Review of the Potential Adverse Impacts of the Proposed Expansion of the Allied Imperial Landfill

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The McFarland FLA has requested that I conduct a review of the potential public health, water resources and other adverse impacts of the proposed expansion of the Allied Imperial Landfill. This review is presented in these comments. These comments are based on over 45 years of reviewing landfill impacts for about 85 landfills. A summary of my qualifications to undertake this review is appended to these comments. The comments presented below utilize reference to Drs. Anne Jones-Lee and G. Fred Lee's "Flawed Technology" report. This report provides an extended discussion of the potential impacts of municipal solid waste landfills on public health, groundwater and surface water resources and the welfare and interests of those within the sphere of adverse influence of a MSW landfill. This area extends typically on the order of several miles from the location where wastes are deposited. Our "Flawed Technology" report,

> Lee, G. F., and Jones-Lee, A., "Flawed Technology of Subtitle D Landfilling of Municipal Solid Waste," Report of G. Fred Lee & Associates, El Macero, CA, December (2004). Updated June (2010).
> http://www.gfredlee.com/Landfills/SubtitleDFlawedTechnPap.pdf

is downloadable from our website at www.gfredlee.com at the URL link provided in this reference. In these comments we cite specific pages in this report where additional information is available for review.

Background Information on the Proposed Expansion of the Allied Imperial Landfill

The INITIAL STUDY FOR THE ALLIED IMPERIAL LANDFILL EXPANSION BY JONES AND STOKES, DECEMBER 2007 (ftp://ftp.co.imperial.ca.us/icpds/eir/imperial-landfill/22initial-study.pdf), Prepared for Imperial County Department of Planning and Building Services, states,

"*The Imperial Landfill is a Class III non-hazardous solid waste landfill located in unincorporated Imperial County, approximately two miles west of the City of Imperial, California. Currently, the landfill is approaching full capacity and the owner/operator, Imperial Landfill, Inc., has prepared a Landfill Plan for the site that includes development of a new cell to provide additional landfill space. The proposed Landfill Plan would extend the facility's life from the remaining three to five (3-5) years to approximately thirty (30) years in order to meet the current and future waste disposal needs of Imperial County.*"

Project Location and Surrounding Uses
The project site (Assessor's Parcel Number 044-030-06) is located at 104 East Robinson Road, in an unincorporated portion of Imperial County, California (Figure 1, Location Map). The new

cell development area for the Landfill Plan would occupy approximately 89 acres of a total of 160 acres currently owned by Imperial Landfill, Inc. directly west of the existing landfill, bounded by Neckel Road to the north, Dogwood Road to the west, Robinson Road to the south, and the existing landfill to the east. The surrounding terrain is relatively level with an elevation of approximately 75 feet below mean sea level (MSL), with the exception of the existing landfill that has a permitted maximum elevation of 20 feet above MSL. Surrounding properties include agricultural operations and vacant land. A few rural residences are situated along the landfill's southern boundary and one residence is located approximately 520 feet to the northeast of the project site.

Landfilling operations are currently conducted in a lined 42-acre cell located on the western portion of the existing site, and a 31-acre cell that has been filled to capacity on the eastern portion of the site. Landfill operations include disposal of municipal solid waste, shredding of greenwaste, and processing of construction, demolition, and inert debris (CDI). The landfill has the capacity to receive 1,135 tons of solid waste per day and is limited to accepting 274 vehicle trips per day. The remaining life for the landfill is estimated between 3 to 5 years.

The project would develop a new disposal cell beyond the currently permitted area as well as increase greenwaste and construction, demolition and inert debris processing. The proposed new cell development totals 160 acres (including an 89-acre cell and 71 acres of remainder) located immediately west of the existing landfill.

According to preliminary calculations performed by Vector Engineering, this would allow the landfill to receive a maximum total of 1,800 tons of waste per County of Imperial Imperial Landfill Plan December 2007 J&S 731.07 day and would admit a maximum total of 475 vehicle trips per day with a monthly rolling average of 1,500 tons per day and 400 vehicles per day. The proposed Landfill Plan design would increase the life of the landfill from 3-5 years to approximately 30 years (Cascade Pacific Environmental 2006).

The landfill expansion would continue operations related to the disposal of nonhazardous solid waste similar to those currently being performed. The landfill would continue to accept residential and commercial waste, non-hazardous industrial waste, CDI, and greenwaste, but would increase receipt of CDI from 25 tons per day to 350 tons per day. The new cell development area would utilize a similar liner system as the existing landfill and would utilize a similar leachate collection and removal system. Groundwater quality monitoring and landfill gas management would be conducted similar to existing operations.

The newly constructed disposal cell would be located at a higher elevation than the currently operating disposal cell, which will be filled to capacity in the near future. Imperial Landfill, Inc. is currently permitted a maximum elevation of 20 feet above MSL (95 feet above surrounding grade) and the proposed maximum elevation of the expanded landfill would be 70 feet above MSL (145 feet above surrounding grade)."

Table 1 on page 2-7 in this Initial Study report states that the liner in the existing and proposed expansion would be a Subtitle D composite, with a leachate collection system, and groundwater monitoring with an expansion of the existing "Perimeter System," and landfill gas management

would be based on an expansion of the existing system. A discussion of the deficiencies in the proposed landfill expansion liner system, gas management system and other design features is provided in a subsequent section of these comments devoted to a review of Imperial County Planning and Development Services Department's draft Conditional Use Permit for the proposed landfill expansion.

Section 9 of the Initial Study states,
"Surrounding Land Uses and Setting: Imperial Landfill, Inc. is located on land designated for Agricultural use (A-2/A-3) with landfill operations conducted under CUP 98-0021 (amended 2002), issued by the Imperial County Planning/Building and Development Services Department. Surrounding lands are also designated for Agricultural use (A-2), and are currently being utilized as follows:

- *North: Agricultural operations, soil borrow operations (daily cover material), rural residential development.*
- *South: Agricultural operations, fallow land, and rural residential development.*
- *East: Existing landfill operations.*
- *West: Fallow land and agricultural operations.*
  There are five (5) residences within 1,000 feet of the property boundary, which are associated with larger agricultural parcels.
- *Two residences approximately 750 feet south of the southwest corner of the site, on Trentham Road.*
- *Two residences south of the southeast corner of the site, approximately 50 and 80 feet south of Robinson Road.*
- *One residence approximately 500 feet of the northeast corner of the site, on a private road adjacent to the Rose C*al.

This Initial Study report states,
"*I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required*."

R. McFarland had informed me that Initial Study report failed to mention that there are another 10 houses within one quarter to one half mile North of Harris Road of the existing landfill.

This is an appropriate conclusion based on the limited buffer lands owned by Allied to dissipate the impact of the waste-derived chemicals/materials on the landfill property. While this Draft Environmental Impact Report (DEIR) for the proposed Allied Imperial Landfill expansion states that the adverse impacts will be "insignificant," in fact, a proper analysis would conclude that the impacts to public health, water resources and the welfare and interests of those in the sphere of influence of the proposed landfill expansion will be highly significant.

Discussion of the Potential Impacts of the Proposed Landfill Expansion
Beginning on page 3-7 of the Initial Study is a summary of potential impacts of the proposed landfill expansion. A review of this discussion shows that it is significantly deficient in reliably informing the County Planning and Development Services Department and the public about the potential impacts of the proposed landfill expansion. A review of the draft and final EIR for the proposed landfill expansion,

Imperial County Planning and Development Services
FINAL ENVIRONMENTAL IMPACT REPORT FOR THE IMPERIAL LANDFILL EXPANSION PROJECT MARCH 2010,
shows that many of the unreliable discussions of adverse impacts discussed in the Initial Study report are also presented in the DEIR and final EIR reports .

An example deficiency in the Initial Study report occurs in the section devoted to discussing the impacts on agriculture. This section focuses on a lack of significant impact of converting the land use of the area of the proposed landfill expansion where it states,
"not be significant c. See II a). The Landfill Plan would not involve changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to non-agricultural use. The proposed new cell development would be merged into the existing landfill and continue to be used as a landfill under the Landfill Plan. Therefore this impact would insignificant."

However, no mention is made of the adverse impact of the existing landfill on nearby agriculture where the proximity of the existing landfill reduces the value of the crops produced on the nearby land. This is a real significant adverse impact of the existing landfill that will continue if the proposed landfill expansion is allowed to occur.

Section III Air Quality of the Initial Study report states,
"*e. Create objectionable odors affecting a substantial number of people?" which is listed as "Less than Significant.*"

Also this section states,
"*d. Sensitive receptors are populations that are more susceptible to the effects of air pollution than is the population at large. Land uses adjacent to the Imperial Landfill are primarily agricultural. The nearest residential dwelling units are approximately 500 feet from the facility's boundary. The project would emit pollutant concentrations during the day; however, the project's emissions would be lower at night after the waste is buried and equipment are turned off. This impact would be considered less than significant with mitigation."*

These statements are examples of the unreliable evaluation of the significant adverse impacts of odors and other hazardous chemical releases in landfill gaseous emissions from the proposed landfill expansion. Allied in the operation of the existing landfill is already allowing the trespass of odors and other hazardous/deleterious chemicals onto adjacent and nearby properties. Allied in its proposed landfill expansion is proposing to continue to utilize adjacent and nearby properties to dissipate the odorous and hazardous chemicals emitted from this landfill.

Page 3-10 Section e of the Initial Study report states *"e. Odors originating from the project site may be faintly noticeable to residents nearby the project site. According to the ICAPCD CEQA Air Quality Handbook guidance, the screening distances for potential odors from landfill site and residential area is one mile."*

It is my experience that at least one mile and for some topographic settings, several miles of landfill owner-owned buffer lands are needed to dissipate landfill odors on the landfill property.

The proposed expansion of the Allied Imperial Landfill provides grossly inadequate buffer lands of only a few hundred feet to the north and south of the proposed landfill expansion and a few hundred yards between where the wastes are proposed to be deposited and the adjacent property line to the west. At least one and more likely several miles of Allied owned lands where no waste deposition will occur should be present in each of the directions from the landfill. The grossly inadequate buffer lands provided by Allied in the proposed landfill expansion are an important reason this proposed landfill expansion should not be approved by the County Board of Supervisors. Allied should not be allowed to continue to use adjacent and nearby properties to dissipate hazardous and deleterious gaseous and other releases from the landfill/

The allowed expansion of the landfill and operation for 30 years will mean that Allied plans to continue to use adjacent and nearby properties to dissipate chemical releases from the landfill on properties owned by others. As discussed in the Flawed Technology review in Landfill Odor Control Problems and Impacts beginning on page 41, landfill odors are much more than a nuisance. They are well documented to be significantly adverse to human health through the release of hazardous chemicals. The US government Agency for Toxic Substances and Disease Registry (ATSDR, 2006) has developed a discussion on gaseous emissions from landfills, in which it states,

"*Many of the typical landfill gases, notably the alkyl benzenes and the sulfur compounds (both organosulfides and acid gases), may present an odor problem that can cause adverse health effects such as mucous membrane irritation, respiratory irritation, nausea, and stress. If an individual has a pre-existing health condition (e.g., allergies, respiratory illness), these additional health impacts can be significant*."

> ATSDR, "Landfill Gas Primer: An Overview for Environmental Health Professionals, Appendix B: ATSDR Guidelines, ATSDR Guidelines for Public Health Actions in Response to Landfill Fires," Agency for Toxic Substances and Disease Registry (2006). http://www.atsdr.cdc.gov/HAC/landfill/html/appb.html

Review of the Allied Imperial Landfill Plan DEIR Section 4.2 -49 Air Quality Threshold AQ-7 states, *"Would the project create objectionable odors affecting a substantial number of people?*
Impact Determination
The proposed action will not add any meaningful new odor sources, nor would it move any existing odor sources closer to receptors. Odors would continue to be managed according to the Odor Control requirements set forth in the approved JTD and will be updated as necessary to the satisfaction of the LEA in the new JTD for the project. Therefore, this impact is considered to be less than significant.
Mitigation Measures, No mitigation measure is required.
Residual Impacts, Impacts would be less than significant."

This discussion is significantly deficient in addressing the impact of odorous releases from the proposed landfill expansion during its proposed 30-year active life. These releases are expected to be significantly adverse to individuals who own or use properties within the sphere of influence of the landfill expansion. As quoted above, "*According to the ICAPCD CEQA Air Quality Handbook guidance, the screening distances for potential odors from landfill site and residential area is one mile."* The proposed site for the landfill expansion is not a suitable site because of the lack of adequate buffer lands between where the wastes will be deposited and

adjacent property lines. The trespass of waste-derived chemicals across the property line that is adverse at the property line is adequate justification for the Imperial County Board of Supervisors to deny the proposed expansion of the existing landfill since the landfill odors and their associated hazardous chemicals will not be dissipated on Allied landfill property. If this landfill expansion is approved this situation will prevent the adjacent and nearby property owners from developing their property as planned.

The authors of the Initial Study and the Draft and Final EIR have failed to provide reliable information on the well known adverse impacts of municipal solid waste landfills that are not properly located so that the releases of waste-derived chemicals from the landfills trespass onto adjacent properties. Lee and Jones-Lee, in their Flawed Technology review, present a discussion of the potential impacts of MSW landfills in the section beginning on page 64,
"*Justified NIMBY*
Hirshfeld et al. (1992), of Duke University, in a paper, "Assessing the True Cost of Landfills," have summarized the potential impacts of landfills that should be addressed as part of landfill development. They point out that the environmental and social costs of landfills are usually ignored, which in turn inhibits the development of other waste management options, such as waste reduction, recycling and resource recovery. They divide the impacts of landfills into "physical" impacts and "social" impacts. The physical impacts are related to ground and surface water pollution by leachate migration, atmospheric releases of landfill gas, and fires. Landfill gas is known to cause explosions resulting in loss of life and property, and damage to vegetation. Hirshfeld et al. also point out that the non-methane organic compounds in landfill gas contain toxic chemicals that are a threat to cause cancer. Further, other components in landfill gas, such as hydrogen sulfide and organosulfur compounds can cause unpleasant odors associated with landfills.

The social impacts of landfills include increased traffic, visible air pollution, noise, aesthetic degradation and limited land utility. The social-impacts cost of landfills, according to Hirshfeld et al., is "(1) the cumulative decrease of surrounding property values; (2) the cost associated with land utility effects, also known as an 'opportunity cost'; and (3) a 'hastening cost'."

The state of Washington Department of Ecology in its Beyond Waste Project is conducting a comprehensive review of solid waste management practices in the state. As part of this effort a series of documents has been developed which discuss solid waste management issues. One of these publications, "Disposal – Yesterday, Today and Tomorrow" (Smith, 2004) states,
"The extent to which today's landfills adequately protect human health and the environment is a subject of debate, however. Requirements that govern siting, operation, closure, and post-closure are stringent and extensive. While the newest landfills are state-of-the-art facilities, they are far from benign in their impacts. Landfills may still affect the air, land, and water but to a significantly lesser degree than before today's standards went into effect."

I have been involved in investigating over 85 landfills located in various parts of the US and in several other countries. I have also served as a consultant to public groups and agencies including county boards of supervisors on the potential impacts of proposed and existing landfills. Several years ago I published two papers, "Addressing Justifiable NIMBY: A Prescription for Siting MSW Landfills," (Lee and Jones-Lee, 1994d) and "Landfill NIMBY and

Systems Engineering: A Paradigm for Urban Planning" (Lee et al., 1994), which discuss when NIMBY is justified. NIMBY is an abbreviation for "not in my back yard."

Beginning on page 64 of our Flawed Technology review we have discussed the potential impacts of municipal solid waste landfills, where we provide Table 2:

Table 2
Adverse Impacts of "Dry Tomb" Landfills on Adjacent/Nearby Property Owners/Users

- 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

From Lee et al. (1994)

The Flawed Technology review provides a discussion of each of the bulleted items in Table 2. Many of these potential impacts will occur with the proposed Allied Imperial Landfill expansion. These impacts are real and lead to justified NIMBY. While the authors of the Draft EIR for the proposed Allied Imperial Landfill expansion state that these impacts are "insignificant," the fact is that each of these impacts can be significant and should be controlled by properly developing MSW landfills with adequate buffer lands between where the wastes will be deposited and adjacent property lines so that there will be no trespass of waste-derived chemicals/material onto adjacent properties.

Hazardous Waste Issues

The various EIR documents and Imperial County's Department of Planning and Development Services' materials on the proposed landfill expansion mention that the proposed landfill expansion will not accept "hazardous wastes." This could lead someone not familiar with the hazardous chemicals that are typically present in municipal residential and industrial so-called non-hazardous waste to conclude that only benign waste components will be allowed in the landfill. It is important to understand the hazardous nature of the municipal and industrial solid wastes that will be legally deposited in this landfill expansion. Lee and Jones-Lee's Flawed Technology review, beginning on page 51, presents a discussion of these issues. In summary, the way that the US EPA defined "hazardous wastes" allows large amounts of regulated and unregulated highly hazardous chemicals that are a threat to human health when present in groundwaters polluted by landfill leachate and in landfill gas that is released from the landfill to be present in the allowed so-called non-hazardous solid wastes.

Control of the Impacts of Landfill Gas Emissions

Page 2-7 of the DEIR under Landfill Gas Control System states,

"*The closed non-operating disposal cell is equipped with an LFG collection system, which consists of a network of vertical LFG extraction wells that feed an automated blower/flare station. The operating 42-acre portion of the landfill would be fitted with a similar LFG collection system as it reaches capacity and approaches closure. The proposed new cell development would be equipped with a similar LFG collection system as it approached capacity, and the system would be designed, installed, and operated in accordance with all regulatory requirements specified in the landfill permit."*

Page 4.2-17 under Baseline Landfill Gas Emissions states,
"Landfill gas, consisting primarily of methane and CO2, is produced by the decomposition of organic refuse. The facility has systems in place that collect the majority of the generated landfill gas and flare the excess gas. A small fraction of the landfill gas is assumed to migrate to the surface of the landfill and be released to the atmosphere."

"*The landfill gas generation rates for the currently-permitted landfill were estimated using EPA's Landfill Gas Generation Model—LandGEM. "*

Lee and Jones-Lee, in their Flawed Technology review beginning on page 42, discuss the unreliability of the use of the US EPA LandGEM model to predict the rate and especially the duration of landfill gas emissions from today's Subtitle D landfills. The developers of this model and the US EPA ignored the fact that today/s Subtitle D landfill will be of the "dry tomb" type where the wastes will be enclosed in plastic sheeting and compacted clay liner and cover. Once the landfill is closed-(no longer accepts wastes) and the prescribed landfill cover is installed, the rate of supply of water to the wastes through the cover will be greatly curtailed. Since landfill gas generation is dependent on moisture (water) content (see page 49 of Flawed Technology review), so long as the wastes are kept dry no landfill gas generation will occur. However, over time the cover will develop cracks and allow water to enter the wastes with the result that landfill gas generation will again occur. This could occur within a few years, decades or a hundred or more years after landfill closure. When this occurs there will be need for the landfill gas collection and flare to work effectively to avoid releases of landfill gas and other associated hazardous chemicals in the gas to adjacent properties.

Additional discussion of the potential problems with landfill covers of the type that Allied plans to use at the proposed expansion of the Imperial Landfill are discussed in the Flawed Technology review beginning on page 20 and in the discussion on the inadequacy of the Imperial County Planning and Development Services Department draft Conditional Use Permit presented in another section of these comments.

Another factor that the LandGEM model developers ignored is that much of the garbage that is placed in today's landfills is enclosed in plastic bags. These bags are crushed by the trash compactor after deposition. This crushing does not open the plastic bagged wastes and therefore hides the wastes in the crushed bags from moisture (water) that is needed to generate landfill gas from the bagged wastes. As a result the bagged waste will be in the landfill in an undecomposed state until the plastic bags decompose. These bags are expected to last for many decades to a hundred or more years. When the plastic bags do decompose, the water that enters the landfill will interact with the wastes and generate landfill gas and leachate. Because of the inability to

reliably predict when over the thousand or more years that the wastes in the Allied Imperial Landfill will be a threat to generate landfill gas as a result of Allied failing to maintain the cover on the landfill so that it does not allow water to enter the wastes, and the unpredictability of the rate that plastic-bagged garbage bags will decompose, it is impossible to reliably predict the duration of landfill gas generation/release in the proposed landfill expansion. It can readily be hundreds to a thousand or more years.

Page 4.2-18 of the Draft EIR under "Baseline Flare Emissions" states,
"*The Allied landfill is subject to federal New Source Performance Standard (NSPS) requirements to capture and destroy landfill gas generated within the landfill. The landfill is required to operate a series of extraction wells connected to a vacuum pump, which discharges the collected landfill gas to the flare. NSPS requires the landfill gas system to be designed to capture at least 75% of the generated gas. The NSPS also requires the facility to conduct periodic measurements of combustible methane at the surface of the landfill cover to ensure that the small fraction of uncaptured landfill gas that might escape through the cover does not cause ambient concentrations to approach combustible levels.*"

As indicated in this quote, the federal landfill gas capture regulations allow up to 25 % of the landfill gas to be released to the atmosphere through the landfill cover. Without adequate landfill gas collection system maintenance for as long as the gas can be generated the actual amount of landfill gas releases including the highly hazardous components of this gas will increase over time as the cover becomes more porous. Also, Allied would need to operate and adequately maintain the landfill flare likely for decades or more even if no gas is generated because of the potential that when the wastes become wet and start generating landfill gas again there will be need to operate the gas combustion system.

It should be understood that the flaring of landfill gas is not 100 % effective in destroying all components including the hazardous components that can cause cancer and other diseases. Further, there is some evidence that the flaring of landfill gas can generate highly hazardous chemicals that are a threat to human health.

The Imperial County Board of Supervisors should, if it chooses to allow this landfill expansion to occur, develop explicit requirements in the Conditional Use Permit for Allied to fund the maintenance of the landfill cover of the closed cells so that no water enters the wastes that generates landfill gas, so long as the wastes in the landfill including any waste that has been hidden in crushed plastic bags that when contacted with water can generate landfill gas. The amount of these postclosure funds will be much larger than now required in the postclosure fund. They should be collected from Allied during the active life of the landfill and placed in a dedicated trust. The Integrated Waste Management Board has been developing an estimate of the magnitude of this funding. Information on this effort is available from the CIWMB (CalRecycle) in,

> CIWMB, "Postclosure Maintenance Beyond the Initial 30 Years and Financial Assurance Demonstrations," California Integrated Waste Management Board P&E Committee Workshop, December 6 (2004).

At the CIWMB hearing on this issue, the private landfill companies objected to this requirement, since it would mean that they would be responsible for funding postclosure care well beyond the

minimum 30-year period now required.

If this assured funding by Allied is not provided, then the County should explicitly assume the responsibility of funding the very high costs for monitoring and maintenance of the expanded landfill for as long as the wastes in this landfill will be a threat to generate landfill gas when contacted by water. This period of time could readily be many decades, to hundreds of years to a thousand years or more.

Water Quality Impacts

Section 4.7 of the DEIR discusses the potential impacts of the expanded landfill on the area's water resources water quality. Tables 4.7-2 and 4.7-3 show that, based on the very limited hydrogeological investigation of the area that has been conducted using both laboratory and field measurements, there are some relatively high permeability "silty sand" layers/lenses with permeabilities of greater than 10^{-4} cm/sec underlying the existing and apparently the proposed landfill expansion. The DEIR states on page 4.7-6,

"*The measured groundwater velocities have varied somewhat but remained close to this value; the most recent groundwater monitoring estimated groundwater flow rates of approximately 8.4 to 10.2 feet per year (Brown and Caldwell 2008).*"

If it is assumed that these values are correct then the eventual failure of the of the US EPA Subtitle D minimum single composite liner system that is proposed for the landfill expansion will allow leachate polluted groundwater to occur under the landfill that will in time migrate offsite to be under adjacent properties. The eventual failure of this type of liner system is discussed in the Flawed Technology review beginning on page 10 and is summarized in comments provided on the County's draft Conditional Use Permit in another section of these comments.

Based on my formal education in groundwater hydrology at Harvard University, 30 years of teaching university graduate level courses in groundwater quality, serving on the editorial board of the *Journal Groundwater* covering the review of papers devoted to groundwater quality issues and over 45 years of professional experience in investigating the groundwater hydrology underlying landfills, only making measurements of permeabilities of the geological strata in a complex geology of the type underlying the existing and proposed Allied Imperial Landfill is not adequate to properly estimate the rate of groundwater movement of leachate polluted groundwater under a landfill. A more adequate investigation of the area could readily show that there are even more permeable layers/lenses underlying the landfill than those found/reported in the DEIR.

Page 4.7-6 of the DEIR states,

"*The only investigated water-bearing zone beneath the Imperial Landfill site is the unconfined water table. The water table occurs at shallow depths, generally between 6 and 25 feet below ground level (Figure 4.7-2).*"

This is the groundwater underlying the landfill that will first be polluted by the eventual failure of the landfill liner system.

In the Groundwater section beginning on page 4.7-4 it is stated,
"*Note that Figure 4.7-2 shows monitoring wells that were installed as part of a previous study to define groundwater conditions under the parcel that was later used to construct the existing landfill. Some of the monitoring wells shown in Figure 4.7- 2 have since been removed or replaced*."

While the Draft EIR claims that the existing unlined and lined landfills have not polluted groundwater, the fact is that the groundwater monitoring system that is in place is not adequate to properly detect the pollution of groundwaters by the unlined landfill, which has certainly occurred. Examination of Figure 4.7-2 shows that only two of the monitoring wells located in the direction of groundwater flow would be expected to see landfill leachate pollution by the original unlined landfill. It is unclear from the information available whether either of those two monitoring wells that are shown to be in the direction of groundwater flow from the unlined landfill are properly constructed and sampled to detect groundwater pollution by landfill leachate from this landfill.

Further, the spacing of the monitoring wells downgradient from the existing lined landfill is such that they would have a very low probability of being polluted by the eventual failure of the existing landfill liner system. The unreliability of this type of groundwater monitoring system is discussed in the Flawed Technology review beginning on page 27.

Basically, the existing Allied Imperial Landfill site has not been adequately characterized to determine how soon offsite groundwater pollution by landfill leachate derived pollutants will occur. Even if the DEIR information is correct on the projected rate of groundwater movement, the highly inadequate groundwater monitoring array will have a low probability of detecting it before it pollutes offsite waters. While these problems are important for the existing Allied Imperial Landfill, it will also be important that the County Board of Supervisors not permit a landfill expansion which will add to the long-term potential for additional groundwater pollution.

Comments on
Draft Conditional Use Permit for the Proposed Allied Landfill Expansion
Developed by Imperial County Planning and Development Services Department
Dated April 21, 2010

Presented herein are comments on the potential problems with the draft Conditional Use Permit (CUP) Developed by Imperial County Planning and Development Services Department for the proposed Allied Imperial Landfill expansion. The CUP is based on information provided to the County by Allied and in the current CUP that was adopted in 2002. This discussion may be of help to the Imperial County Board of Supervisors to understand the deficiencies in the proposed landfill expansion should it be permitted with these CUP conditions. Many of the comments presented herein are based on information that is presented in our "Flawed Technology" review,

> Lee, G. F., and Jones-Lee, A., "Flawed Technology of Subtitle D Landfilling of Municipal Solid Waste," Report of G. Fred Lee & Associates, El Macero, CA, December (2004). Updated June (2010).
> http://www.gfredlee.com/Landfills/SubtitleDFlawedTechnPap.pdf

where specific page numbers are given to the Flawed Technology report for additional information on the topic being discussed. This Flawed Technology report is available as a downloadable file from www.gfredlee.com at the URL listed above. This report is based on over 35 years of work on the impact of municipal solid waste (MSW) landfills on public health, groundwater and surface water resources and the interests of those within the sphere of influence of a MSW landfill which can be several miles from where the wastes will be deposited.

Page 4 section 1.1.2 of the draft CUP states,
"The Landfill will be constructed and operated to meet or exceed all federal, state, and county standards regarding design, construction, and operation of a landfill."

Those who understand how the current US EPA Subtitle D landfilling regulations were developed understand that these regulations were not based on a critical evaluation of the landfilling approach that is needed to protect public health, groundwater resources and the interests of those who own or use properties within several miles of a landfill. Subtitle D landfills have the potential to generate leachate (garbage juice) that will pollute groundwater with hazardous and deleterious chemicals that are a threat to human health and the environment for hundreds to a thousand or more years. These landfills also have the potential to generate landfill gas that will contain hazardous and obnoxious chemicals for a long period of time well beyond the current minimum 30-year funded postclosure period. Specific deficiencies in the siting, design, operation, closure and postclosure care provisions for Subtitle D landfills include:

- a single composite landfill liner of the type proposed for the Allied Imperial landfill expansion will eventually fail to prevent leachate pollution of groundwater,
- the landfill cover that is proposed for the landfill expansion will eventually allow rainfall to enter the landfilled wastes which will generate leachate that will pollute groundwater,
- a grossly inadequate groundwater monitoring system exists for the existing landfill and the landfill expansion that has a low probability of detecting leachate-polluted groundwater before it leaves the landfill owner's property,
- inadequate postclosure funding for landfill monitoring, maintenance and remediation of polluted groundwater for as long as the wastes in the landfill will be a threat,
- inadequate buffer lands exist between where wastes will be deposited and adjacent properties, which will result in adverse impacts on nearby property owners/users from landfill releases, including odors, dust, vermin, and noise and lights from landfill activities,
- decreased property values will occur for owners of nearby properties which will prevent the development of their property as planned if the landfill were not present..

As discussed in our Flawed Technology review on page 6, Subtitle D landfilling regulations arose out of a litigation settlement where the US EPA repeatedly stated that these regulations will not be protective. However the US EPA agreed to adopt these regulations to settle the law suit. While these deficiencies have been well known since the early 1990s when these regulations were adopted, the Agency has not corrected these regulations so that they will be truly protective.

Page 6, Section 1.8 of the draft CUP, entitled "Landfill Closure, PostClosure and Financial

Assurances" states,
"Permittee shall prepare and maintain a Site Closure Plan and a PostClosure Maintenance Plan, all or portions of which are approved by the appropriate agencies with applicable subject matter jurisdiction (i.e., LEA< RWQCB, and CALRECYCLE), which shall comply with all applicable local, State, and Federal laws, regulations, and ordinances as may presently exist or hereafter be amended, including closure design and procedures approved by LEA/CALRECYCLE, and in accordance with the following:"

A critical technical review of US EPA and state of California landfilling regulations shows that there are many aspects of these regulations that are not protective. Our Flawed Technology review discusses many of these issues. Of particular concern is that the siting of a landfill or landfill expansion does not require that the landfill owner acquire sufficient buffer lands to dissipate the landfill releases on the landfill property. Under the currently allowed landfill siting approach the landfill owner expects to continue to be able to use adjacent properties to dissipate releases of waste-derived chemicals such as landfill odors. As discussed in the Flawed Technology review beginning on page 64, this leads to justified NIMBY (not in my back yard) by those who own or use properties near a landfill. Under the non-protective nature of the current federal and state of California landfilling regulations, it is the responsibility of the local planning department and county boards to protect the interests of those who will be adversely impacted by a landfill such as the proposed Allied Imperial landfill expansion.

It is well recognized in the landfilling literature (see Flawed Technology page 48) that one of the most significant deficiencies in the US EPA Subtitle D regulations is the failure to require that a landfill developer provide adequate funds for monitoring and maintenance of the landfill for as long as the wastes in the landfill will be a threat, which can be hundreds to a thousand years or more. The draft CUP states on page 32, in section 3-2.8,
"Groundwater monitoring and any corrective actions on groundwater contamination, gas collection and control, and maintenance of landscaping and drainage shall be continued for 30 years, or as additionally required by state or federal regulations after final closure, with a certified availability of funds for the above post-closure activities defined prior to initiation of each discrete landfill unit."

This wording may seem to be protective with the words "*or as additionally required,"* until it is understood that there is no provision for the developing of postclosure funding to assure that a landfill developer such as Allied (if it is still in business 30 years after closure of the landfill) be required to develop the postclosure funding after the 30 year minimum period required. Implementation of this requirement for full postclosure funding will lead to private landfill companies such as Allied spending much more funds for postclosure monitoring, maintenance and groundwater remediation that they earned while the landfill was actively receiving wastes and generating revenue.

Page 22 section 2.2.5 under Water Resources states,
"A composite liner, composed of HDPE flexible geomembrane a minimum thickness of 60 mils (or other technologically superior liner) placed over two feet of soil with a maximum permeability of .0000001 centimeters per second, shall be installed below all refuse deposits in the western fill area."

and Page 31 section 3.2.6 states,
"Final landfill cover shall be constructed in accordance with the EPA, Subtitle D, RCRA Regulations and shall consist of a minimum 2-foot-thick compacted soil foundation layer, a minimum 18-inch soil layer with a maximum permeability of .0000001 centimeters per second, and a minimum 1-foot-thick vegetative (erosion) cover or design which is agreed to be technologically equivalent or superior."

Both the landfill liner and cover designs specified in the draft CUP are the minimum allowed under Subtitle D regulations. An extensive discussion is presented on why these specifications are not protective in the Flawed Technology review beginning on page 10 for liners and page 20 for landfill covers. As discussed on page 5 of the Flawed Technology report, the US EPA acknowledged that this liner and cover will not be protective for as long as the wastes in a Subtitle D landfill will be a threat. In 1988 in the draft Subtitle D regulations the US EPA stated, "*First, even the best liner and leachate collection system will ultimately fail due to natural deterioration, and recent improvements in MSWLF (municipal solid waste landfill) containment technologies suggest that releases may be delayed by many decades at some landfills."* This situation still exists today.

On page 34 of the draft CUP under Air Quality is a discussion of the proposed restrictions for maintaining air quality at and near the proposed landfill expansion. The draft CUP is grossly deficient in protecting the health and interests of those who own or use property near the proposed landfill expansion. One of the most important air quality issues associated with the active life (when wastes are deposited) of landfills such as the proposed expansion of the Allied Imperial Landfill that is to be developed without adequate buffer lands between where wastes will be deposited and adjacent property lines is off site odors. The draft CUP fails to establish operating conditions that will protect the owners/users of adjacent and nearby properties within a mile or so of where wastes are to be deposited from highly obnoxious odors on their property. The Flawed Technology review beginning on page 38 discusses what is known about the adverse impacts of landfill odors. As discussed it is well established that landfill gas odors are not only a nuisance but are also a human health threat. Some individuals become ill when they smell obnoxious odors. Further, it is well established that associated with landfill gas odors are hazardous chemicals that, while not necessarily odorous, will cause a variety of diseases including cancer, birth defects etc., in populations living near the landfill. The Flawed Technology review provides references to the literature on these issues. Basically, if an individual can smell landfill odors on adjacent and nearby property, they are being exposed to obnoxious and hazardous conditions.

It is also well understood that complying with air quality regulations for a few of the primary pollutants such as those (PM10, NOx, ROG, SOx and CO) established for the existing proposed Allied Imperial Landfill does not mean that there are not unregulated hazardous chemicals in landfill gas that can cause diseases in people. The Flawed Technology review beginning on page 41 discusses the fact that only a very limited number (about 100 to 200) of the many thousands of potentially hazardous chemicals that are present in wastes are monitored and regulated. It is well established that some people become ill from exposure to hazardous chemicals in landfill gaseous emissions where the cause of the illness is not identified.

The problems of offsite landfill gas odors and associated hazardous chemicals can be primarily associated with the active life of the landfill. For the proposed Allied Imperial landfill this proposed period will be for 30 years. Once the landfill is properly closed with adequate air quality collection and treatment systems that are maintained, the offsite gaseous emissions can be greatly reduced/eliminated.

A properly developed CUP for the proposed expansion of the Allied Imperial landfill should include the requirement that Allied prevent offsite odors from trespass onto adjacent properties at the property line. If odor trespass occurs then Allied should be required to immediately close the landfill.

Overall Deficiencies in the Draft CUP

As discussed above, the Imperial County draft Conditional Use Permit conditions of operations for the expansion of the Allied Imperial Landfill are not protective of public health and the interests of those who own/use properties near the proposed landfill expansion. The proposed landfill expansion should not be allowed by the Board of Supervisors. Allowing the current Allied Imperial Landfill to close in about 3 years, followed by proper closure and monitoring/maintenance of the closed landfill for as long the wastes in the closed landfill will be a threat will greatly reduce the potential adverse impacts of releases from the closed existing landfill. It will be important that the County Board of Supervisors establish conditions that will insure that the adverse impacts of the current landfill are effectively controlled to protect the interests of those who own properties within the sphere of influence of the landfill.

Summary of Qualifications to Provide Comments

Information on Dr. G. F. Lee's qualifications to provide these comments is summarized below. G. F. Lee earned a bachelor's degree in environmental health sciences from San Jose State College in San Jose, California, in 1955. His undergraduate education included work on public health aspects of landfilling of municipal solid wastes. He obtained a Master of Science in Public Health degree from the University of North Carolina, Chapel Hill, NC in 1957, and a PhD degree in Environmental Engineering from Harvard University in 1960. Both his masters and PhD degree work included studies on water quality, public health, and waste management.

For 30 years he held teaching and research positions in university graduate-level environmental engineering/environmental science programs at several major US universities. During that time he conducted more than $5 million in research and published more than 500 papers and reports on various aspects of water quality and the impact of chemical contaminants on public health and environmental quality. His work included investigating numerous municipal solid waste landfills and conducting research for the US EPA and others on landfill liner properties. In 1989 he retired from university teaching and research and expanded his part-time, private consulting activities into a full-time business. He was joined in that work by his wife, Dr. Anne Jones-Lee, who at that time held a professorship in environmental engineering/science. Since that time they have been active in investigating more than 85 municipal solid waste landfills located in various parts of the US and other countries. They have published more than 650 additional papers and reports, approximately 120 of which are devoted to landfill pollution issues.

In 1992 Drs. Lee and Jones-Lee developed a "Flawed Technology" review (Lee and Jones, 1992), in which they summarized the significant potential problems with US EPA Subtitle D landfilling with respect to protecting public health and the environment for as long as the wastes in the landfill will be a threat. Throughout the 1990s Drs. Lee and Jones-Lee developed several papers and reports that provided further information on the potential problems with Subtitle D landfilling. A comprehensive review of these issues was published by Lee and Jones (1991). The discussion presented herein represents an integration of the current understanding of the problems with Subtitle D landfilling of municipal solid waste as applied to the proposed expansion of the Allied Imperial Landfill. Additional information on Drs. G. F. Lee and Anne Jones-Lee's experience and expertise in evaluating landfills' public health, environmental and other impacts is available from www.gfredlee.com, at http://www.gfredlee.com/landfill.htm.