a discussion,

“Practical Environmental Ethics: Is There an Obligation to Tell the Whole Truth?” Published in condensed form, “Environmental Ethics: The Whole Truth,” *Civil Engineering*, Forum, 65:6 (1995),
<http://www.gfredlee.com/ethics.htm>

and

“Selection of an Independent Consultant to Review the Potential Impacts of a Proposed Landfill,” Report of G. Fred Lee & Associates, El Macero, CA, December (2006),
<http://www.members.aol.com/annejlee/SelectIndepConsult.pdf>,

which discuss the fact that consultants that normally work for landfill developers cannot be expected to provide adequate, reliable information on the adequacy of a proposed landfill siting, design, operation, closure and postclosure care and then expect to gain future work from landfill developers. This situation means that those who may be impacted by a landfill should/must acquire funding to inform regulatory boards, the courts, etc., of the potential impacts of a proposed landfill on their interests. This funding will enable them to obtain the services of a qualified attorney, hydrogeologist, and consultant knowledgeable on the properties of landfill containment and monitoring systems to present the impacted public's views on the appropriateness of developing a particular landfill. Typically, a report of the type that Drs. G. Fred Lee and Anne Jones Lee have developed for their clients, evaluating the potential impacts of a proposed landfill or landfill expansion, will be needed in the landfill permitting hearing. Example reports are available online at

<http://www.gfredlee.com/plandfil2.htm#examples>.

Suggested Approach. Individuals/groups that face an evaluation of the impacts of a proposed landfill and the reliability of the landfill proponents' documentation in support of the landfill's development first need to develop an organization of those concerned about the landfill's impacts. Next, it is suggested that the group determine the reasons for their concerns. In making this evaluation it may be helpful for the members of the group to consult the Lee and Jones-Lee “Flawed Technology” review as well as several of the example reports on Drs. Lee and Jones-Lee's website. Please call if there are questions about any of the materials on their website.

This group should then work with their local elected officials and the press to inform them of their concerns about the potential impacts of the proposed landfill. Next the group should assess the amount of funds available to evaluate the potential impacts of the proposed landfill. Some citizen groups opposed to a landfill have been able to identify a local attorney who will assist the group at no or limited cost to the group. The group needs to acquire the assistance of a local hydrogeologist who is familiar with the hydrogeology of the proposed landfill area. The hydrogeologist should review the landfill application for the accuracy of the hydrogeology information in the application.

There is need for the group to acquire the assistance of a landfill expert who can review the landfill's proposed location, design, etc., and prepare a preliminary report on the potential impacts of the landfill. If possible (depending on availability of funding), the landfill consultant should visit the area and discuss the situation with members of the group. Based on the review of the landfill proposal and the site visit, a course of action should be developed by the group to address their concerns about the potential impacts of the proposed landfill. If possible the consultant should personally present a summary of his/her findings at a landfill review board hearing. If insufficient funds are available from the group to support this presentation, then the landfill consultant's report should be submitted to the review board where a conference call can be established between the review board and the consultant to discuss aspects of the report.

All of these activities should be conducted in close coordination with the group's attorney, and all work should be conducted so that it can be used in an appeal of a review board/regulatory agency's decision to proceed with the development of a landfill that does not adequately protect the health, groundwater resources, welfare and interests of those potentially impacted by the landfill. Since review boards' and regulatory agencies' review of a proposed landfill may be limited to whether the landfill meets the current (often inadequate) minimum regulatory requirements, it may be necessary to have the development of the landfill reviewed by the courts, through litigation.

Acquiring the Assistance of Drs. Lee and Jones-Lee

Drs. Lee and Jones-Lee make available on their website, at no cost, their papers and reports to assist those concerned about evaluating the potential impacts of landfills. They will answer telephone questions about their publications. They can also serve as paid consultants to states, counties, municipalities, environmental groups, citizen groups and individuals in reviewing the potential impacts of landfills, preparing reports, and testifying in landfill review board hearings, regulatory agency permitting hearings, trials, etc. Information on their qualifications to serve as consultants is available at

<http://www.gfredlee.com/landfill.htm>,
<http://www.gfredlee.com/exp/areawork.htm> and
http://www.gfredlee.com/exp/lfbio_exp.htm.

Please contact Dr. G. Fred Lee at gfredlee@aol.com or by phone at (530) 753-9630 for information on obtaining the services of Drs. G. Fred Lee and Anne Jones-Lee in evaluating the impacts of a proposed or existing landfill.