Comments on
Western Regional Sanitary Landfill Placer County, California
Impact on Public Health, Groundwater Resources and the
Interests of Those Within the Sphere of Influence of the Landfill

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February 3, 1997

Ed Schnabel, Chairman
Central Valley RWQCB
3443 Routier Road, Suite A
Sacramento, CA 95827-3098

Dear Chairman Schnabel:

I wish to respond to the January 10, 1997 "Notice Tentative Waste Discharge Requirements for Western Placer Waste Management Authority Western Regional Sanitary Landfill Facility Class II and III Landfills Placer County." The proposed WDRs for continued operation of the Western Regional Sanitary Landfill (WRSL) is another of the Central Valley Regional Water Quality Control Board's (CVRWQCB) landfills that will not comply with the performance standards set forth in Chapter 15 of protecting groundwaters from impaired use for as long as the wastes in the landfill will be a threat. It is clear from the pollution by the existing closed waste management units at this landfill that the site groundwaters are vulnerable to pollution by landfill leachate. The construction of a single composite liner, as proposed, obviously will, at best, do no more than postpone when further groundwater pollution occurs by the waste management units that are proposed to be constructed under the proposed WDRs. Further, the groundwater monitoring system of a few monitoring wells spaced hundreds of feet apart proposed for the continued operation of this landfill has little probability of detecting groundwater pollution before widespread pollution occurs off-site.

While at this time I have no personal interest in this landfill, I am highly concerned about protecting the future generations' groundwater resources in the Central Valley as well as elsewhere in California and the US. Previously, I have provided detailed comments to the Central Valley Regional Water Quality Control Board staff (A. Inouye) on the highly significant deficiencies in the approach that the Central Valley Regional Water Quality Control Board's staff and Board have followed with respect to regulating the activities of the Placer County Department of Public Works for the design, operation, closure and post-closure care of the

WRSL. These comments included an approximately 50-page report entitled, "Review of Regulatory Compliance of the Western Regional Sanitary Landfill Placer County, California," dated June 1995. I have also submitted to the CVRWQCB (Inouye) copies of back-up materials to that report which provide technical support for my conclusions regarding the highly significant deficiencies used by the CVRWQCB staff, Board and Placer County in the development, design, operation, closure and post-closure care for this landfill. The proposed WDRs show that the Board staff is continuing its and the Board's past policy of approving landfills that meet minimum prescriptive design requirements, even though it is obvious to the staff who understand landfill liner and groundwater monitoring issues, that minimum prescriptive design requirements which now include a single composite liner will not protect groundwaters from impaired use for as long as the wastes represent a threat at geologically unsuitable sites, such as the WRSL site, as required in Chapter 15. The permitting of the continued operation of this landfill as proposed will be another facade where the Board is perpetuating obviously technically invalid approaches that will ultimately be of significant harm to the highly important groundwater resources of the Central Valley region.

It is clear that the Board staff in developing the proposed WDRs has chosen to ignore the information that I have previously provided which presents detailed information from the literature documenting that the minimum Subtitle D liners and groundwater monitoring systems that the staff proposes to allow the Placer County Department of Public Works to use will not protect groundwaters from impaired use as required in Chapter 15. The staff are proposing to continue to perpetuate the highly unreliable, behind-the-scenes approach that was developed in the mid-1980s by the regional board staff throughout the state where they agreed to assume, without public review, that the minimum design requirements set forth in Chapter 15 would be equivalent to the independent minimum performance standards set forth for in these regulations for protecting groundwaters from impaired use for as long as the wastes in the landfill represent a threat. While the staff state in the draft WDRs for the continued operation of the WRSL on page 5, item 24b, that,*"This order implements: b. The prescriptive standards and performance goals of Chapter 15, Division 3, Title 23 of the California Code of Regulations, effective 24 November 1984, and subsequent revisions;".*Such as statement is obviously technically invalid. The performance standards set forth in Chapter 15 are explicit in requiring protection of groundwaters from impaired use for as long as the wastes in the landfill represent a threat. Further, Chapter 15 and the Landfilling Policy adopted by the State Board on June 17, 1993 explicitly require protection of groundwaters from impaired use for as long as the wastes represent a threat. Further, Chapter 15 does not state or imply that the minimum prescriptive standards set forth in the Chapter or now Policy are equivalent to the minimum prescriptive design standards for landfill leachate containment systems.

It was obvious in the mid-1980s when the Regional Board staff agreed among themselves, without public review, to assume that the minimum prescriptive standards for landfill design were equivalent to the performance standards set forth in Chapter 15 that this assumption was obviously technically invalid to anyone who had even the most elementary understanding of Darcy's Law. At that time, the minimum prescriptive standards allowed at some sites the construction of a landfill that had a liner consisting of one foot of compacted soil with a maximum permeability of 1×10^{-6} cm/sec. A simply Darcy's Law calculation would have shown the staff that such a liner will be breached by landfill leachate in less than one year. The State

Water Resources Control Board's updated SWAT information released in December 1995 has confirmed that landfills lined with that liner polluted groundwaters to the same degree as unlined landfills. This is exactly what would be expected. The incorporation of a single composite liner into the minimum prescriptive standards as occurred on June 17, 1993 only postpones for an additional period of time when groundwater pollution occurs; it will not prevent it.

As discussed in materials that I have provided to the Central Valley Regional Water Quality Control Board on the WRSL, the wastes in the WRSL will be a threat to groundwater quality forever. The liner systems, such as the single composite liner, have a finite period of time during which they can function effectively. I request that all previous correspondence that I submitted to the CVRWQCB, including my June 1995 report, "Review of Regulatory Compliance of the Western Regional Sanitary Landfill Placer County, California," and its appendices become part of the administrative record for this review of the adequacy of the CVRWQCB staff's proposed WDRs for the continued operation of the WRSL.

As you know, several individuals have contacted CALFED about the importance of including Sacramento and San Joaquin Valley groundwater quality protection as part of CALFED's water quality management program. While it is unclear as to what the CALFED program will consist of at this time, certainly it should consist of protecting groundwaters from impaired use by waste management activities for as long as the wastes in these waste management units are a threat.

This past week I agreed to assist the Sacramento River Watershed Toxics Control Program Toxics Subcommittee in initiating a groundwater quality protection component of this program. This program will likely include full enforcement of the requirements set forth in Chapter 15 of the protection of groundwater from impaired use for as long as the wastes in the landfill and other waste management units are a threat. It could also include the establishment of an independent body of stakeholders who are concerned about the management of surface and groundwater quality within the Sacramento River watershed who would work toward requiring the Central Valley Regional Water Quality Control Board to fully comply with Chapter 15 requirements of protecting groundwaters from impaired use for as long as the wastes in landfills and other waste management units represent a threat. There certainly will be discussions about the inadequacy of the CVRWQCB's approaches towards permitting landfills since the adoption of Chapter 15 in 1984 and the WRCB's Landfilling Policy in 1993. The expanding interest in protecting groundwaters from pollution from various sources, including landfills, will likely cause general public recognition of the inadequacies of past and currently proposed Board activities in this area.

Last fall, in a highly similar situation, I filed a petition with the State Water Resources Control Board on the significant technical deficiencies in the CVRWQCB's Order No. 96-228 governing the proposed expansion of the University of California, Davis' campus landfill and the closure of the existing "west" campus landfill. I request that a copy of that petition be incorporated into the administrative record for the review of the proposed WDRs for the WRSL. With few exceptions, the issues raised on the technical deficiencies of Order No. 96-228 are directly applicable to the proposed continued operation of the WRSL as well as the closure of existing waste management units at this landfill.

I hope that this reconstituted Board will critically examine these issues and reject the staff's proposed approach of allowing this landfill to expand with its technically flawed approach for waste containment and groundwater monitoring. There are alternative approaches that are readily available that can be used to manage municipal solid wastes without inevitable groundwater pollution. It is time that this Board set a precedent for the Central Valley and, for that matter, the state in providing true protection of groundwaters from waste-derived constituents as required by Chapter 15.

Another significant deficiency in this proposed Order is the inadequacy of the approach that is being allowed for closing the waste management units at the WRSL. Again, the minimum Subtitle D, Chapter 15 approach is obviously technically flawed and will not protect groundwaters for as long as the wastes represent a threat. This issue is discussed in my petition to the State Water Resources Control Board on the deficiencies in the Board's Order No. 96-228. There are alternative approaches that can and should be required of Placer County in properly closing all of the existing waste management units so that the wastes in this landfill are not exposed to further percolation of precipitation through the cover which generates leachate and ultimately pollutes groundwater.

If any members of your staff, Placer County or consultants claim that the proposed landfill expansion or the proposed landfill closure approaches will protect groundwaters in accord with Chapter 15 requirements for as long as the wastes represent a threat, please establish a public peer review where these issues can be properly addressed. I am very confident that if experts in the field who do not have other agendas than proper solid waste management with groundwater quality protection review this issue they would conclude, as I have, that the proposed expansion of the Western Regional Sanitary Landfill should not be allowed as proposed in this draft Order. Those who advocate the "safety" of this landfill should be required to document in a public peer review arena that the liner system and groundwater monitoring systems that are proposed in the Order will conform to Chapter 15 minimum performance requirements.

If there are questions about these comments, please contact me. They are being submitted as an individual who is concerned about protecting future generations' groundwater quality.

Sincerely yours,

G. Fred Lee, PhD, DEE

Copy to w/o enclosures:
W. Bennett
J. Caffrey
W. Attwater
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Enclosure

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February 5, 1997

William Marshall, Chief
Waste Discharge to Land Unit
Central Valley Regional Water Quality Control Board
3443 Routier Road
Sacramento CA 95827

Dear Mr. Marshall:

In accord with your request, please find attached a set of the materials I wish to use as appendices to my January 27, 1997 comments sent to Ed Schnabel, Chairman, Central Valley Regional Water Quality Control Board, on the significant technical deficiencies in the "Notice Tentative Waste Discharge Requirements for Western Regional Placer Waste Management Authority Western Regional Sanitary Landfill Facility Class II and III Landfills Placer County." These appendices provide technical support for my findings that this landfill as proposed will ultimately pollute groundwaters with landfill leachate, rendering them unusable for domestic and some other purposes.

Since I have found that landfill proponents and their consultants typically try to discredit the technical validity of my statements by claiming that I have only cited Dr. Jones-Lee's and my work on landfill issues, I wish to point out that many of the attached papers and reports are review articles developed by us which discuss in detail the literature on the topic of the ultimate failure of minimum Subtitle D landfill liner systems in preventing leachate from passing through the liner into the underlying groundwater system for as long as the wastes in the landfill represent a threat. As documented in the enclosures, this is the performance standard that the proposed new waste management units for the WRSL must achieve if they are to conform to minimum Subtitle D requirements for groundwater quality protection. These performance standards cannot be achieved with the WRSL proposed design at the WRSL location.

It is time for the Central Valley Regional Water Quality Control Board to stop permitting landfills that will obviously only postpone when groundwater pollution occurs. The Board should use the information that is readily available in the literature on the ultimate failure of the liner systems that are proposed for the WRSL and the inability of the proposed monitoring system to detect groundwater pollution before widespread pollution occurs. The enclosed appendices to my January 27, 1997 letter to Chairman Schnabel provide the technical back-up from the literature on this topic.

As I indicated, I stand willing to have these issues peer-reviewed by independent experts who do not have a financial interest in continuing to work for landfill companies in developing landfills. One of the enclosed papers ("Environmental Ethics: The Whole Truth") specifically addresses this issue. I urge that if the staff have any questions about the technical validity of my findings they request that the Board conduct a full, public peer review of the issues in which the landfill proponents are required to present the information that they claim supports the position that the landfill liner system proposed for the WRSL expansion will conform to Chapter 15 and the WRCB's Landfilling Policy requirements of protecting groundwaters from impaired use for as long as the wastes represent a threat.

If the landfill proponents claim that the wastes will only be a threat for 30 years or so, please have them explain what happens to the large amounts of salt, heavy metals and other constituents in a "dry tomb" type landfill which do not degrade and will be in the landfill effectively forever. Further, please have the landfill proponents who claim that the groundwater monitoring system that has been proposed for the WRSL involving a few vertical monitoring wells and a few lysimeters provide the Board with a proper evaluation of the reliability of this system in detecting leachate leakage through the liner. Chapter 15, Article 5 is explicit in requiring *"... the best assurance of the detection of subsequent releases from the waste management unit."*Also, it requires that a sufficient number of monitoring wells be located so they *"...provide for the best assurance of the earliest possible detection of a release from a waste management unit."* A proper analysis of this situation will show that the groundwater monitoring wells must be spaced no more than a few feet apart in order to comply with this requirement in order to detect leachate that has leaked through the liner at the point of compliance for monitoring.

I am confident that a proper peer review of these issues will show that a minimum Subtitle D landfill of the type that the staff propose to permit for the continued operation of the WRSL will demonstrate that it is only a matter of time until the landfill liner system fails to protect groundwater from impaired use.

As mentioned previously, these comments are submitted on behalf of future generations of Californians who wish to have available groundwaters that do not contain Placer County *et al.* solid waste leachate.

Please contact me if you have questions on these matters.

Sincerely yours,

G. Fred Lee, PhD, DEE

Copy to w/o encl.: E. Schnabel, Chairman, CVRWQCB
J. Caffrey, Chairman, WRCB
W. Attwater

GFL:oh
Enclosures

Review of Regulatory Compliance of the Western Regional Sanitary Landfill Placer County, California

by

G. Fred Lee, Ph.D., P.E., D.E.E.
G. Fred Lee & Associates
El Macero, California

February 1995

Executive Summary

This report provides the initial conclusions from a preliminary investigation of the regulatory compliance of the Western Regional Sanitary Landfill (WRSL or Landfill) Placer County, California.

This Landfill has been and is operating in violation of numerous regulatory requirements. **It has been found that the WRSL is located on a site which is unsuitable for this landfill design and the type of disposal operation being conducted. It is being operated in such a manner as to pose a significant threat to public health, the environment, and the uses of adjacent and nearby properties.** Without immediate correction, the WRSL will cause severe damage to the interests of those who own or use property within the sphere of influence of this Landfill. It should be required immediately to change its method of operation and to strictly comply with all regulatory requirements.

Water Pollution

The Landfill owner/operators, Placer County Board of Supervisors and Department of Public Works have developed an inappropriate design for this Landfill that will not comply with the State Water Resources Control Board's Chapter 15 regulations that have required since 1984 the landfilling of municipal solid wastes (MSW) in such a way as to prevent groundwater pollution - use impairment for as long as the wastes in this Landfill will be a threat. This Landfill is already polluting the groundwater aquifer systems associated with it. Further, the wastes in this Landfill will be a threat to cause water pollution forever, i.e. as long as the Landfill exists.

The groundwater monitoring program that has been allowed to be developed and used at this Landfill does not conform to the original Chapter 15, Article 5 requirements adopted in 1984, nor does it conform to the revised Article 5 requirements adopted in 1991. Widespread groundwater pollution by landfill leachate (garbage juice) can occur at this Landfill without being detected by the groundwater monitoring system in place at the Landfill. The Regional Water Quality Control Board's recently proposed Tentative WDR's which requires the addition of two groundwater monitoring wells in an attempt to try to improve the groundwater quality monitoring will, if implemented, still fall far short of conforming to Chapter 15, Article 5 requirements for a groundwater monitoring system at a landfill of this type.

Hazardous Gas Migration

Hazardous and otherwise deleterious gases have been allowed to migrate through the soil from the Landfill to adjacent properties.

Hazardous and Toxic Waste Materials

While this Landfill was "certified" by the County Board of Supervisors as not accepting hazardous or toxic materials, substantial amounts of these materials have been and will continue to be deposited as wastes in this Landfill.

Other Important Problems

A number of other important problems have occurred with this Landfill's operations. There have been at times severe problems with landfill odors, wind-blown litter - wastes, illegal roadside dumping of wastes, etc. Also, a number of regulatory compliance problems have occurred, including failure of the operator to properly provide daily and intermediate cover of the waste, thereby allowing increased escape of odorous, hazardous or deleterious gases and reducing the control of potential disease vectors and vermin such as rats, mice and birds from gaining access to the waste and transporting waste components from the Landfill site.

Regulatory Compliance

This Landfill has been allowed to operate in violation of its operating permits (Central Valley Regional Water Quality Control Board Order No. 90-272 dated September 28, 1990) and the mitigation measures set forth in the various EIR's and their supplements that were certified by the Placer County Board of Supervisors as well as the conditions set forth in the Conditional Use Permits issued by the Placer County Planning Department.

Closure and Postclosure

Inadequate attention has been given by the County to the closure of Landfill modules as they have been filled and the eventual closure of this Landfill. The County has not made appropriate plans to provide for the long-term *ad infinitum* postclosure maintenance and remediation programs that will be required at this Landfill.

Adequacy of Documentation

The various documents such as the County Department of Public Works Environmental Impact Reports and their supplements as well as the County Solid Waste Management Plan have provided highly unreliable information to the County Board of Supervisors and the public on the past and proposed operations of this Landfill. This unreliable information has asserted that the Landfill would be operated in accord with strict regulatory requirements and would be a "good neighbor" to adjacent property owners/users. However, a review of the compliance record for this Landfill shows that there have been many problems with the operations of this Landfill which cause it to be adverse to the interests of those who own or use properties near the Landfill.

Needed Corrective Action

The Landfill should be operated in accord with strict regulatory compliance. If the Landfill owner/operator - County does not achieve strict regulatory compliance, then the Landfill should be closed and all wastes removed.

An intensive, comprehensive groundwater and unsaturated zone monitoring program needs to be initiated to determine the extent and degree of the pollution of the aquifer system that underlies the waste management modules. When the extent of pollution is known, corrective action should be initiated to prevent further pollution and to clean up the contaminated aquifer system to the maximum extent practicable.

All new Landfill modules should be constructed with a double composite liner in which the lower composite liner is part of the leak detection system for the upper composite liner. When uncontrollable leakage of leachate through the upper composite liner occurs that could pollute groundwater, impairing its use if the lower liner were not present, then the wastes must be removed from the Landfill and properly managed.

If it is not possible through the installation and maintenance of a landfill cover with reliable leak detection to prevent leachate generation in the Landfill modules, then the wastes in the Landfill module will have to be removed and properly managed.

A highly efficient, reliable gas monitoring and collection system should be installed, operated and maintained at this Landfill for as long as the wastes in the Landfill have the potential to produce landfill gas upon contact with moisture. The recently initiated landfill gas monitoring program is significantly deficient in reliably monitoring landfill gas releases and impacts at the WRSL.

Each day's deposited waste should be covered with no less than six inches of dirt.

There should be no increase in dust arising from Landfill operations at the property line of the adjacent property owners' lands. A reliable dust monitoring program should be installed and operated in perpetuity, focusing on total dust as well as PM 10 particles.

No wind-blown litter should be allowed to escape from the waste deposition areas.

No landfill odors should be present at the property line of adjacent properties.

The County should establish an illegal roadside dumping clean-up program that picks up fugitive waste along the highways within the sphere of influence of the Landfill so that at no time any such wastes are present along the roads for more than 12 hours.

Leachate generated in the Landfill should be transported via truck or pipeline for off-site treatment.

All surface runoff from the Landfill property that could contain any waste constituents should be impounded and tested for potentially hazardous or deleterious chemicals. Only if it is found to be of satisfactory quality, may it then be released to the natural watercourses.

All management of inert wastes at this Landfill should be in composite-lined and eventually double-composite-lined modules, unless the wastes are, in fact, shown to conform to Chapter 15 requirements of no leachable components above water quality objectives.

All Landfill modules that will not receive additional wastes for at least six months should be covered with a testable leak detection cover to prevent moisture from entering the wastes.

All Landfill modules that reach design final grade should be closed in accord with regulatory requirements which should include a leak detectable landfill cover.

The proposed plans for the development of the WRSL waste modules along Feddyment Road and to the south of module 13 should be curtailed since the development of these modules would involve placing wastes essentially on the property line which based on past operating experience would result in violation of a variety of regulatory requirements.

A dense, rapid-growing, vegetative screen should be planted and maintained to screen the view of the Landfill from adjacent properties.

A dedicated trust fund of sufficient magnitude to address all plausible contingencies associated with closed Landfill modules should be developed. The magnitude of this fund should be sufficient to exhume the wastes and manage them properly. It also should be of sufficient magnitude to provide for clean-up of leachate-contaminated soils and the aquifer system.

An amount of $100,000/year should be provided by the County for third-party independent monitoring of the Landfill operations. This monitoring activity should be done on behalf of the property owners within the sphere of potential influence of the Landfill.

Conclusion

It is concluded that if the WRSL comes into full regulatory compliance, and this compliance is vigorously maintained and the other provisions discussed in this report are implemented, then this Landfill will not be significantly adverse to those who own or use properties near the Landfill.

Introduction

This report provides the initial conclusions from a preliminary investigation of the regulatory compliance of the Western Regional Sanitary Landfill (WRSL or Landfill) Placer County, California. Also presented are recommendations on how this Landfill should be operated in the future so that it is within full strict regulatory compliance and not adverse to the health, environment, welfare and interests of those who own or use adjacent or nearby properties.

Investigation

The author's investigation of the WRSL included review of the operating permits, environmental impact reports and supplements, technical reports on the characteristics of the site, LEA and other agencies' site inspection reports and other documents and included a site inspection of the Landfill. A summary of key findings and issues pertinent to the deficiencies in the design, operation, closure and postclosure requirements is presented below.

Water Pollution

Municipal solid waste landfills are notorious for polluting groundwaters by leachate (garbage juice), rendering the groundwater unusable for domestic and many other water supply purposes. The WRSL at this time is polluting the underlying groundwater aquifer system which will lead to a loss of groundwater resources for use by this and future generations. This pollution arises from a wide variety of hazardous and/or deleterious chemicals present in municipal solid waste which, when in contact with water arising from rainfall entering the landfill, produce leachate. For unlined landfills, this leachate migrates out the bottom of the landfill into the underlying aquifer system. For soil-lined landfills, such as WRSL Modules 1, 2, 10 and part of 11, the liner, at best, only postpones for a few months to a couple of years when leachate passes out of the containment system for the module into the underlying groundwater aquifer system and therefore begins to threaten groundwater pollution, impairing its use. The state of California regulations (Water Resources Control Board's Chapter 15) governing the landfilling of wastes which were originally adopted in 1984 prohibit groundwater pollution by landfill leachate that impairs use of the groundwater for as long as the wastes present in a landfill represent a threat. The wastes in the WRSL will be a threat to groundwater pollution forever.

While various County Department of Public Works documents try to give the impression that there are significant amounts of low-permeability clays between the bottom of the Landfill and the groundwater located some 55-65 feet below it, it was recognized by the County Department of Public Works in 1977 through the County's EIR that the unsaturated area between the soil surface and the groundwater table was not impermeable to water passage through it. As indicated in this EIR in a discussion of the geology of the area, Mr. John Livingston, Consulting Geologist for Placer County, concluded that the Landfill site is underlain by "Victor Sandstone." It is stated in the 1977 EIR that,

"The Victor Sandstone has very low permeability and very low surface infiltration rates throughout the formation though it does serve as a recharge area for the Sacramento Valley groundwater basin. In some places the underlying formation surrounds sand and gravel filled channels which are very likely groundwater reservoirs of small capacity."

Since precipitation which infiltrates surface soils eventually recharges groundwater in the region, there is a hydraulic connection between the ground surface and the groundwater table. This hydraulic connection means that leachate developed in the Landfill can pass from the bottom of the Landfill through any liner system that has been developed thus far into the underlying, unsaturated aquifer, eventually reaching the water table, impairing the uses of the groundwater for domestic purposes. The Water Resources Control Board's Chapter 15 and the Porter-Cologne

Water Quality Control Act requirements governing the land disposal of solid waste in Class III landfills require that landfills be sited, designed, constructed, operated, closed and maintained so that releases of waste-derived constituents do not impair or threaten to impair the uses of groundwater for as long as the wastes in the landfill represent a threat. This issue is discussed below.

Groundwater pollution is of importance to adjacent and nearby property owners to the WRSL from several perspectives. First, there are groundwater production wells located down groundwater gradient from this Landfill that are used today. Second, even though there are no known plans now for some of the adjacent property owners to use this groundwater for domestic water supply purposes, this resource may be important to future generations. Who can say that at some time in the future adjacent and nearby property owners will not want to use the groundwater that underlies their property for domestic water supply or other purposes? Such use is certainly appropriate and protected by law. It is for this reason that Chapter 15 and the current State Water Resources Control Board's Landfilling Policy require protection of groundwater from impaired use for as long as the wastes in the landfill represent a threat.

The transport of leachate from the WRSL into the groundwater under adjacent properties trespasses on the rights of adjacent property owners/users and represents a significant potential threat to public health, the environment and the property owners'/users' economic and other interests. *The various documents that have been developed by the County Department of Public Works for their consultants and therefore approved by the Department of Public Works do not adequately or reliably describe the potential consequences of groundwater pollution by landfill leachate to future generations who may wish to use this water for domestic water supply purposes.* Chapter 15 and the state's Landfilling Policy prohibit groundwater pollution by landfill leachate for as long as the wastes in the landfill represent a threat. Chapter 15 and the Porter-Cologne Act are clearly designed to unequivocally protect groundwater from pollution by landfill leachate for use by future generations.

Municipal solid waste leachate of the type generated at the WRSL contains a wide variety of chemical constituents that are hazardous to public health or, even though not hazardous in the regulatory sense, are highly deleterious to the use of the groundwater for domestic water supply purposes. Further, once a groundwater is polluted by municipal landfill leachate, it can never be cleaned up. Further, the area of the aquifer that has been polluted can never be cleaned up so it is again safe for domestic water supply purposes. As discussed in the enclosed papers by Jones-Lee and Lee (1993) as well as Lee and Jones-Lee (1994a), municipal landfill leachate of the type generated at WRSL-type landfills contains a wide variety of conventional pollutants, Priority Pollutants, and unregulated non-conventional pollutants whose hazard to public health and the environment is unknown. Over 95% of the organics in MSW leachate are non-conventional pollutants. Therefore, even if all the drinking water MCL's (maximum contaminant levels) are met for a groundwater that contains MSW leachate, it can never be assumed that this water is safe to consume since only about 100 to 200 of the chemicals out of the 60,000 chemicals that are used by society today are regulated. There is a vast arena of unregulated chemicals that can be detrimental to public health and the environment in municipal landfill leachate. This situation mandates that no pollution of groundwaters by municipal solid waste landfills be allowed.

It is well-known today that the presence of a groundwater pollution plume under a property derived from adjacent or nearby properties is a significant detriment to the property owners. A pollution plume under property adversely affects the value of that property, independent of whether there are plans to use the groundwater under the property for domestic water supply purposes. Few individuals will knowingly purchase a property at full market value which is underlain by a groundwater pollution plume of hazardous or deleterious chemicals.

It is, therefore, very important that the WRSL be required to operate within the environmental regulations (Chapter 15) which prohibit the impairment of use of groundwater at the edge of the waste management unit, i.e. the groundwater downgradient area where the wastes are deposited in the Landfill. The US EPA's Subtitle D regulations governing landfilling of wastes which were incorporated into the state of California's Landfilling Policy in June 1993, prohibit the spread of groundwater pollution derived from landfills to within no more than 150 meters (approximately 165 yards) of the edge of the waste management unit, and the point of compliance for groundwater monitoring shall be on the landfill owner's property.

The WRSL is located in an area that has a number of geological characteristics that make the area an unsuitable site for a landfill of this design. First and foremost, this Landfill is situated above high quality groundwater whose use can be readily impaired by small amounts of leachate derived from this Landfill. *The Landfill permit application documents, such as the County's Environmental Impact Reports (EIR's) and their supplements, do not objectively evaluate the suitability of the site for this Landfill. They have failed to properly consider the long-term potential for leachate generated in this Landfill to reach the groundwater table, polluting these waters and thereby impairing their use.* Such impairment is in violation of the state's Chapter 15 regulations and its Landfilling Policy.

The groundwater underlying this site is located about 55 to 65 feet below the ground surface (CVRWQCB Order No. 90-272, 1990). There are some low-permeability layers with permeabilities of 10^{-4} to 10^{-7} cm/sec between the bottom of the Landfill and the groundwater table. The "Periodic Site Review (Engineers Report), Western Regional Sanitary Landfill, Placer County, California" dated October 6, 1988 (EMCON, 1988a) well logs show that appreciable amounts of silts, sands, and gravel underlie the Landfill. Some of the County's documents try to portray the image that the natural geologic strata will protect groundwater from pollution by Landfill leachate. However, if the natural strata were a true barrier to leachate transport from the bottom of the Landfill to the groundwater table, there would be no need for a liner system to try to prevent leachate from leaving the Landfill and polluting groundwater. Chapter 15 allows the construction of landfills without liners at sites where the natural strata provide protection of groundwater resources. The WRSL site is certainly not a site of this type. The natural strata, at best, potentially postpone for only a few tens of years when the leachate that leaves the Landfill and enters the underlying groundwater aquifer system passes down through the unsaturated zone, reaching the groundwater table.

The CVRWQCB Order No. 90-272 required that a plastic sheeting liner be installed in the new Landfill modules. Further, the draft CVRWQCB Order No. (to be assigned) requires groundwater quality protection from impaired use by waste-derived constituents where it states on page 7, item 5, *"The discharge of solid or liquid waste or leachate to surface waters, surface*

water drainage courses, or ground water is prohibited." This draft Order also specifies that these requirements are in effect for as long as the wastes represent a threat.

The strata below the WRSL will not prevent the transport of leachate through them for as long as the wastes placed in the WRSL will be a threat to the groundwater resources connected to this Landfill. Further, the high-permeability sand and gravel lenses which underlie this Landfill area will allow rapid transport of leachate away from the Landfill. In addition, the low-permeability layers likely contain cracks or areas of higher permeability (10^{-4} cm/sec or greater) which will allow more rapid transport of leachate from the Landfill to the saturated groundwater of the region. The County has attempted to reduce the transport of leachate through the sandy lenses by installing clay plugs where the lenses intersect the Landfill modules. The transport of leachate through the clay plugs and along the sandy lenses increases the total area through which this Landfill can pollute groundwater. Most landfills can only leak through the bottom of the landfill. In the WRSL, however, the sandy lenses provide an increased area through which transport of leachate can occur to the groundwater table. At this time, insufficient hydrogeologic investigation has been conducted at this site to reliably identify all the possible pathways through which leachate generated in the Landfill can be transported to the groundwater table. During the period of time that the wastes in the Landfill will be a threat, leachate from this Landfill can reach the groundwater table and then be transported in the groundwater under adjacent properties, impairing their uses.

Since the WRSL site does not provide natural protection of the groundwater in the vicinity of the Landfill from pollution by landfill leachate, a waste containment system (liner) is required. Three different approaches have been used at the WRSL in the development of waste management modules. Initially (prior to 1984), waste management modules were constructed without designated liners. Compacted soil formed the bottom of the Landfill. The compaction of this soil was not, however, to any specified degree such as that which occurred in 1984 where the then Subchapter 15 required compaction so that the maximum permeability of one foot of this material was less than 10^{-6} cm/sec. Subsequently, the County constructed waste management modules with a two-foot layer with the minimum compacted soil liner permitted under Subchapter 15. In 1990, the County began to use a plastic sheeting liner (FML). This liner, however, did not have a low permeability backing of this plastic sheeting layer of the type required today. As discussed below, this liner can, at best, only postpone when groundwater pollution occurs. Further, it can leak leachate at a high rate depending on the permeability of the soil layer on which it is placed.

As required by Chapter 15 and the state's Landfilling Policy, the landfill containment system must be able to prevent the impaired use of the groundwater at the edge of the landfill, i.e. the point of compliance for groundwater monitoring, for as long as the wastes in the landfill represent a threat. As discussed by Jones-Lee and Lee (1993), wastes in this type of landfill ("dry-tomb" type) will be a threat to groundwater quality forever. Therefore, the natural strata plus any liner system that is used must be able to function as an effective barrier to transport of leachate from the Landfill to the groundwaters, forever.

A review of Chapter 15, Article 4, §2540 (WRCB, 1994) states under section (c),

"Class III landfills shall have containment structures which are capable of preventing degradation of waters of the state as a result of waste discharges to the landfills if site characteristics are inadequate."

Chapter 15 is explicit in requiring that the overall performance standard of prevention of groundwater impairment of use applies throughout the active life and postclosure period for landfills. The postclosure period for landfills is defined as the period of time that the wastes represent a threat (Chapter 15 §2580 (a)). This means that the overall performance standard for the existing as well as any expansion of the WRSL is one of prevention of all impaired use of groundwater in the vicinity of the Landfill for as long as the Landfill will exist. This is an explicit overall, over-riding performance standard set forth in Chapter 15 that must be met. As discussed below, the design for the current Landfill modules will not comply with the overall performance standard set forth in Article 4, §2540.(c) of protecting groundwaters from impaired use for as long as the wastes are a threat.

The overall groundwater quality protection requirements of Chapter 15 of preventing impaired use of groundwaters due to landfill-derived constituents for as long as the wastes represent a threat is a separate regulatory requirement that applies in addition to any minimum design requirements for liners, covers or other components of the containment system set forth in the Policy.

While some of the documents developed by the County in support of the WRSL discuss the so-called containment capabilities of the liner system, a critical review of this issue shows that the containment capabilities may occur at the time that the currently used composite liner is new, provided it is installed properly. *The County Department of Public Works as well as the County's consultants have failed to reliably report on the potential long-term problems of the liner systems that have been used or are currently being used at this Landfill in preventing leachate from leaving this Landfill and entering into the underlying aquifer system.*

Haxo and Haxo (1988) reported that the US EPA HWERL Ad Hoc Technical Committee concluded in a discussion of "Service in Landfills of Flexible Membrane Liners and Other Synthetic Polymeric Materials of Construction,"

"The polymers that were discussed and first-grade compounds based on these polymers should maintain their integrity in landfill environments for considerable lengths of time, probably in terms of 100's of years.

Nevertheless, when these polymers or compounds are used in products such as FML's, drainage nets, geotextiles, and pipe, they are subject to mechanical and combined mechanical and chemical stresses which may cause deterioration of some of the important properties of these polymeric products in shorter times."

In a discussion of "areas of concern," Haxo and Haxo state,

"The combined mechanical and chemical stresses under which the liner system functions may cause cracking and breaking of the components due to environmental stress-cracking or possibly mechanical fatigue under long service."

"Seams of FML's continue to be an area of concern, as none of the test methods truly assess the effects of long-term exposure in landfills."

"Clogging of drainage and detection systems continues to present a problem. The clogging can be by biological clogging due to growth or sedimentation or through precipitation of dissolved constituents."

The behavior of the plastic sheeting (FML) layer in the composite liner being used under part of Module 11 and all of Modules 12 and 13 is dependent on the integrity of the plastic sheeting. Holes, rips, tears, etc. and ultimately points of degradation of this liner govern its expected performance (Lee, 1994; Lee and Jones, 1993a; Lee and Jones-Lee, 1994b). No one knowledgeable in the properties of plastic sheeting liners claims that these materials will work perfectly forever. Anyone who does make this claim does not understand their properties.

It is generally agreed that, over time, the containment properties of both clay liners and plastic sheeting liners used individually or as a composite liner will deteriorate, eventually leading to widespread failure of the containment system. The US EPA (1988a), as part of developing Subtitle D regulations stated in the August 1988 Federal Register,

"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."

The US EPA Criteria for Municipal Solid Waste Landfills (US EPA, 1988b) state:

"Once the unit is closed, the bottom layer of the landfill will deteriorate over time and, consequently, will not prevent leachate transport out of the unit."

The US EPA's discussion of the expected performance of MSW landfill liner systems permitted under Subtitle D is reliable. At best, these landfill liner systems only postpone for a period of time when groundwater pollution will occur; they will not prevent it. These are the types of liner systems that have been and are now being used at the WRSL. It should be noted that there about half a dozen states in the US that would not allow the liner systems that are used at the WRSL today (Module 13) for use in municipal solid waste landfills because of the well-known properties of only postponing when groundwater pollution occurs.

The long-term stability situation today for plastic sheeting liners is no different than in 1988. The same issues still exist. No one knowledgeable of the properties of these systems reports that the plastic sheeting liners of the types used today will function perfectly forever in a landfill environment. Since the liners are buried under many tens to hundreds of feet of garbage and are therefore not subject to inspection and repair, and since some components of the waste will be a threat forever, it is only a question of time until the liners fail to prevent leachate from passing

through them and polluting groundwaters in the vicinity of the landfill. It is for this reason that Lee and Jones-Lee (1993b) in "Revisions of State MSW Landfill Regulations: Issues for Consideration for the Protection of Groundwater Quality," published in *Environmental Management Review* have recommended that all municipal solid waste landfills that operate with the "dry tomb" type landfilling approach use double-composite liners. When the landfill owner/operator cannot prevent leachate leakage through the upper composite liner, the wastes in the landfill must be removed and properly managed. Under this approach, the "dry tomb" type landfilling approach existing at the WRSL must be considered to be a temporary storage of the wastes where eventually if the owners/operators of this Landfill cannot - do not prevent moisture from entering the Landfill and generating leachate, then the wastes in this Landfill must be removed and properly managed. Failure to plan for this situation will result in groundwater pollution at the WRSL and, therefore, will result in a violation of Chapter 15's groundwater protection requirements.

While some of the documents that have been developed by or for the County claim the WRSL meets the minimum requirements set forth in Chapter 15 and now the Landfilling Policy, the facts are that the minimum landfill containment design and related requirements set forth by the state in Chapter 15 do not necessarily conform to the groundwater protection standards set forth in this regulation. Chapter 15, however, is explicit in requiring the protection of groundwaters from impaired use for as long as the wastes represent a threat regardless of the type of containment system employed. This is an overriding performance standard that must be met by all containment systems. The information provided by the County in support of the WRSL development and expansion is highly misleading on how this Landfill conforms to Chapter 15 requirements. There is no statement in Chapter 15 that says that meeting the minimum design requirements is adequate regulatory compliance to overall performance requirements of protecting groundwaters from impaired use for as long as the wastes represent a threat. Meeting the minimum liner design requirements of either Subtitle D or Chapter 15 will not protect groundwaters from pollution by landfill leachate in a WRSL setting.

The Central Valley Regional Water Quality Control Board has required through the waste discharge requirements (WDR's) that the County design, construct and maintain a landfill liner system that will meet the overall performance standards of Chapter 15. The information provided by the County on the properties of the landfill containment materials has been highly unreliable. The Central Valley Regional Water Quality Control Board acted on inadequate and unreliable information in approving the design for the expansion of the WRSL since the adoption of Subchapter 15 in 1984. This unreliable information has also misled the public into believing that this Landfill will protect the groundwater resources connected to the Landfill.

The initial waste disposal modules at WRSL were constructed without a low-permeability liner. Therefore, there is no engineered containment system for these modules which would enable the collection of at least part of the leachate generated within the module. All of the leachate generated within these modules (Modules 1 and 2) has been passing through the bottom of the Landfill into the unsaturated zone below the Landfill on its way to the groundwater table. Further, for those modules for which a leachate collection and removal system was provided (Modules 10, 11, 12 and 13) part of the leachate generated within the Landfill has been passing through this liner system into the unsaturated zone below the Landfill. The Porter-Cologne Act

provides authority to the regional boards to require that landfill owners/operators investigate the potential for groundwater pollution from landfill modules that were constructed without liners or with liners that have limited ability to prevent leachate passage through them. This authority is set forth in §13304(a)-(e) where it is stipulated that any condition that threatens with a substantial probability of harm the pollution of groundwaters shall be regulated as though groundwater pollution was occurring. **The Central Valley Regional Water Quality Control Board should immediately require that Placer County initiate a comprehensive monitoring program under the modules that have been constructed without low-permeability liners, including those that have compacted soil liners and those modules with a plastic sheeting liner to determine if landfill leachate is in the unsaturated zone below the Landfill modules.** If, as expected, it is found there, then Placer County must initiate the provisions of Article 5, Chapter 15 which ultimately leads to the clean-up of the area of the unsaturated zone and any groundwaters that are found to contain leachate.

The current groundwater monitoring system consisting of a couple of wells spaced about 2,000 feet apart along the property line is grossly deficient in detecting leachate migration from these modules. There is a very low probability that the groundwater monitoring wells downgradient from the unlined Landfill modules would detect groundwater pollution by landfill leachate before it trespasses under adjacent property owners' lands. The most likely path for rapid leachate transport from the existing modules is laterally through the sandy lenses and then in zones of higher permeability through the lower permeability natural strata. This makes monitoring of leakage from the modules very difficult to achieve with any degree of reliability. It is therefore suggested that the Central Valley Regional Water Quality Control Board should immediately require that Placer County conduct horizontal drilling at various depths and locations under the existing modules to detect the transport of leachate from the modules toward the water table and within the groundwater. Failure to follow this approach could readily result in significant pollution of groundwaters by landfill leachate from these modules without detection by the current monitoring system.

The requirement that the groundwater resources of the state must be protected from further pollution by landfill leachate for as long as the wastes represent a threat is explicitly stated as a performance standard in Subchapter 15. The State Water Resources Control Board in June 1993 reaffirmed that it is the Board's position that all on-land waste disposal in the state shall be conducted in such a manner as to protect the groundwater resources of the state from pollution (impaired use) by leachates derived from the wastes for as long as the wastes are a threat. Those familiar with leachate transport and compacted clay liners as well as natural strata know from a simple Darcy's Law calculation that one foot of 1×10^{-6} cm/sec clay will be breached by water or leachate in a period of less than one year. Therefore, the compacted soil liners that are present under WRSL modules which have as a liner one or two feet of 1×10^{-6} cm/sec soil will allow leachate to pass through the liner on its way toward pollution of groundwaters under the Landfill in much the same way as the modules which do not have low-permeability liners. While there may be small amounts of attenuation of certain chemicals in the soil liner, eventually as leachate passes through it the attenuation capacity will be exceeded. Further, there are large numbers of constituents in MSW leachate which are not attenuated.

A similar situation exists with the approach taken by the County for addressing the transport of leachate through a sandy lens that intersects a waste module. The County adopted the approach of plugging these sandy lenses at the point where they enter the waste module with two feet of clay - soil that has a permeability less than 1×10^{-6} cm/sec. Such a plug will only slow down for a few years the transport of leachate along the sandy lens. This plugging approach is obviously an ineffective approach towards dealing with the unsuitable geological strata under the Landfill where sandy lenses are in contact with the bottom of the Landfill. As discussed above, these sandy lenses, even plugged sandy lenses, will serve as a conduit for rapid transport of leachate away from the Landfill and enhance the opportunity for vertical transport of leachate through the natural strata to the groundwater table.

The soil-lined modules which are part of the WRSL can leak leachate at high rates, compared to those needed to pollute groundwaters. The pollution of groundwaters by landfill leachate, impairing their uses for domestic water supply can occur when leakage rates are above about 1 to 5 gallons/acre/day. The one foot of 1×10^{-6} cm/sec soil liner under several of the Landfill modules has a design leakage rate, under one foot of head, of 1,200 gallons per acre of landfill area per day (Daniel, 1990). Further, according to Workman and Keeble (1989), under one foot of head, the leachate can pass through one foot of soil compacted to a maximum permeability of 1×10^{-6} cm/sec in less than one year. It is, therefore, evident that the 1×10^{-6}cm/sec landfill liner under several of the WRSL modules will not prevent groundwater pollution by landfill leachate. It does reduce the extent of the pollution to the extent that leachate is transported to a leachate collection and removal system. However, even for Module 10 and part of Module 11 where there is a leachate collection and removal system, under low rates of leachate generation, the leachate can readily pass through the liner and never reach the collection sump.

The leakage of leachate through the soil-lined modules will not be uniform across the bottom, but will occur in some areas to a greater extent than in others. This will lead to leachate finger-like plumes of a few feet to a few tens of feet in width. The groundwater monitoring system that the County has developed for the WRSL involving a couple of vertical wells monitoring groundwaters at the edge of the property is highly unreliable in detecting groundwater pollution by landfill leachate. To remedy this situation, it is recommended that a combination of vertical monitoring wells and horizontal wells be used in both a saturated and unsaturated monitoring program to detect when sufficient leachate has left the Landfill on its way toward the groundwater table to potentially impair the use of the groundwaters under the Landfill.

In 1990, the County adopted an approach involving the use of a single plastic sheeting layer as a liner at the WRSL. This layer is not necessarily backed by a low-permeability layer in intimate contact with it. According to Daniel (1990), a plastic sheeting liner without a low-permeability backing with two 1 cm^2 holes per acre can leak leachate under one foot of head at a rate of 3,300 gal/acre/day. The WRSL plastic sheeting-lined modules would be expected to leak at a rate lower than this because they are backed to some extent with lower permeability, but not necessarily low-permeability, soils. Even when new, plastic sheeting liners of this type typically have more than two 1 cm^2 holes per acre. Over time the number of holes in this liner will increase, allowing even more transport of leachate through it. Such a liner is not an effective barrier to leachate transport through it for as long as the wastes in the Landfill will be a threat.

Because of the inevitable groundwater pollution by the waste modules that contain only the soil liner and the plastic sheeting liner, the Central Valley Regional Water Quality Control Board should require that Placer County immediately undertake a comprehensive horizontal drilling program to determine the extent and degree of pollution of the unsaturated aquifer system that has occurred under these modules. If leachate has reached the water table under the unlined modules or the soil-lined or plastic sheeting-lined modules, the Central Valley Regional Water Quality Control Board should order Placer County to immediately start pump and treat operations to collect all groundwater polluted by leachate to prevent its spread from its current location on the Landfill property.

The horizontal drilling should include a set of horizontal wells that can detect incipient movement of leachate through unsaturated as well as saturated flow from the bottom of the Landfill toward the water table. If Placer County cannot stop leachate generation in these modules which can lead to groundwater pollution, then the Central Valley Regional Water Quality Control Board should require that Placer County exhume the wastes in these modules and properly manage them so they comply with the requirements of Chapter 15.

Since several of the modules at the WRSL have a single composite liner under them, it is possible that if these modules were constructed properly that the pollution of the groundwaters by leachate generated in these modules will be postponed for a number of years, i.e. until the plastic sheeting liner deteriorates to the point where significant amounts of leachate that could cause water pollution pass through the liner system into the underlying aquifer system.

One of the most significant problems with plastic sheeting- lined and single composite-lined landfills is that they create an almost impossible situation for reliably monitoring the inevitable failure of the composite liner. Enclosed is a paper that was published in the December 1994 issue of *Environmental Science & Technology* that reviews the problems with trying to monitor single composite-lined landfills for liner leakage in accord with regulatory requirements (Lee and Jones-Lee, 1994c). The *ES&T* summary paper is based on much more extensive discussion of the topic (Lee and Jones-Lee, 1992a). This paper and the back-up report are based on the work of Cherry (1990) who first demonstrated the inadequacy of the groundwater monitoring systems that are being used at lined landfills. Such systems have very low probabilities of detecting leachate-polluted groundwater before widespread pollution occurs. Currently, there are a couple of monitoring wells located about 2,000 feet apart along the down groundwater gradient side of the landfill as the groundwater monitoring system for the WRSL. However, vertical monitoring wells spaced more than a few feet apart for plastic sheeting-lined and compacted soil-lined landfills cannot comply with the Chapter 15, Article 5 requirements. Article 5, Chapter 15, §2550.7(C)1. states,

"a sufficient number of monitoring points installed at appropriate locations and depths to yield ground water samples from the uppermost aquifer that represent the quality of ground water passing the point of compliance and at other locations in the uppermost aquifer to provide the data needed to evaluate changes in water quality due to the release from the waste management unit;"

Recently, the Central Valley Regional Water Quality Control Board has issued revised Tentative WDR's that includes the addition of one additional upgradient and one additional downgradient vertical monitoring well. This will mean that there will be three monitoring wells downgradient of the Landfill. Such a monitoring approach has a very low probability of detecting groundwater pollution by landfill leachate in accord with Chapter 15 requirements.

In accord with requirements set forth in Chapter 15, the County has installed an unsaturated monitoring system to provide an early warning of leachate migration through the liner system into the underlying aquifer system. Chapter 15, Article 5 §2550.7 requires for an unsaturated zone detection monitoring program,

"(A) a sufficient number of monitoring points established at appropriate locations and depths to yield soil-pore liquid samples or soil-pore liquid measurements that represent the quality of soil-pore liquid that has not been affected by a release from the waste management unit;"

(B) for a detection monitoring program under Section 2550.8 of this article, a sufficient number of monitoring points established at appropriate locations and depths to yield soil-pore liquid samples or soil-pore liquid measurements that provide the best assurance of the earliest possible detection of a release from the waste management unit;"

The unsaturated monitoring system that has been installed at the WRSL falls far short of meeting these requirements. The limited area sampled by the lysimeters that have been used and the limited area that will be polluted by the initial leakage through the liner mandates that many more unsaturated monitoring devices be used to comply with Chapter 15, Article 5 requirements than the County has installed at the WRSL.

The Central Valley Regional Water Quality Control Board should immediately order Placer County to develop a groundwater monitoring system that will have at least a 95% probability of detecting the pollution of groundwaters, including the unsaturated zone under the Landfill, at the earliest possible time, i.e. in order to comply with the current regulatory requirements of Chapter 15.

Since the WRSL has a number of modules that are not yet constructed, Placer County should be required that if it wishes to continue to dispose of municipal solid wastes at this Landfill that it should, as a minimum, construct a double composite-lined module in which the lower composite liner is the bottom part of leak detection system for the upper composite liner. This is the approach that the state of Michigan has adopted in Rule 641. As discussed in the enclosed paper, Lee and Jones-Lee (1994c), this approach enables a fairly reliable monitoring of the inevitable failure of the single composite-lined landfill liner system.

The Placer County Board of Supervisors and Department of Public Works should understand that it will be necessary to exhume the wastes in the double composite-lined modules when it becomes clear that the Landfill operator cannot operate this Landfill in such a way that controls leachate generation rates to those below the rate that could lead to groundwater pollution under the Landfill.

In order to ensure that the County will, in fact, address the failure of the compacted soil-lined and plastic sheeting and Subtitle D composite-lined modules as well as double composite-lined modules in an appropriate, timely manner, the County should be required to establish a dedicated trust fund of sufficient magnitude so that if it at any time in the future the County cannot stop leachate generation in any of the closed modules through the development of appropriate covers, then the County would be required to exhume the wastes from those modules and properly manage them. In developing the magnitude of the dedicated trust fund, a plausible worst-case failure scenario should be assumed. It is suggested that this dedicated trust fund be generated from increased disposal fees for those that are currently using the Landfill. It is largely those generators of the waste, i.e. the public, who have for years been getting by with solid waste disposal in Placer County at less than real cost, who should now pay for the inappropriate approaches that have been adopted by the County for MSW management. The time has come for the County to start to face up to paying the true costs for all future solid waste disposal as well as for making up for the cost of inappropriate approaches that have been used in the past.

It may be attempted to be argued by some that the County in designing, constructing and operating the WRSL was simply complying with existing regulations. Such an argument is fallacious since at least since 1984 with the adoption of Subchapter 15, now Chapter 15, this regulation mandates the prevention of groundwater use impairment. The basic problem that occurred is that the County either knowingly or should have known through its staff or consultants that the proposed design and operation of the Landfill was not in accord with regulatory requirements. It is ultimately the County Board of Supervisors and the people of Placer County who are responsible and who must pay for the significant mistakes that have been made in developing this Landfill and in conducting its operations.

In summary, the WRSL is sited at a geologically unsuitable site for such a landfill due to the fact that there are high quality groundwaters located below the Landfill. The natural strata between the water table and the base of the Landfill and the Landfill liner containment systems that have been developed thus far will not prevent leachate from moving from the Landfill down into the groundwater, leading to groundwater pollution and impairment of use. Such impairment of use represents a violation of Chapter 15's requirements for design, operation, and closure of a Class III municipal solid waste landfill.

The compacted soil-lined modules at the WRSL are already polluting the aquifer system beneath the Landfill with landfill leachate. The plastic sheeting-lined and composite-lined modules will, if they are not already polluting the aquifer system (unsaturated zone), at some time in the future while the wastes remain a threat will pollute this system. Since this pollution is in violation of Chapter 15 and Porter-Cologne Act requirements, the Central Valley Regional Water Quality Control Board should issue orders to Placer County to immediately take steps to more reliably monitor leachate migration from the Landfill through a significantly increased number of vertical monitoring wells appropriately placed and an extensive network of horizontally drilled wells under the Landfill to detect leachate migration through both the saturated and unsaturated parts of the aquifer. For all Landfill modules that are no longer accepting wastes, a landfill cover which will prevent moisture from entering the Landfill and thereby generating leachate, should be constructed and maintained. This cover could be of the Robinson type with a built-in leak detection system which will indicate when the cover no longer maintains its integrity.

If the County at any time in the future cannot operate the Landfill so that it prevents leachate from continuing to be generated in the Landfill modules once the module is closed, then the County must remove the wastes from the Landfill and properly manage them so that the Landfill complies with the requirements set forth in the state's regulations. In order to ensure that the County will provide the necessary funds to meet regulatory requirements, the County should be required to set up a dedicated trust fund of sufficient magnitude to maintain the cover of the Landfill for as long as the wastes are a threat. When leachate generation in the Landfill is not prevented, then the County should be required to exhume the wastes and properly manage them.

The adoption of this or a similar approach will ensure that in the future the WRSL will conform to Chapter 15 requirements of protection of groundwater resources hydraulically connected to the Landfill for as long as the wastes in the Landfill represent a threat to these resources' potential uses.

The key to the continued use of the currently filled WRSL waste storage modules will be the ability of the County to install and maintain a cover on the closed modules that will prevent moisture from entering the Landfill through the surface. On page 11, item 19, the Central Valley Regional Water Quality Control Board in the proposed revised Tentative WDR's for the WRSL specifies that,

"At closure, each landfill unit shall receive a final cover which is designed and constructed to function with minimum maintenance and consists, at a minimum, of a two-foot thick foundation layer which may contain waste materials, overlain by a one-foot thick clay liner, and finally by a one-foot thick vegetative soil layer. Lined landfill modules, or portions thereof, shall be covered with a barrier layer having a permeability of at least as low as the liner."

This proposed cover, while conforming to minimum cover design requirements set forth in Chapter 15 and the Landfilling Policy, will not be an effective barrier in preventing moisture from entering the Landfill and generating leachate. A one-foot thick clay liner in the cover with the same permeability as the module bottom liner that has been used in the modules which do not contain a plastic sheeting layer as a liner will, after installation, quickly become only partially effective in preventing moisture that penetrates the vegetative layer from entering the Landfill. This clay layer will soon contain numerous desiccation and differential settling-caused cracks through which moisture can penetrate into the Landfill. In a study of landfill covers conducted by the state of Wisconsin (Montgomery and Parsons, 1989), it was found that a four-foot thick compacted clay cover after three years had cracks up to one half-inch wide that extended 35-40 inches into the clay. Roots had penetrated 8-10 inches into the clay. This experimental cover was on a stable base not subject to the differential settling and some of the other problems associated with the construction of a compacted clay cover on a landfill.

While it is sometimes advocated that if problems develop in the integrity of the landfill cover that these will be repaired, as discussed by Lee and Jones (1993) such assertions can be misleading in that in the typical landfill cover, including one that meets the current minimum regulatory design requirements, the low-permeability layer is located below a one-foot thick vegetative soil layer. Visual inspection of this layer will not necessarily reveal desiccation or differential settling-associated cracks in the low-permeability layer. The vegetative soil layer

could appear to be in good condition, yet the low-permeability clay layer underlaying it could have numerous cracks which would allow rapid transport of moisture through the layer into the Landfill.

For the waste storage modules that have a plastic sheeting liner, the cover will have to contain at least an equivalent plastic sheeting layer. That plastic sheeting layer will have holes in it at the time of construction. Over time the number of holes will increase due to the deterioration of the properties of the plastic sheeting. This layer will also be subject to many stresses which can lead to failure. While depending on the type of plastic used such a layer can better withstand differential settling-associated stresses, differential settling can lead to increased rates of failure of the plastic sheeting over longer periods of time. This plastic sheeting layer will also not be available for visual inspection since it will be buried under the vegetative layer.

In a discussion of the approach that the states should use to revise their MSW landfill regulations to achieve minimum Subtitle D requirements, Lee and Jones-Lee (1993b) discussed the fact that "dry tomb" landfills of the WRSL type will require continuous maintenance and periodic low-permeability layer cover replacement for as long as the landfill exists, i.e. in perpetuity. Since it is not possible to reliably detect with the approaches used today failure of the low-permeability layer of a landfill cover except by its generation of leachate which at some WRSL modules may only be detected by groundwater pollution of adjacent or nearby property owners' production wells, Lee and Jones-Lee recommend that a different approach has to be taken for the construction and maintenance of a "dry tomb" landfill cover. Lee and Jones-Lee discuss the Robertson (1990) testable liner system for use in a landfill cover. This system, if properly installed and maintained in perpetuity, can be an effective barrier to preventing moisture from entering the landfill. It is strongly recommended that the WRSL modules that have been filled to capacity and will not receive further wastes in the next year or more be covered with a Robertson-type testable cover layer. The County should be required to operate a highly effective cover testing program and to maintain this cover to ensure that no moisture enters the closed Landfill modules for as long as they exist. Part of the dedicated trust fund discussed in this report should be used to provide funds in perpetuity for testing and maintenance, including periodic replacement of the low-permeability cover for the Landfill.

In addition to the pollution of the groundwaters in the vicinity of the Landfill, surface water pollution of downstream watercourses can occur by precipitation runoff that becomes contaminated with waste materials. Municipal solid waste landfills are recognized as being potentially significant sources of hazardous or otherwise deleterious chemicals in the surface runoff from the landfill properties. It is important that the County be required to manage the surface runoff from this Landfill in such a way as to prevent any hazardous or otherwise deleterious chemicals associated with the Landfill's operations from leaving the Landfill property. The current approach set forth in the Central Valley Regional Water Quality Control Board's proposed revised Tentative WDR's for monitoring surface water runoff is highly deficient compared to that needed to protect the public health and environmental interests of those who own properties downstream of the surface runoff from the Landfill property. It is recommended that the County be required to operate the Landfill in such a way as to minimize all runoff from the landfilling areas that have direct contact with the wastes. Further, since it is virtually impossible to prevent waste-derived constituents from entering surface runoff from the

Landfill properties, it is recommended that all surface runoff from the Landfill property that has any possibility of contact with wastes be collected and stored on the Landfill property until chemical analyses and toxicity measurements can be made of this runoff water. This water should be released only when it has been found that there are no hazardous or otherwise deleterious chemicals in it.

Gas Monitoring and Control

The WRSL has a serious landfill gas migration problem that has not been and is still not being adequately addressed. Potentially significant explosive public health and environmental hazards are present at the WRSL and at the property line with some adjacent properties due to the County's failure to properly evaluate and manage landfill gas produced at the WRSL.

Municipal solid waste landfills can emit significant amounts of landfill gases which typically contain 45-55% methane and 40-50% carbon dioxide and trace but highly significant amounts of a wide variety of potentially hazardous gases. As discussed by Lee and Jones-Lee (1994c) in the Cal EPA Comparative Risk Project report, landfill gases can represent threats to personal safety through explosions, cause highly obnoxious odors, present significant public health threats to those who own or use properties near the landfill through the presence of hazardous chemicals including potential carcinogens, and damage vegetation in the vicinity of the landfill.

The WRSL has been allowed to operate with essentially no landfill gas monitoring. The very few measurements that have been made by regulatory agencies over the years have indicated, as would be expected, that the landfill gas that is produced in the waste modules is migrating beneath the soil surface toward adjacent properties. At this time there is no landfill gas control program at the WRSL. While the County's various EIR's and their supplements claim that if landfill gas migration problems are encountered, a gas collection system will be installed, the facts are, as is demonstrated by the County of Placer Department of Health and Medical Services "Stipulated Agreement," issued in July 1994 (DHMS, 1994) that this Landfill has been allowed to operate for years without adequate gas control. This County Department of Health's "Stipulated Agreement" on page two, item four, under "Explosive Gas Control" states,

"Preliminary filed [sic] *monitoring by the CIWMB and LEA on May 19, 1994, using a Gas Tech Landfill Gas Meter and a sampling probe driven to 9 feet then withdrawn approximately one foot, revealed landfill gas one foot from the east fence line, 85 feet north of the 2nd leachate collection pipe, at 32% methane by volume in the air. Landfill gas at the site perimeter shall not exceed 5%."*

Landfill gas at the concentrations reported in this "Stipulated Agreement" represent essentially undiluted landfill gas. This is a potentially very serious landfill gas problem and points to the highly inappropriate approach that the County and, for that matter, the regulatory agencies have followed over the years in addressing what was obviously going to be a problem.

In addition to the Air Resources Control Board's and Integrated Waste Management Board's requirements for proper management of landfill gas, the Central Valley Regional Water Quality

Control Board Order No. 90-272 (dated September 28, 1990) is explicit in requiring landfill gas management. On page eight and nine, item 18, the Order requires:

"The migration of methane gas from the landfill unit shall be controlled as necessary to prevent nuisance conditions or the impairment of beneficial uses of waters. Methane and other landfill gases shall be adequately vented, removed from the landfill, or otherwise controlled in order to prevent danger of explosion or health effects due to migration through the vadose (unsaturated) zone."

Landfill gas is also of concern because of its potential to damage vegetation. It is well-known that landfill gas migration in the soil can severely hamper the growth and in some situations kill terrestrial plants. While no mention has thus far been made of this issue in the various reports on the WRSL gas migration issue, it is highly likely that vegetation on adjacent properties has been damaged by the County's failure to properly control landfill gas migration at the WRSL.

In response to the DHMS "Stipulated Agreement" (DHMS, 1994), Placer County's Western Placer Waste Management Authority (WPWMA) finally began to conduct a limited-scope landfill gas migration monitoring program in the fall of 1994. Lawrence & Associates (1994b) reported on the first round of sampling of the perimeter gas monitoring wells. While they had significant problems in the handling of some of the samples and the field blank which raises questions about the reliability of the results reported, they did find that methane was detected in all perimeter gas probes at concentrations of 5-74%. Lawrence & Associates (1994b) concluded,

"It is probable that landfill gas containing greater that 5% methane has migrated past the northern property boundary, from the northeast corner to as far west as the entrance gate, and past the eastern property boundary, from the northeast corner to as far south as Module 12."

Basically what has been found is exactly what would be expected, and the reason why the County should have established and conducted a proper gas monitoring program many years ago. Landfill gas at the concentrations found in the soils at the landfill property line represents a significant explosive hazard to any structures into which the gas migrates. Any time landfill gas methane concentrations are above 5% methane there is a potential for explosion. Landfill gas concentrations at the levels reported are in violation of various regulatory agencies' requirements. This is yet another example of the inappropriate operations that have been allowed to take place at this Landfill. The Local Enforcement Authority should have forced Placer County into a highly reliable landfill gas collection system years ago when it first became clear that landfill gas migration was occurring.

Not only is there concern about landfill gas causing explosions due to its methane content, there is also a significant potential for public health impacts due to landfill gas. It is well-known that landfill gas contains a variety of known or potential human carcinogens that represent significant threats to public health. Hodgson*et al.* (1992) California Air Resources Control Board's studies on the hazardous nature of landfill gas emissions in California state,

"The Landfill Gas Testing Program of the State of California has demonstrated that landfills typically contain toxic VOC regardless of the type of waste they are designated to accept and that off-site migration of landfill gas is a fairly common occurrence."

A review of the data provided by Hodgson *et al.* shows that landfill gas typically contains a variety of highly hazardous, potentially carcinogenic chemicals, such as vinyl chloride, that must be controlled to protect public health and the environment. Vinyl chloride is a common constituent present in municipal solid waste landfill gas. It is of particular concern since it is a known human carcinogen that can cause cancer in people and animals at very low concentrations. According to Lawrence & Associates (1994a), the California Integrated Waste Management Board's (CIWMB) soil gas sampling conducted in May 1994 found vinyl chloride in the gas from the leachate collection pipe at 0.5 ppm.

At this time, the landfill gas monitoring and evaluation program conducted by the County is highly deficient compared to the program that should have been conducted to comply with regulatory requirements. The recently initiated landfill gas monitoring program, while an improvement over the previous almost non-existent landfill gas monitoring conducted by the County, is still deficient compared to the monitoring that should be conducted at the WRSL. Of particular concern is the inadequate number of gas monitoring points and the parameters being monitored. The complex subsurface geology at the WRSL site in which sandy lenses are present in the vicinity of the landfill modules could readily result in lateral transport of landfill gas for considerable distances in a sandy lens.

Another deficiency in the past and current landfill gas monitoring program is the failure to evaluate the potential for groundwater pollution by landfill gas VOC's and other highly hazardous chemicals typically present in municipal solid waste landfill gas. The Hodgson *et al.* (1992) studies discussed above point to the importance of monitoring for a large number of hazardous chemicals that are commonly found in landfill gas. The migration of VOC's in landfill gas can be much more rapid than the migration of leachate. It can also lead to pollution of groundwaters up groundwater gradient from the landfill since landfill gas migration does not necessarily follow the groundwater gradient.

The monitoring of the vadose zone for landfill gas and the groundwaters for landfill gas VOC's should be done with sufficient sensitivity to detect potentially hazardous concentrations of these components of the gas to public health and wildlife. Increasing attention is being given by regulatory agencies to the protection of wildlife from adverse impacts of environmental chemicals. Terrestrial animals and possibly birds are also susceptible to acquiring cancer from landfill gas, and therefore in addition to controlling off-site migration of landfill gas, landfill gas control on the Landfill property must be achieved to protect wildlife populations that inhabit the Landfill property.

As discussed above, the CVRWQCB Order No. 90-272 specifically delineates the management of landfill gas to control health effects due to migration through the vadose (unsaturated) zone. In order to comply with this Order it is obviously necessary to monitor the vadose zone and the groundwater near the Landfill for hazardous components in landfill gas. Monitoring of these components at the groundwater monitoring wells falls far short of conducting a reliable vadose

zone monitoring for hazardous components of landfill gas that represent a threat to public health through migration to the groundwater table. At this time, inadequate attention by the County has been given to complying with the CVRWQCB's Order on landfill gas migration monitoring within the vadose zone and associated groundwaters.

Typically, flares are used for management of the gas collected in a landfill gas collection system. At the Sardinia '93 conference held in Sardinia, Italy one year ago, a British engineer (Eden, 1993) reported that landfill gas flares of the type being widely used tend to produce dioxins in potentially significant amounts. Placer County should be required to reliably monitor all landfill gas flares that it uses for landfill gas management to determine the extent of dioxin formation and control the hazards of all gases present in the discharge from the flares so that the emissions from the flares do not represent significant threats to public health and the environment in the vicinity of the Landfill.

All regulatory agencies that control landfill gas emissions should issue orders to Placer County to immediately take steps to install a highly reliable landfill gas collection system for all modules that are no longer accepting wastes. Further, these regulatory agencies should require that the County properly maintain this system as long as landfill gas is being produced or could be produced within the landfill module.

To ensure that the County - Landfill operator have adequate funds to properly operate and maintain this system a dedicated trust fund generated from County sources, such as disposal fees, should be developed that could be used as a source of funding for gas monitoring and gas collection system maintenance.

It is important to understand that when a true low-permeability cover is installed on a particular waste module, it is possible that landfill gas production will decrease to a low level and may actually halt due to lack of moisture needed for gas production. Even though landfill gas production is no longer occurring, if the wastes in the landfill have fermentable materials in them, then it will be necessary to maintain the gas collection system until these fermentable materials have been converted to non-fermentable residues which may not occur as long as a true "dry tomb" landfill module is maintained. Failure to require maintenance of the landfill gas collection system could readily result in moisture entering the landfill at some time in the future due to inadequate maintenance of the cover which generates landfill gas which then migrates to adjacent properties which at that time could be developed, leading to an explosion and/or public health hazards. Further, landfill gas migration through the cover could lead to hazards to vegetation and wildlife in the vicinity of the closed landfill modules, and such migration will contribute to the greenhouse effects associated with global warming.

An important characteristic of the landfill module cover must be recognized in developing the monitoring and maintenance of the cover and landfill gas monitoring and collection systems. The key situation that must be considered is that the low-permeability layer in the landfill cover is usually buried beneath a drainage layer and topsoil. As discussed above, this means that visual inspection of the landfill cover may not show that the low-permeability layer, which is the key to the prevention of moisture from entering the landfill, has been breached and is allowing moisture into the landfill, leading to both leachate production and landfill gas production. Under these

conditions where the breach of the low-permeability layer occurs without being repaired, landfill leachate production and landfill gas production would occur. The only way that this would be detected is through finding leachate in the leachate collection system for the composite-lined system. As noted above, leachate generation in the compacted soil-lined modules will not be detected under the current monitoring system until extensive groundwater pollution has occurred.

Ultimately in time, the composite-lined landfill liner system will deteriorate to the point where the plastic sheeting no longer is an effective leachate collection system. Under these conditions, the leachate will pass through the liner rather than be collected. Before this occurs, however, leachate should be collected in those waste modules which have leachate collection and removal systems that might indicate that the landfill cover is no longer functioning to prevent moisture from entering the landfill and producing leachate. Any time leachate is produced, landfill gas will also likely be produced. Similarly, it may be that landfill gas monitoring would be an indication of potential problems associated with leachate production. As a result, both the landfill gas monitoring system and the leachate monitoring systems must be highly effective and maintained in perpetuity to detect potential problems associated with either liquid or gaseous emissions from the WRSL.

One of the most noticeable and objectionable aspects of landfill gaseous emissions is the presence of landfill odor. As discussed in the Cal EPA Comparative Risk Project report (Lee & Jones-Lee, 1994c), landfill odor detection in the air near and downwind of the landfill is a potential indication that landfill gas emissions are occurring that could be significantly detrimental to public health and the environment. Landfill gas can, under certain meteorological conditions, be carried for long distances. There are reports in the administrative record for the proposed WRSL expansion onto the Lastufka property (EMCON, 1988b) of significant odors associated with the WRSL at over a mile from the Landfill. Such odors are not unexpected from the way that the County has sited and operated this Landfill.

BVA (1994) discusses the various potential impacts of the WRSL on neighboring residences and states that according to CCR Title 14, §17683 and §17713,

"California regulations state that a landfill owner/operator `shall not cause, let, permit, suffer or allow emissions of odorous substances which cause the ambient air at or beyond the facility's property boundary to be odorous and to remain odorous.'"

This means that there shall be no malodorous conditions occurring at the property line between the Landfill and the adjacent properties. Any malodorous conditions found at this point would be a violation of the California regulations.

BVA (1994) states on page 1-1 of Section 1 of the 1.1 Executive Summary under the first bulleted item,

"Under California and federal law, the primary responsibility for assuring that a landfill has no impacts on adjacent residents rests on the landfill owner/operator. As discussed in this report, a regulatory-compliant landfill should not have problems related to noise, odor, dust or other potential nuisances."

Title 14. Natural Resources, Division 7. California Waste Management Board, §17225.45 requires that a landfill be operated so that it does not cause a nuisance. A nuisance is defined as,

"`Nuisance' includes anything which is injurious to human health or is indecent or offensive to the senses and interferes with the comfortable enjoyment of life or property, and affects at the same time an entire community or neighborhood or any considerable number of persons although the extent of annoyance or damage inflicted upon the individual may be unequal and which occurs as a result of the storage, removal, transport, processing or disposal of solid waste."

Further, the Porter-Cologne Water Quality Control Act, §13050(m) defines nuisance as,

"`Nuisance' means anything which: (1) is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property, and (2) affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal, and (3) occurs during or as a result of the treatment or disposal of wastes."

As quoted above Order No. 90-272 from the Central Valley Regional Water Quality Control Board prohibits landfill gas migration from causing a nuisance at the property line. It is clear that several regulatory agencies have statutory authority to require that the operations of the WRSL be conducted in such a way as to prevent off-site migration of odors.

Landfill odors, in addition to being a nuisance, are now recognized as being a significant public health threat. The public health implications of odors from landfills is discussed in the report to the Cal EPA where Dr. Shusterman of the Department of Health Services has found significant public health problems associated with malodorous conditions (Shusterman, 1992).

Therefore, Placer County should be required to operate the WRSL so that there are no detectable odors at the adjacent property lines. It is clear that Placer County and, for that matter, the regulatory agencies have allowed the continued operation of the WRSL without effective control of odor. It may be that those responsible for enforcing the regulations have concluded that since no one is living or extensively using the adjacent properties at the property line, violations of the regulatory requirements for the control of odor and other landfill gas components at the property line can be ignored. It is situations such as this that should not be allowed to occur since it eventually leads to the county boards of supervisors, such as occurred with the Placer County Board of Supervisors, to conclude that they have the right to declare a public use of adjacent properties for buffer lands in order to dissipate the odors and other obnoxious conditions associated with the WRSL's operations. If the WRSL were operated in accord with regulatory requirements, there would be no need to use adjacent property owners' lands as a buffer to cover up for the inadequate operations of the WRSL that have been allowed to occur by the regulatory agencies over the last 10 years or more.

Landfill regulations should be enforced, independent of whether the adjacent properties are used for farming, high-density residential or other purposes. The regulations do not allow the

regulatory agency personnel to make discretionary judgements about whether to enforce the regulations or not. They are explicit in requiring enforcement. This explicit requirement, however, has been ignored to some extent by the regulatory agency personnel responsible for regulating the WRSL operations. It should be noted, as discussed in the appended discussion of the failure of this Landfill to achieve regulatory compliance, that the LEA's that have periodically inspected the Landfill have noted problems in the operations of this Landfill with virtually every inspection. This situation became sufficiently severe so that the Placer County Department of Health and Medical Services issued Order No. 92-01 in February 1992 (DHMS, 1992) covering some of the inappropriate operations of the Landfill. As shown in the LEA periodic inspection reports, many of these same problems have been allowed to continue. This is a very serious problem which reflects the inadequate regulatory attention that has occurred associated with the operations of this Landfill.

One of the purposes of daily cover of the wastes in a municipal solid waste landfill is to reduce the amount of odorous emissions associated with the daily deposition of wastes in the landfill. Daily cover, if properly applied, can be helpful in reducing some of the landfill odors, especially those associated with overnight releases from the waste. It does not, however, address the release of odorous materials that occurs at the time of dumping of wastes. Typically, those odors are dissipated within the landfill-owned buffer lands which allow for their dilution prior to reaching adjacent property owners' lands. It is important to note that under certain climatic and geographical settings, a buffer of considerable distance may not be adequate to dissipate the odorous emissions from a landfill. A site-specific investigation of the situation has to be conducted to determine how a landfill owner/operator should control odors so there are no offensive odors at the property line. If a landfill owner/operator does not acquire sufficient buffers to dissipate odors associated with the landfilling operations, it may be necessary that the disposal of wastes take place under a dome in which all air associated with the odorous release from the wastes is collected and treated before it is released to the atmosphere.

At this time, the WRSL plans to include modules along Feddyment Road where wastes would be deposited within a few tens of feet of the road. As discussed elsewhere in this report, unless special precautions are taken to control landfill odor releases from the deposited waste in these modules, such as the dumping of wastes under a dome where all dome air is treated before release, there will almost certainly be violations of various regulatory requirements requiring no off-site, malodorous conditions at the landfill property line, which in this case would be the public road. As discussed in this report, unless the County commits to extraordinary provisions for control of odors, dust, etc. for the proposed modules along Feddyment Road, the County should be prohibited from developing those modules as planned.

The California Integrated Waste Management Board's regulatory requirements for daily covering of the wastes include as stated in Title 14, Division 7, §17225.17 (CIWMB, 1990),

"`Daily Cover' includes that cover material spread and compacted on the entire surface of the active face of the sanitary landfill at least at the end of each operating day in order to control vectors, fire, water infiltration, erosion and to prevent unsightliness."

According to the Conditional Use Permit (CUP-787) issued by the Placer County Planning Department on July 7, 1984, (PCPD, 1984) item 13 states,

"A minimum 6" layer of earth shall be spread over the compacted solid waste layer by the end of each day's operations. If no additional refuse is to be placed in an area for a period of 6 months or longer, a minimum 12" of intermediate cover shall be placed."

The LEA for the Landfill has repeatedly noted in inspection reports for the Landfill that the Landfill is operated without adequate daily cover and intermediate cover for those parts of the Landfill that have not received waste within 180 days. There are reports of wastes being exposed at the surface through the daily and intermediate cover. When waste exposure occurs, landfill gases, including odorous components, can be released. Further, these areas are sites in which birds, rodents and other vermin and potential vectors of disease can gain exposure to the waste. The potential significance of these types of problems is discussed below.

The County has announced plans for a materials recovery facility (MRF) on the Landfill property adjacent to the property line. MRF's can be significant sources of odors. The County's operation of an MRF on the Landfill property must be conducted so that it does not lead to off-site odors at the adjacent property line. If odors are encountered, it may be necessary to conduct the MRF operations in a structure which prevents release of odorous materials outside of the structure. All air released from the MRF may have to be treated to control odors.

The County has also announced its intentions of conducting a solid waste composting operation at the WRSL. Solid waste composting of the type the County indicates it plans to use can be highly significant sources of odor. Any composting operation conducted at the WRSL must comply with the regulations of no off-site odor at the adjacent property line, including the County road.

Landfill-derived Dust

Municipal solid waste landfills are notorious for generating on-site and off-site dust. The off-site dust is a nuisance, damages property, and most importantly, is now becoming widely recognized as a significant public health hazard. This hazard arises from the presence of PM 10 particles in the dust. PM 10 particles are particulate matter of less than 10 μ size. This is the size of the particle that enters and causes damage in the lungs. The Human Health Advisory Committee of the Cal EPA Comparative Risk Project (CCRP, 1994) in a comparison of the public health risks of environmental chemicals and constituents in California recently concluded that airborne PM 10 particles are among the most hazardous constituents in the environment affecting public health. Therefore, there is significant public health justification to control municipal solid waste landfilling operations so that they do not cause any increased incidence of off-site dust and especially PM 10 particles at the landfill adjacent property owners' property line.

Municipal solid waste landfills generate dust from a variety of sources and activities. The roads which the garbage trucks and other vehicles use at the landfill between the public roads and waste deposition area are often significant sources of dust. Further, significant dust can be generated at the landfill daily cover mining site as part of daily cover extraction. The deposition

of the daily cover at the active face of the landfill is often a significant source of MSW landfill dust. Further, the wastes themselves can through the dumping operations release significant dust to the atmosphere. Some of the waste-associated dust can be highly hazardous and include such things as asbestos if the management of the asbestos-containing waste is not properly carried out. The WRSL has been accepting asbestos-containing waste.

Another source of dust from municipal solid waste landfills is from the closed modules. Because of the thin layer of topsoil that is often allowed in the cover above a waste module, it is found that there are significant difficulties establishing a good vegetative layer on the landfill cover that will prevent dust formation during periods of moderate to high wind. The "closed" modules (those no longer accepting waste) at the WRSL do not display a good vegetative layer that will be maintained in perpetuity to ensure that wind erosion of the closed modules and the Landfill overall does not result in off-site dust problems on adjacent and nearby properties during periods of moderate to high wind.

Some dust control at a MSW landfill is often accomplished through watering of the roads. Little can be done to control dust at the daily cover excavation site and during waste and daily cover deposition, however. It is essential in order to prevent off-site migration of dust to control the operations of the landfill so that at any time that dust is generated during landfill operations which could migrate to adjacent properties that the operations of the landfill be curtailed. This could mean that during periods of moderate to high winds which would tend to promote off-site transport of dust and the associated PM 10 particles, that no dumping of wastes, excavation of daily cover material and deposition of daily cover material on the wastes be allowed. It may be necessary, especially for Landfill modules near the property line, to conduct the daily cover excavation and especially waste deposition and daily cover deposition under a dome in order to control dust migration.

The WRSL operating records do not demonstrate any attempt to curtail dust through the modification of operating schedules and conditions during windy periods. The WRSL should establish a wind direction and velocity monitoring program which can be used to determine when there is need to curtail landfill operations that lead to off-site dust generation. Further, a dust monitoring program should be conducted at the adjacent property property lines and on adjacent and nearby properties to determine whether the Landfill is controlling dust and especially that it is not contributing PM 10 particles to adjacent and nearby properties over those that would be contributed from the lands if the Landfill were not present.

Hazardous and Toxic Waste Materials

The various EIR's and other supporting documents by or for the County and approved by the Placer County Board of Supervisors have repeatedly asserted that **no hazardous or toxic substances** will be placed in this Landfill (EIR-77, EIRS-85). Those who do not understand the characteristics of municipal solid wastes and the potential impact that various chemical constituents present in solid waste leachate of the type that have and will continue to be accepted at the WRSL could be led to believe that the leachate that is produced in this Landfill would not be detrimental to water quality. However, those knowledgeable in these topic areas know that large amounts of highly hazardous substances have been and will continue to be placed in this

Landfill. First, every substance is hazardous at some concentration and duration of exposure. Even such materials as common salt can be a hazardous material. Jones-Lee and Lee (1993) (see attached) present information on the average composition of landfill leachate for a variety of landfills located across the US. While thus far data on the composition of the leachate that is being collected at the WRSL has not been examined by the author, it would be expected to be similar to that reported by Jones-Lee and Lee (1993). Typical MSW leachate contains a wide variety of constituents which in small amounts render large amounts of groundwater unusable for domestic water supply purposes.

All one needs to do to understand the statements which were certified by the Placer County Board of Supervisors that the WRSL would not accept any toxic or hazardous substances is to examine the composition of municipal solid waste. As discussed by Lee and Jones-Lee (1993c), many of the common household chemical residuals disposed of in MSW landfills represent highly hazardous chemicals. It is for this reason that attempts are made to collect household hazardous waste separately. However, these programs fall far short of being completely effective in preventing highly hazardous chemicals from entering the municipal solid waste stream and therefore being deposited in the landfill. Further, what would be considered benign wastes as street sweepings, which are placed in municipal landfills, contain a variety of heavy metals, such as lead, which can also be hazardous in a landfill.

Landfill operators to varying degrees try to reduce the amounts of hazardous waste that enter the landfill through load checking. Such programs, effectively conducted, can detect relatively large amounts of hazardous waste in containers that are readily identifiable, but they will not prevent hazardous substances that cause wastes to be classified as hazardous from entering the landfill. The WRSL has only recently implemented a minimal load checking program. There is no doubt that even with the current load checking program, substantial amounts of hazardous and toxic materials are entering the Landfill. It is equally certain that during the many years when no load checking program was in place, large volumes of hazardous and toxic material were placed in the WRSL where many of them will remain a threat in perpetuity, i.e. for as long as the Landfill exists.

Another area of concern at municipal landfills is the potential for small amount of radioactive waste to be incorporated into the municipal and industrial wastes that are deposited in the WRSL. While MSW landfill operators claim that they are monitoring for radioactive waste, the facts are that the monitoring that is done only monitors for certain types of radioactive waste that can be readily monitored with the approaches used. Substantial amounts of radioactive waste can be deposited in municipal solid waste landfills without being detected by these monitoring programs.

It therefore must be concluded that the Placer County Department of Public Works, their consultants and the Placer County Board of Supervisors have been misrepresenting the character of the wastes that enter the WRSL for many years with respect to the presence of toxic substances in the wastes. The amounts of highly toxic substances that enter this Landfill produce a leachate that is not only hazardous to consume, but also can render the groundwater polluted by it unusable for domestic water supply purposes. Further, because of the character of this leachate,

once the aquifer solids are contaminated with it, it is impossible to clean up the aquifer again so that it would be considered safe for domestic water supply use.

The WRSL accepts what are classified as inert wastes. Chapter 15 §2524., "Inert Waste," defines inert waste as,

"(a) Inert waste does not contain hazardous waste or soluble pollutants at concentrations in excess of applicable water quality objectives, and does not contain significant quantities of decomposable waste."

However, no leaching test has been developed to determine whether so-called inert wastes complies with the Chapter 15 definition of no soluble components in excess of applicable water quality objectives. It is important, therefore, that the WRSL be required to treat inert wastes similarly to municipal solid wastes and place them within the landfill containment system (lined module) unless it is appropriately demonstrated that the inert wastes contain no soluble components that could cause exceedance of water quality objectives.

Other Important Problems

Municipal solid waste landfills can be a significant source of human and animal disease vectors and vermin. Of particular concern are birds, flies, rats and other rodents, mosquitos, etc. According to BVA (1994), CCR, Title 14, §17258.21, 17682, 17683 and 17707 require landfill owners/operators to control vectors and vermin at the landfills. One of the primary approaches for controlling vectors and vermin is through proper application of daily cover. In addition to insufficient daily cover causing obnoxious conditions due to landfill odors, the entry of vermin, rodents, birds, etc. into the waste can lead to potentially significant public health problems. The recent finding of hantavirus at several locations throughout the US reinforces the importance of requiring landfill owners/operators to vigorously pursue daily cover development so that mice do not gain entrance to food within the landfill. Similarly, wind-blown waste litter as well as roadside dumping of wastes should be picked up immediately since some of this litter contains food that helps to sustain rodent populations.

Hantavirus is a significant public health threat associated with various types of rodent populations. Landfills can be significant stimulators of rodent populations in their vicinity. The hantavirus has now been recognized as causing death in many people due to unknown respiratory problems (Sorensen, 1994). Approximately 50% of the people who acquire this virus from being in contact with areas where rodents, including mice, are or have been recently present, die. This problem has been misdiagnosed for many years. It points to the extreme importance of controlling mice and other rodent populations near landfills in order to protect the public health of those who own or use properties near the landfills.

Litter is another of the problems associated with landfill operations that represents at least a nuisance and quite possibly a public health threat to those who own or use properties near the landfill. This is especially true for roadside dumping of wastes which contain food material for birds, rodents and other animals and insects. The above-mentioned hantavirus situation could become a problem at a landfill where roadside litter is not vigorously controlled due to this litter

representing a food source for mice and other rodents that carry the virus. Litter control at the WRSL has been highly inadequate and must be significantly improved through more effective policing of litter and through control of operations during periods of high winds which allows wind-blown litter to leave the area of deposition and be scattered on the Landfill property as well as on adjacent properties. It may be necessary to apply additional daily cover to the active face of the Landfill on days when there are sufficient winds to cause wind-blown litter that is not controlled by the litter fencing. Further, if adequate fencing and daily cover are not effectively utilized to control wind-blown litter, it may be necessary to curtail dumping operations during periods of high wind to prevent wind-blown litter from causing a nuisance and representating a public health threat to those who own or use properties near the Landfill.

Truck traffic is one of the adverse impacts of landfills on those who own or use property near landfills. The typical landfill operation allows garbage trucks to converge on the landfill at about the same time each day. This situation is of significance since the impact of garbage truck traffic is related to the number and frequency of trucks entering the landfill. At this time, the pick-up of garbage is regulated in many areas so that the garbage trucks do not disturb those who generate the wastes. In order to protect the interests and safety of those who own or use properties near a landfill, it may be necessary to control the arrival of garbage trucks at the landfill so that they do not significantly disturb those who own or use properties near the landfill. Certainly those who own or use properties near the landfill are entitled to the same degree of protection from adverse impacts of garbage collection and associated truck transport as those who have generated the waste that are placed in the landfill.

The Landfill inspection reports note that the WRSL has had significant problems with controlling erosion at the Landfill. It is clear that the WRSL has been operated outside of regulatory compliance with respect to erosion control. This is of concern since it results in off-site transport of erosional materials which are in violation of regulations, including the CVRWQCB's stormwater runoff permit. The WRSL should be required to control erosion from the property so that there is no transport of erosional materials associated with the landfilling operations and the "closed" Landfill modules to adjacent properties. This control on the "closed" Landfill modules will have to be actively practiced in perpetuity.

Regulatory Compliance

The operations of this Landfill have been out of regulatory compliance in a variety of areas for many years. A review of the Local Enforcement Agency's (LEA) inspection reports for the Landfill shows that essentially every time an inspection is made, problems with regulatory compliance are found. The County of Placer Department of Health and Medical Services has issued two Orders (Orders No. 92-01 and 94-01) to require that the WRSL come into regulatory compliance.

In July 1994, the County of Placer Department of Health and Medical Services, issued a "Stipulated Agreement 94-01" (DHMS, 1994) which sets forth various WRSL permit violations and conditions that should be followed to address these violations.

DHMS (1994) reported that:

The WRSL has been operating in violation of its Solid Waste Facility Permit No. 31-11-0210 issued in 1983 on the amount of solid wastes permitted to be received each day.

The WRSL is in violation of its approved design in the height of the proposed final landfill.

The WRSL is overdue for its Periodic Site Review which is required every five years. The last review was completed in 1988.

The WRSL is in violation of the Explosive Gas Control regulations.

The DHMS (1994) "Stipulated Agreement" does not address many of the key issues that are of concern to adjacent and nearby property owners that have been repeatedly noted in LEA reports as violations of the operations of this Landfill. DHMS (1992) "Notice and Order 92-01" covers the violations of the WRSL operations that have been found as of 1992. This Order notes that the WRSL has been operating in violation of the terms and conditions of the Solid Waste Facility Permit No. 31-AA-0210 in the following areas:

- increased tonnage of waste received compared to the permitted limit
- proposed acceptance of asbestos and incinerator waste.

There were also violations of 14 CCR §17616 and 18222 for the Report of Disposal Site Information (RDSI). It is reported in DHMS (1992) that the Landfill was conducting a number of operations that were not properly permitted, such as having two working faces, salvage removal frequency, wood chipping operations, special tire handling practices, used oil recycling procedures, handling of wastewater sludges, handling of incinerator ash, changes in management of the organization and the existence of an on-site airport for model airplanes as well as problems with site security.

Further, there were problems with violation of 14 CCR §17676 in which the wastes were pushed and spread down a slope, creating an excessively large working face.

Violations were noted of 14 CCR §17682 Cover where the County of Placer Department of Medical & Health Services found,

"The cover currently applied is inadequate. Wastes are mixed with and daylight through the cover materials."

A cut wall was developed which contained exposed waste. Overall, the cover was not being adequately applied and maintained at the site.

Further, unpermitted, inadequately permitted and illegal salvaging operations were being conducted at the site. Order 92-01 reports,

"Products not approved for salvage (foods) are being salvaged from the lower tipping/working face area."

A review of LEA inspection reports shows that many of these problems persisted after this Order was issued, even though the Order requires that the Landfill owner/operator submit a compliance schedule for approval by the Agency within 90 days. Further, the Order indicates that the CIWMB's inspection report of December 17, 1991 found a number of areas of inappropriate or inadequate operations of the Landfill.

There has been a more or less constant problem with roadside dumping and windblown litter, both on-site and off-site of the Landfill property. On several occasions during the past eight months that the author has been involved in this matter, he has found through site visits to the Landfill area that the litter problem associated with this Landfill is not being adequately addressed. Litter is a significant reason for the adverse impacts on adjacent and nearby property owners/users. As discussed by Lee and Jones-Lee (1994a,b), a landfill operator must be very diligent in controlling the litter problems so that they do not represent threats to public health, the environment and adjacent or nearby property owners' interests.

Closure and Postclosure

Chapter 15 Article 8, Closure and Post-Closure Maintenance, §2580 under (a) states,

"The post-closure maintenance period shall extend as long as the wastes pose a threat to water quality."

This means that the County must plan for *ad infinitum* postclosure care and funding. At the present time the scope of the postclosure problem has not been accurately identified at the WRSL. Because of the inappropriateness of this site and the inadequate design that has been developed, postclosure activities at this Landfill will be far more expensive than would be required at a properly sited and designed landfill. The County has not yet begun to properly address the long-term postclosure issues at the WRSL and has yet to establish approved plans for closure and postclosure monitoring, including adequate financial assurances to meet all plausible contingencies that could occur at the WRSL. This failure is particularly troublesome in light of the fact that the type of landfilling operation and landfill design is inappropriate for the site since the "dry tomb" landfill waste modules that have been constructed at this site will only postpone when groundwater pollution occurs. This will necessitate the County spending large amounts of money in the future to try to stop groundwater pollution through intensive maintenance of the landfill cover, clean-up of the contaminated groundwater and aquifer and likely ultimately, if the requirements of Chapter 15 are to be fulfilled of protecting groundwaters from impaired use for as long as the wastes represent a threat, removal of the wastes from the Landfill and properly managing them.

It is important to note that while US EPA Subtitle D regulations as well as the WRCB Subchapter 15 require only 30 years of assured postclosure funding, Chapter 15 and the WRCB Landfilling Policy mandate that the postclosure period be for as long as the wastes represent a threat. Further, the Subtitle D regulations make it clear that the minimum 30-year postclosure period may be extended. Lee and Jones-Lee (1992b, 1993d) have discussed the inappropriateness of only planning for a 30-year postclosure maintenance period. As they discussed, in order to

ensure that funds will, in fact, be available when needed *ad infinitum*, postclosure funding should be based on the development of a dedicated trust fund developed from disposal fees.

The Placer County Department of Public Works EIR's have claimed that the Landfill cover space will be used for agriculture or possibly some other beneficial use upon closure of the Landfill. This statement is highly misleading since the closed Landfill has to have a low-permeability cover maintained on it forever. The likelihood of being able to use this site for any of these purposes is extremely remote. Lee and Jones-Lee (1994d) have discussed the importance of recognizing that the covers of "dry tomb" landfills must be maintained so that the low-permeability characteristics of the cover are maintained for as long as the landfill exists, i.e. forever. This means that what has been done in the past with respect to reuse of landfill cover space where there was no attempt to maintain a low-permeability cover and therefore prevent groundwater pollution will not be possible in the future where such covers have to be maintained according to Chapter 15 and Subtitle D.

Lee and Jones-Lee (1994e) have discussed the long-term liabilities associated with "dry tomb" landfilling of municipal solid waste. The "dry tomb" landfilling approach attempts to isolate the untreated municipal solid waste in thin plastic sheeting and compacted soil - clay liners and covers. However, the liner and cover materials used today are not adequate to keep all moisture out of the wastes for as long as the wastes are a threat and thereby prevent leachate generation. Further, the liners will not prevent leachate generated in the waste from passing out through the bottom of the landfill into the underlying aquifer system. They point out the importance of recognizing that "dry tomb" landfills are "temporary" storage areas for MSW that will need large amounts of funds to try to maintain the "dry tomb" characteristics of the landfill. Further, ultimately funds will be needed to exhume wastes from these landfills if groundwater pollution is to be prevented for those "dry tomb" landfills, such as the WRSL, that are sited at geologically unsuitable sites for this type of landfill which only use minimum design Subtitle D liner and cover systems.

At several locations in this discussion, mention is made of the need to develop a dedicated trust fund to ensure that funds will, in fact, be available to meet the regulatory requirements for operation and, most importantly, closure and postclosure activities. While various types of financial instruments are allowed to meet postclosure needs, many of these are well-known to be unreliable. Lee and Jones-Lee (1993d) have discussed the reliability of postclosure care financial instruments. As they discuss, the dedicated trust fund is a reliable approach that has been acknowledged by the Executive Director of the Solid Waste Association of North America as the approach that should be followed for all landfills (Hickman, 1992). This is the approach that Placer County should use for the WRSL to ensure that funds will, in fact, be available when needed. Failure to follow this approach could readily result in a situation where the public health, environmental and other interests of those who own or use properties near the Landfill would be compromised due to the County's failure to provide the large amounts of funds when needed to address future problems that will develop at the WRSL after it is closed.

It is well-known that county boards of supervisors and others are highly reluctant to spend funds derived from the current constituency to address landfill problems arising from past disposal practices. All one needs to do to confirm this situation in Placer County is to examine whether

the current Board of Supervisors is aggressively pursuing the protection of public health and the environment in the vicinity of the landfills that have been operated in the County in the past. Recently, the local newspapers have carried a discussion about a city of Rocklin closed landfill that has been found to be polluting groundwater and surface water and has landfill gas migration problems. According to the newspaper account, arguments have developed between the current owner of the landfill site and the city on who is responsible for doing the tests to determine the extent and degree of release of hazardous and explosive materials (leachate and gases) from this landfill. Ultimately, the responsible party will have to fund remediation measures to stop pollution and to clean up the contaminated soils and aquifer. The costs for such activities will be large, and there will be reluctance to spend funds for this remediation activity. Meanwhile, unless the regulatory authorities aggressively pursue the regulatory requirements of investigating and remediating pollution at all landfills, including those that have been "closed," i.e. no longer accepting wastes, the pollution arising from the landfill will continue to spread. This is the situation that is occurring at many of the Placer County landfills today and is one that could readily occur at the WRSL if adequate funding is not made available when needed to address the eventual failure of the landfill containment system to prevent leachate from polluting the aquifer system and ultimately the groundwaters in the area.

There may be some who object to having the current residents of Placer County who are depositing wastes at the WRSL contribute funds to a dedicated trust fund which would be necessary to address past inappropriate operations of this Landfill as well as to ensure that this Landfill will be operated in the future in accord with regulations. If this landfill had been operated in accord with regulatory requirements, there would be no need for the additional expenditures to develop a dedicated trust fund to address past problems as well as those that are likely to occur in the future because of the inappropriate siting and design of this Landfill.

Adequacy of Public Documentation in Support of Landfill Design and Operations Impacts

Placer County has been required to develop a series of environmental impact reports (EIR's) and other regulatory agency reports that discuss the potential impacts and the operating experience of the WRSL. This section discusses the adequacy of these reports in discussing the public health, environmental and other impacts of the WRSL.

An Environmental Impact Report (EIR) for a proposed project such as a landfill and landfill expansion is required by the California Environmental Quality Act (CEQA) to reliably inform decision makers and the public about the potential environmental impacts of a proposed project. CEQA guidelines §15151 (CEQA, 1992) require,

"An EIR should be prepared with a sufficient degree of analysis to provide decision-makers with information which enables them to make a decision which intelligently takes account of environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible. Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among the experts. The courts have looked not for perfection but for adequacy, completeness, and a good faith effort at full disclosure."

Public Resources Code §21081 and 21081.6 (as amended on September 30, 1994) require that,

"The public agency shall adopt a reporting and monitoring program for the changes made to the project or conditions of project approval, adopted in order to mitigate or avoid significant effects on the environment. The reporting and monitoring program shall be designed to ensure compliance during project implementation."

Placer County, either directly or through contractors working for the County Department of Public Works, has developed a series of EIR's or EIR supplements governing the activities associated with the development and operations of the WRSL.

These include,

EIR-77. Environmental Impact Report (EIR), Southwestern Placer County Regional Sanitary Landfill, prepared by the Placer County Department of Public Works, December (1977).

EIRS-85. "Supplemental Environmental Impact Report for The Expansion of the Western Regional Landfill," prepared for Placer County Department of Public Works by Eljumaily - Butler Associates, October (1985).

EIRS-89. "Final Supplemental Environmental Impact Report for Expansion of the Western Regional Sanitary Landfill," prepared for County of Placer Planning Department by Emcon Associates in November 1988 and finalized by the County in April (1989).

EIRS-91. "Supplemental Environmental Impact Report for Modification of the Solid Waste Facility Permit for the Western Regional Sanitary Landfill," prepared for the Western Regional Sanitary Landfill Authority by Placer County Department of Public Works, April (1991).

FEIRS-91. "Final Supplemental Environmental Impact Report for a Modification of the Solid Waste Facility Permit for the Western Regional Sanitary Landfill," prepared for the Western Regional Sanitary Landfill Authority by the Placer

County Department of Public Works, August (1991).

FEIR-93, "Final Environmental Impact Report for the Western Regional Materials Recovery Facility, Placer County, California" Western Regional Sanitary Landfill Authority, March (1993).

MBA-94, "Initial Study for the Western Regional Sanitary Landfill" prepared by Michael Brandman Associates, November (1994).

In addition, there have been a number of other documents developed by or for the County Department of Public Works that provide information on the WRSL. These include:

ASWAT "Air Quality Solid Waste Assessment Test Report, Western Regional Sanitary Landfill, Placer County, California" EMCON Associates, October (1988).

WSWAT-88, "Solid Waste Assessment Test (SWAT) Report, Western Regional Sanitary Landfill, Placer County, California," EMCON Associates, June (1988).

EMCON-87, "Geologic/Hydrogeologic Reconnaissance, Lastufka Property, Placer County, California" Report of EMCON Associates prepared for County of Placer and City of Auburn, California, March (1987).

EMCON-88, "Periodic Site Review (Engineer's Report), prepared by EMCON Associates for Western Sanitary Landfill, Placer County, California, October 6 (1988).

EMCON-90. "Disposal Site Information Western Regional Sanitary Landfill," Emcon Associates, January (1990).

EMCON-92, "Third Quarter 1992 Groundwater Monitoring Report, Western Regional Sanitary Landfill," Report of EMCON Associates to the Central Valley Regional Water Quality Control Board, September (1992).

SWMP-89, "Placer County Solid Waste Management Plan," Prepared by Placer County Department of Public works (1989).

RDSI-90. "Report of Disposal Site Information, Western Regional Sanitary Landfill," prepared for the Placer County Department of Public Works by EMCON Associates, January (1990).

RDSI-93, "Report of Disposal Site Information, Western Regional Sanitary Landfill, Placer County, California," Report of EMCON Associates, June (1993).

WRSLA "Annual Report for Storm Water Discharges Associated with Industrial Facilities" for the Western Regional Sanitary Landfill June 1993.

GENPLA-94, "Placer County General Plan Update," February 18 (1994).

Review of these EIR's and their supplements as well as the other documents prepared by or for the Placer County Department of Public Works shows that there is a consistent pattern where, with few exceptions, the potential adverse impacts of this proposed Landfill or Landfill expansion have been reported and certified to be readily mitigatable. Members of the public who are not knowledgeable of the potential impacts of landfills and especially the gaseous and liquid releases from landfills and other aspects of MSW management could be led to believe from the EIR's which were certified by the County Board of Supervisors that this Landfill would be designed, constructed and operated in such a way as to have little or no adverse impact on the public or adjacent and nearby property owners and users. However, a review of the design and operations of this Landfill shows that this Landfill's design and operations have in a number of instances failed to conform to the conditions set forth in the certified EIR's.

There has been a consistent pattern of misrepresenting the ability of the various mitigation measures that were discussed in the EIR's to protect public health, the environment and the interests of adjacent and nearby property owners. Those within the Department of Public Works

and those consultants who are responsible for developing these EIR's knew or should have known that the statements that they were making about the proposed Landfill's operations and impacts on the environment would be unreliable. It is important to note that the adverse impacts of landfills are well-known in the technical as well as public literature. It is these adverse impacts that cause people who own or use properties near a proposed landfill to become justifiable NIMBY's ("not in my back yard").

In EIR-77 page two, last paragraph, it states,

"Mitigation measures developed in this EIR may be implemented by making them a part of the Management Agreement between Placer County and the landfill operator."

The FEIRS-91 states on page seven that,

"If a LEA fails to take appropriate enforcement action against a non-complying facility, the CIWMB may have their LEA designation as an enforcement agency rescinded, and the CIWMB Enforcement Division staff would thereafter act as the enforcement agency in that jurisdiction."

The County LEA is responsible for implementing this mitigation monitoring program. It is, however, the CIWMB who is ultimately responsible for seeing that the mitigation measures set forth in the EIR's and their supplements are, in fact, carried out. It is clear, however, that the County LEA and the CIWMB have not carried out their responsibilities in seeing that mitigation measures stated in EIR's and certified by the County Board of Supervisors have been carried out in a timely manner. It is only now after years of violations of regulatory requirements that the County of Placer Department of Health and Medical Services is beginning to take enforcement action against some of the violations that have repeatedly occurred in the operations of the WRSL.

As an example of the problems with the operations of the existing WRSL, Placer County has amended its General Plan to include provisions that would designate the WRSL as a predominant land use in the area and states that residential development in that area would be subject to a buffer distance of up to one mile. (PCPD, 1994). MBA (1994) states,

"In addition, the site is surrounded by a Buffer Zone in the Placer County General Plan. Policy 4.G.11 protects landfill facilities from future residential encroachment by requiring a residential buffer of one mile measured from the property line of an active or future landfill site. Buffers generally are intended to separate residential, commercial, and other uses continuously or frequently occupied by people, from potential land use conflicts with landfill uses. Here, however, the buffer precludes only new residential land uses. This policy states specifically,

`When considering land use changes in the vicinity of a landfill operation, the County shall consider the landfill as the dominant land use in the area. In order to protect these facilities from incompatible encroachment, new residential land uses shall be separated from the property lines of active and future landfill sites by a buffer of one mile. Such buffers do not apply to closed landfills or solid waste transfer stations. Other uses will be required to provide buffers as described in the General Plan. The intent of this policy is to prohibit the creation of new parcels

for residential uses within one mile of the landfill; not to prohibit construction of a residence on an existing legal building site within this area.'"

The adoption of this approach demonstrates the inappropriate operations of this Landfill. As discussed below, the regulatory requirements for this Landfill require that there should be no adverse impacts on adjacent property or nearby property owners/users due to releases from the Landfill or its operations at the property line. If this Landfill had been properly designed for the characteristics of the site to comply with Chapter 15's groundwater protection standard of protecting groundwaters from impaired use for as long as the wastes represent a threat, and if this Landfill had been operated in accord with regulations, there would be no need for the County to try to impose a public use on adjacent and nearby properties in order to provide a land buffer on adjacent property owners' lands to try to dilute the Landfill releases due to inappropriate operations.

It is clear that the County Department of Public Works and those who are contracted to operate the WRSL have become recalcitrant in operations of this Landfill in accord with regulatory requirements. The LEA inspection reports show that, time after time, the same problems associated with the operations of this Landfill continue to occur. Year after year goes by and nothing is done by the LEA and the Placer County Department of Health in addressing some of the violations of regulatory requirements. In order to ensure that those who own or use properties near the Landfill are better protected than has occurred in the past, it is recommended that Placer County provide a fund that can be used for third-party independent review and monitoring of the Landfill operations. A sum of $100,000/year should be provided for administration by those who own or use properties near the Landfill under its potential sphere of influence (within two miles) to monitor the operations of the Landfill so that it is operated within regulatory requirements.

At this time, the LEA is only required to inspect the WRSL and other landfills every eighteen months. Such inspection frequency is obviously inadequate to protect the interests of those who own or use properties near the Landfill, especially where there are numerous problems found with each inspection. Such infrequent inspections could lead to the Landfill owner/operator adopting inadequate-sloppy solid waste management practices in the year and a half between inspections.

This third-party independent review is not designed to replace the Regional Board's responsibilities for this activity. It is designed to supplement the Regional Board's activities and ensure that a more reliable Landfill impact evaluation monitoring and remediation program is developed and implemented than has occurred thus far at the WRSL.

Needed Corrective Action

The following actions need to be immediately taken to cause this Landfill to operate within full regulatory compliance.

1. A comprehensive groundwater evaluation and monitoring program should be immediately initiated to determine the extent of groundwater pollution that has occurred under the soil-lined waste management modules (Modules 1, 2, 10 and part of 11). If, as would be expected with this

type of liner system, leachate has passed through the liner into the underlying groundwater aquifer system (unsaturated zone) and therefore "threatens" pollution of the groundwaters under the Landfill impairing their use, then a comprehensive plan of corrective action should be initiated to stop further leakage of leachate out of these modules into the underlying groundwater aquifer system. Further, clean-up of the unsaturated zone as well as any polluted groundwaters immediately under the Landfill should be undertaken to the maximum extent practicable in accord with the requirements set forth in Chapter 15, Article 5.

2. For the plastic sheeting-lined modules (part of Module 11 and all of Modules 12 and 13), a comprehensive, reliable liner leakage monitoring program should be established to determine when the plastic sheeting liner fails to prevent leachate from migrating from the Landfill into the underlying aquifer system and thereby threatening the impairment of the use of the groundwaters under the Landfill.

3. All new waste disposal modules constructed at this Landfill should contain a double-composite liner system in which the lower composite liner is a leak detection system for the upper composite liner. When leakage through the upper composite liner occurs at a sufficient rate to potentially pollute groundwaters, impairing their use for domestic water supply purposes, the waste in those modules where such leakage cannot be stopped will have to be removed and properly managed.

4. If it is not possible to stop the leakage from any waste module into the underlying aquifer system (unsaturated zone below the Landfill), then the waste in those modules will have to be removed and properly managed.

5. A highly efficient, reliable gas monitoring and collection system should immediately be installed at this Landfill to prevent all lateral migration of gases through the soil. The current Lawrence & Associates gas monitoring plan for detecting gas migration through the soil is significantly deficient and must be improved to include not only far more soil gas monitoring points, but also the measurement of a suite of VOC's typically found in landfill gas that are hazardous to public health and the environment and thereby threaten groundwater pollution. The VOC measurements should include samples taken under the Landfill to determine if VOC's are migrating to the water table, thereby threatening to pollute or actually polluting the groundwaters with VOC's in violation of the Landfill's current WDR's.

When a landfill gas collection system has been installed, the disposal of the collected gases should be done in such as way as to eliminate any hazardous or otherwise deleterious conditions due to gas transport through the air at the adjacent property lines. This gas should be routinely tested for highly hazardous chemicals that are potential carcinogens, including dioxins that could be formed in the flaring of the gas.

6. Cover of each day's deposited wastes should be conducted in strict regulatory compliance where no less than six inches of dirt are placed on the wastes each day. There should be no waste exposed through this daily cover. Further, an intermediate cover of at least one-foot thickness should be placed on all inactive waste deposition areas that will not receive wastes in the next six

months in accord with regulatory requirements. All cracks and other problems that develop in the integrity of the daily and intermediate cover should be immediately - within one day - repaired.

7. The operation of this Landfill should be conducted in such a manner as to cause no increase in dust at adjacent property owner's property lines due to the Landfill operations, including roads, areas from which daily cover material is derived, stockpiling of soil on the Landfill property, deposition of waste, daily or intermediate cover, etc. or from any closed or partially closed areas of the Landfill. A highly reliable dust monitoring system should be established, including measurement of PM 10 particles, on the Landfill as well as adjacent properties to ensure that the health and welfare of adjacent property owners/users is protected from Landfill-derived dust.

8. The operation of this Landfill should be conducted in such a manner as to ensure that no wind-blown litter escapes from the waste deposition areas. This will require highly efficient litter fencing that is properly operated and maintained. It may also require termination of the operations of the Landfill during times of high wind.

9. It may be necessary to control wind-blown litter, odors associated with dumping of the garbage, etc. from the active face of the Landfill through the use of additional daily cover. The minimum 6-inch thick layer of daily cover may have to be applied several times per day in order to control releases of litter, odors, problems associated with birds, etc. so that there is no adverse impact to adjacent property owners/users at the property line with the Landfill. There should be no offensive landfill odor at the Landfill/adjacent property line.

10. The County should establish a roadside illegal dumping and litter collection program that ensures that at least twice a day (early morning and at the end of the daylight hours), seven days a week, all roadside garbage, litter, etc. is picked up within the sphere of influence of the Landfill, which is understood to be at least two miles from the Landfill.

11. The management of leachate collected at this Landfill should be done by offsite transport and appropriate treatment. No leachate should be used for dust control, reinjection into the Landfill or for other purposes on the Landfill property. The leachate collection pond currently at the Landfill should be reconstructed with a double composite liner in which the lower composite liner is a leak detection system for the upper composite liner. If leachate is found in the leak detection system between the two composite liners, then the upper composite liner will have been found to have failed, and the upper composite liner will have to be repaired to stop leachate migration through it that could, if the lower composite liner were not present, threaten groundwater pollution.

12. All surface runoff from the Landfill property that can in any way contain waste-derived constituents should be collected prior to runoff and tested for potential adverse impacts on downstream water quality. No runoff of such water should be allowed until it has been found that they meet water quality objectives at the point of discharge and are found to be non-toxic to aquatic life using a suite of sensitive test organisms typically used for short-term, chronic aquatic life toxicity testing.

13. Any Landfill module that will not receive additional waste for at least one year must be covered with a leak detectable cover, such as the Robinson system or equivalent, which is operated and maintained in such a way as to prevent moisture from passing through the cover into the wastes.

14. All wastes, including inert wastes, received at this Landfill should in the future be placed within the now single-composite-lined module (Module 13). With the development of the next module, which should be double-composite-lined, all wastes, including inert wastes, should be placed in double-composite-lined Landfill modules. In order for inert wastes to be exempted from this requirement, they must comply with Chapter 15's requirement of having no soluble components that will leach in excess of water quality objectives. All such inert wastes that are to be placed outside of the Landfill module containment systems should be reliably tested for soluble components prior to placement.

15. As Landfill modules reach the designed final grade for the Landfill, then these modules should be immediately closed in accord with regulatory requirements.

16. A dense, rapid-growing, vegetative screen should be planted and maintained to screen the view of the Landfill from adjacent properties. The owners/users of adjacent properties should not be able to see the Landfill and its operations from the property line.

17. To ensure that funds will be available in perpetuity (for as long as the Landfill represents a threat to public health, the environment and the welfare and interests of adjacent and nearby property owners/users), the County should establish as part of the disposal fees for this Landfill a dedicated trust fund of sufficient magnitude to meet all anticipated plausible, worst-case failure scenarios for the Landfill, such as air and water monitoring, maintenance of the closed Landfill modules, and including exhumation of the wastes and their proper management as well as the clean-up of any contaminated soils and groundwater aquifer systems, including the unsaturated zone, at the site to the maximum extent practicable.

18. The Landfill should be operated within strict reporting requirements, and all permits and required documentation for continued or future operations should be filed in an appropriate and timely manner.

19. If the County cannot operate this Landfill in accord with strict regulatory compliance so that it is not adverse to the owners/users of adjacent properties at the property line with the Landfill, then the Landfill should be shut down and the County should be required to remove all wastes from the Landfill and properly manage them.

20. The proposed plans for future development of the WRSL involving the construction of landfill waste modules along Feddyment Road (Modules 3-9) and to the south and southwest of Module 13 (Modules 14, 15 and 16) should be curtailed since these modules would involve placing wastes essentially on the property line with adjacent property. Based on past operating experience, placing wastes essentially on the property line with adjacent properties would result in violation of a variety of regulatory requirements.

21. The County should provide a sum of $100,000/year for third-party independent monitoring of the Landfill operations to be administered by those who own or use properties within two miles of the Landfill. This fund should be provided each year in perpetuity for as long as the Landfill represents a threat, which is recognized to be forever.

Conclusions

As discussed by Lee and Jones-Lee (1993e, 1994f,g) the adverse impacts on adjacent and nearby property owners/users of landfills do not have to occur. Landfills can be sited, developed, operated, and closed in a way so that they do not represent significant threats to public health, the environment and other interests of those who own or use properties near them. The problem is that those in departments of public works, and others responsible for the operations and regulation of the operations of landfills try to operate these landfills at far less than the real cost needed to protect public health and the environment from adverse impacts of releases from the landfill. Basically, this is a situation where the public who contributes wastes to a landfill are able to do so at less than real cost for garbage disposal resulting in public health, environmental and other impacts and at the expense and welfare of those who own or use properties near the landfill.

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Attachment A
Supplemental Materials on WRSL Gas Issues

The County of Placer Department of Health and Medical Services' (DHMS, 1994) "Stipulated Agreement" ordered Placer County's Western Placer Waste Management Authority (WPWMA) to establish a contractual arrangement to conduct an evaluation of landfill gas migration at the WRSL. WPWMA established a contract with Lawrence & Associates (1994a) covering the development of a landfill gas monitoring plan for the WRSL that was originally submitted in August 1994 and subsequently revised in October 1994. A review of this landfill gas monitoring plan is presented below.

The proposed perimeter gas monitoring network will consist of 18 gas wells, 15 near the property line and 3 shallow probes in the area of the landfill offices and the Materials Recovery Facility (MRF). The gas wells will have one to three probes, depending on their depth. These wells will be monitored quarterly until the gas control system is operational. When such a system is operational, the wells that have shown greater than 5% methane will be monitored monthly for a period of one year. Structural monitoring of the facilities will be conducted quarterly at the Landfill office, gatehouse and the MRF building. Surface emission monitoring of the Landfill surface will not be initiated until after the gas control system is operational.

The gas control system will be an active system consisting of vertical extraction wells where the gas extracted will be combusted in a central flare located on the northern end of the property or used for power generation. The landfill gas condensate will be collected and characterized as to

whether it is a hazardous waste or not. If it is a hazardous waste, then it will be disposed of as a hazardous waste. If it is not a hazardous waste, it will be discharged to the sanitary sewer system.

To conduct a landfill gas monitoring program which only measures methane as a potentially hazardous or deleterious gas is highly inadequate; it certainly is not in accord with what is known today about the potential hazards of landfill gas to public health and the environment. Further, a survey should be conducted as part of this plan to assess damage to vegetation that almost certainly has occurred because of landfill gas migration from the site.

Lawrence & Associates (1994a) state on page 3, first paragraph, that gas movement in lined areas is more likely to be towards the surface of the waste, not through the low-permeability liners into native soil. While this statement is correct for true low-permeability liners, several of the modules at the WRSL do not have low-permeability liners. Gas migration in these modules certainly has taken place in all directions. Nor does it mean for those modules where there is a true low-permeability liner that there will not be movement of gas through holes, cracks and other imperfections or areas of damage or deterioration that occur in the plastic sheeting liner for those parts of the Landfill that have such liners. It is well-known that landfill gas migration under plastic sheeting-lined landfills is one of the ways to detect failure of the liner to maintain its design characteristics. For example, Waste Management, Inc. has recently proposed for the RailCycle - Bolo Station Landfill to be located near Cadiz, California to use gas phase measurements under the plastic sheeting liner as a measure of failure of the liner (Waste Management, Inc., 1994).

On page 4 of the Lawrence & Associates (1994a) report it is stated that the California Integrated Waste Management Board's (CIWMB) soil gas sampling conducted in May 1994 found vinyl chloride in the gas from the leachate collection pipe at 0.5 ppm. This indicates, as would be expected, that vinyl chloride (a known human carcinogen) is present in the landfill gas associated with the WRSL.

Lawrence & Associates (1994a) state that the proposed gas monitoring wells will not penetrate the water table beneath the site. This is a serious deficiency in the gas monitoring plan since pollution of groundwaters by VOC's, such as vinyl chloride, is one of the key areas of concern with respect to the environmental impact of the Landfill.

Lawrence & Associates (1994a) on page 5 present Table I from the air SWAT gas-probe testing conducted in November 1988. The information provided, however, is not adequate to determine the appropriateness of the air SWAT gas-probe testing that was conducted at that time since the detection limits for the "NA" measurements are not presented. Without such information, this is an incomplete table which can give highly misleading information about the potential presence and significance of the various hazardous components of the gases being emitted from the WRSL.

Page 7, first paragraph, mentions that the spacing of the proposed gas monitoring wells will be 1,000 feet apart. Such spacing is not adequate to necessarily detect areas of high gas migration. Much closer spacing should be used in a situation such as this where the subsurface geology is highly complex. Also, far more gas sampling probes with depth need to be included than those

indicated in the proposed plan. Gas migrations could readily occur without being detected with this proposed monitoring plan. The proper development of a study of this type should involve a preliminary study in which detailed sampling is done. Based on this detailed sampling, a monitoring program can be developed that has some meaning. At this time the approach that was used in developing this plan is somewhat arbitrary and is not adequate.

On page 9, first paragraph, Lawrence & Associates (1994a) state that the gas monitoring plan does not include measurement of trace gases *"....because there are no structures near the site."* This is an inappropriate approach to follow and does not properly address the CVRWQCB's requirements of preventing groundwater pollution by landfill gas VOC components. At this time this component of the landfill gas sampling is not being addressed. This is a very significant deficiency that should be addressed immediately.

On page 10, second paragraph, Placer County should be required to commit to a landfill gas monitoring program in perpetuity for as long as the wastes have the potential to produce gas, which as discussed elsewhere in this report will likely be forever, depending on the quality of the landfill cover that is developed and maintained at the Landfill on the closed waste modules.

Lawrence & Associates (1994a) on page 11 mention the monitoring of vinyl chloride in structures if methane is found in landfill gas within the structures at greater than 500 ppm. This approach is not technically valid. Vinyl chloride and other potentially hazardous gases should be monitored with detection limits that are appropriate to detect public health hazards independent of the methane concentrations. There are situations in which soil bacteria can degrade methane, lowering its concentration. While vinyl chloride and some of the other VOC's can also be degraded by soil bacteria, the degradation rates are significantly different. The VOC's in landfill gas at all of the probes as well as in structures should be monitored independent of methane concentrations.

Pages 13 and 14 of the Lawrence & Associates (1994a) report mentions the construction of approximately 77 vertical gas extraction wells. There is need, once these gas extraction wells are in place, to monitor the surface of the Landfill to ensure the extraction wells are effective in collecting and removing landfill gas so that it is not emitted through the cover. It is well-known that often landfill gas extraction systems are installed at landfills that are not properly maintained by the landfill owner/operator. A prime example of this is with the Mountain View Landfill in the city of Mountain View, California. The author of these comments was involved as a consultant to the Mountain View Golf Company in their recent litigation against the City of Mountain View for failure to maintain the closed landfill properly so that the City's constructed golf course on the landfill would not be adversely affected by landfill gas emissions from the landfill. The courts have recently ruled a $4 million settlement to the Mountain View Golf Company because of the failure of the City to properly maintain the landfill gas collection system.

Page 13, third paragraph discusses the proposed sampling of emissions through the landfill cover in which the sampling probe would be held two inches above the surface of the Landfill and samples would be taken while walking a parallel path no more than 50 feet apart. This approach is highly inadequate to detect landfill gas migration through the cover. Gas sampling through a

landfill cover must be done by making small depressions in the cover and sampling in the depression in which the open area of the depression is covered to reduce mixing with air. The proposed approach will allow appreciable dilution of the gas emitted through the cover, giving artificially low readings.

Page 13 in the first paragraph under "Gas Control" mentions the flaring of extracted gas. As discussed in this report, landfill gas flares are being found to produce the combustion conditions that lead to dioxin formation. If gas flares are used at this Landfill, then the exhaust must be tested for dioxins as well as a variety of other potentially hazardous combustion products.

Overall, the Lawrence & Associates (1994a) "Landfill-Gas Monitoring Master Plan" is designed to just barely meet an inappropriately developed perceived discussion of minimum regulatory requirements. It falls short of meeting the real regulatory requirements and must be significantly expanded if public health and the environment are to be protected and regulatory requirements are to be achieved.

On page 5 of the Lawrence and Associates (1994b) report covering the first round of sampling of the gas monitoring wells, it is reported that the laboratory was unable to analyze three of the samples because the gas sampling bags did not contain sufficient sample. This is a case where the gas in the bags was lost due to improper handling. There is also a significant problem with the handling of the field blank where it was contaminated with methane. These problems are significant and represent sloppy handling and inappropriate approaches in doing the sampling and/or analysis. It is important to note that no trace gas analyses were conducted for VOC's and other potentially highly hazardous gases. This is an example of a highly deficient gas monitoring program that the County has entered into with Lawrence & Associates.

Reference

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Attachment B
Examples of Unreliable Reporting of the
Potential Public Health, Environmental and Other Impacts of the WRSL

EIR-77

EIR-77 states on page four, first paragraph,

"The proposed landfill would be operated as a `Class II-1' site in accordance with procedures established by the State Water Resources Control Board. Class II disposal sites are the sites at which protection to ground and surface waters and the public and wildlife resources is provided from Group 2 and 3 wastes."

EIR-77 states in the third paragraph,

"Group 2 wastes consist of or contain chemically or biologically decomposable material which does not include toxic substances nor those capable of significantly impairing the quality of usable waters."

This quote is followed by a discussion of the kinds of wastes that are planned to be accepted at this Landfill, which include garbage, rubbish, construction and demolition materials, street refuse, dead animals, abandoned vehicles, sewage treatment sludge, ashes, infectious materials from hospitals, tires and scrap as well as a variety of agricultural wastes, including manure, dead animals and plant residues. Someone reading this EIR who is not knowledgeable in the characteristics of the solid wastes of the types listed on pages four and five would be led to believe that these kinds of wastes when placed in this Landfill would not contain any toxic substances or substances that could significantly impair the quality of "usable waters." The above-quoted statements are highly misleading statements by the Placer County Department of Public Works staff and management who reviewed and approved this EIR. The various kinds of waste listed on pages four and five of EIR-77 contain a wide variety of toxic substances as well as many substances that are capable of significantly impairing the quality of usable waters.

The discussion of the types and the characteristics of the wastes which are placed in this Landfill with respect to the impacts on groundwater quality is one of the prime examples of the highly unreliable statements made in the EIR's that have been developed for this Landfill which have misled the public into assuming that the waste placed at this Landfill would not be a threat to the groundwater resources in the region of the Landfill.

On page five, bottom of the page, mention is made of group 3 wastes consisting *"...entirely of nonwater-soluble, nondecomposable inert solids."* The wastes listed are construction and demolition wastes and industrial wastes such as clay products, glass, inert slags, inert tailings, and inert plastics. Again the authors of this EIR have provided highly unreliable information on the group 3 inert wastes that would be accepted at this Landfill. Several of the wastes that are listed on the bottom of page five contain soluble constituents that can readily leach materials that can pollute groundwaters.

On page nine, last paragraph, it is stated,

"The work area for the proposed project (some 20 acres) would be surrounded with `cyclone' type fence of sufficient height to provide security and trap wind-borne debris within the site."

This is another of the mitigation measures that was stated would be accomplished in EIR-77 that has still not been accomplished. During periods of high winds, litter is scattered over the property and on adjacent properties. Further, LEA inspections of the property have noted inadequate security through fencing.

Page 14, second paragraph states,

"At the end of each day's operations, a cover layer of earth (6 inch minimum) would be spread over the compacted solid waste layer."

As discussed elsewhere, the LEA inspection reports have frequently found that the operators of this Landfill on behalf of the County Department of Public Works have failed to provide six inches of daily cover over the waste.

Page 27, first paragraph states,

"Since Group 2 wastes prohibit toxic substances on the site, the decomposable materials would not jeopardize and would very likely increase soil fertility."

This is another of the unreliable statements made in support of this Landfill application. There are a wide variety of toxic materials in the waste which could be adverse to public health and the environment.

Page 28, last paragraph states,

"Drainage within the site must not be permitted to leave the site and contaminate either ground or surface waters."

There certainly has been drainage from the site which has been contaminated with waste materials that could affect designated beneficial uses of downstream waters. Further, the aquifer system under the Landfill has been polluted by Landfill leachate.

Page 29, first paragraph, states,

"The operating and reclaimed area of the landfill would be lined with impermeable materials (meeting State specifications) so that the water table would not be affected by deep infiltration. Where necessary, impermeable clay would be used as a lining material to prevent horizontal movement of water through highly permeable sand lenses found in the Victor sandstone [sic] *formation."*

This is more of the unreliable information that occurs in EIR-77 on the ability of the landfill containment system to prevent groundwater pollution by wastes placed in the Landfill. The so-called impermeable clays that are used to plug sandy lenses would only slow down the rate of movement along the sandy lens by about a couple of years. Further, meeting the state's minimum design specifications for lining of an area with an "impermeable" material does not prevent groundwater pollution. It slows it down by less than a year. The County Department of Public Works has misled the public and others into believing that this Landfill would not represent a threat to groundwater quality in the vicinity of the Landfill.

At the bottom of page 33 and the top of page 34 mention is made that birds such as seagulls, rats and other animals would increase in numbers due to the operations of this Landfill, and these would be a threat to carrying disease (vectors) to livestock, domestic pets and poultry. On page 35, it states,

"Frequent earth cover will keep them [rodents] *from the site by restricting their access to the waste cells and, compaction destroys the integrity of the food....Unless earth cover and other operations are diligently performed, crop losses and potential for transmission of diseases can be expected to increase in the adjoining agricultural areas."*

The implication of this statement is that daily cover will be diligently applied. This was certified by the County Board of Supervisors in the certification of EIR-77. However, as discussed elsewhere in this report, the LEA has repeatedly found that daily cover has not been applied as required by regulatory requirements. Therefore, there has been a potential for vectors to carry disease organisms from the waste to livestock, domestic pets and poultry in the area.

On page 36, top of the page, under "Mitigation Measures," it is stated,

"Toxic substances will not be disposed of at this landfill site; this should limit hazards of the landfill to wildlife and domestic pets which might come in contact with the solid waste."

It is also stated in this paragraph,

"Once the solid waste is compacted, earth cover (6 inches minimum) would be placed over that `cell' of compacted material."

The public is led to believe from EIR-77 that problems of vectors and vermin typically associated with municipal solid waste landfills would not occur at this Landfill because daily cover would be applied to the waste. However, as is shown in the LEA reports, there have been several instances where daily cover has not been adequately applied to the waste as required by the regulations and by the certified EIR-77.

Page 44, first paragraph, states,

"Groundwater would be well protected by the impermeability of the native materials (which meets or exceeds the level permitted by the State Guidelines)."

According to EIR-77, leachate will not be permitted to infiltrate into the undisturbed ground and the adjacent groundwater reservoirs at a rate greater than 10^{-6} cm/sec, i.e. the state guidelines for so-called native materials' natural protection. 10^{-6} cm/sec represents about one foot/year. Assuming that the statement made by the County staff in EIR-77 is correct and the rate of migration of leachate to the groundwater table is about one foot/year, it would only be 60 years until leachate from the Landfill is polluting groundwaters. As discussed in this report, the waste present at this Landfill will be a threat forever. Sixty years is an infinitesimally small part of the time that these wastes will be a threat. Misleading and inadequate information is provided by the County staff in discussing these issues. They should have translated the 10^{-6} cm/sec into terms that the public can understand. Based on the staff's own analysis of the situation, it is only a relatively short period of time until groundwater pollution occurs at this Landfill.

Page 45, mid-page, states,

"....and lining pervious areas with impermeable clay to preclude contamination of nearby ground or surface waters. This mitigation measure would be employed wherever sand lenses are more laterally permeable than permitted by State guidelines."

Again, unreliable information is presented on the ability of the mitigation measures to prevent groundwater pollution. The approach adopted would obviously only slow down when groundwater pollution occurs; it would not prevent it.

Page 46, second paragraph, states,

"Degradation of receiving waters would not be permitted. A monitoring program would be undertaken at the same time as the landfill operation is begun to ascertain that degradation is not occurring downstream and in adjacent groundwater."

As discussed elsewhere in these comments, the monitoring program that was undertaken by the County consists of two vertical monitoring wells located at the downgradient property line. There was also one vertical monitoring well located upgradient of the Landfill. Such a monitoring program is highly inadequate to detect groundwater pollution before it trespasses under adjacent properties.

Throughout EIR-77, discussions are presented about how the potentially adverse impacts of operations of this Landfill would not be of significance to adjacent property owners since these lands are used primarily for agricultural purposes. Such problems such as odors, dust, noise, etc. are determined to be mitigatable based on the fact that there is no one at the property line who would be adversely impacted by these releases from the Landfill. EIR-77 assumes that those who own adjacent properties will always use them as they were being used at the time the EIR was prepared. Those who own these properties should have the right to use their property in a similar way as those who own similar properties at other locations. The County should not take for granted that it can construct a landfill in the region and use adjacent properties to dissipate the inadequate or inappropriate operations of the landfill which results in releases of leachate, gases, odors, dust, noise, litter, etc. that trespass on adjacent property owners' lands. As discussed in these comments, the use of adjacent property owners' lands as a buffer for dissipation of potentially hazardous or deleterious releases from the Landfill is in violation of several regulatory requirements.

Page 50, second paragraph, states,

"Eventually, the restored/reclaimed landfill area should permit the same agricultural land use and open-space that presently exists."

This is another of the misleading statements contained in EIR-77. The likelihood of being able to use the landfill area for agricultural purposes after landfill closure is extremely remote for a variety of reasons, including the release of landfill gas which will kill the vegetation in the areas where the gas permeates through the landfill cover. Such permeation will likely occur even if a gas collection system is installed.

On the bottom of page 60, it states,

"Locating the project in an area in which residential development is not expected to occur is a mitigation measure because the landfill should not be a neighbor to future residential development."

Again, EIR-77 has provided unreliable information, and the County has adopted an inappropriate approach for mitigation of the adverse affects of the Landfill. The County, as part of developing this Landfill, should have acquired sufficient bufferlands around it as part of landfill development to buffer any releases from the Landfill that would occur because of inadequate or inappropriate operations. This approach is required by regulatory requirements which mandate that adverse impacts of the Landfill operations shall not occur at the property line with adjacent properties.

As discussed by Lee and Jones-Lee (1993e, 1994a), the magnitude of the buffer around the landfill depends on the activities that are carried out by the landfill operator to control releases from the landfill. Placer County in developing this Landfill assumed that wastes could be deposited within a few feet of adjacent property owners' lands because at the time of developing the Landfill only agricultural use was being made of these lands. However, such an approach is a condemnation and taking of adjacent property owners' lands for public use without appropriate compensation. Those who own these lands should have the right to use these lands in a manner similar to uses that are made of this type of land located outside the sphere of influence of the Landfill.

Basically, the overall planning and development of this Landfill was inappropriately done by the County Department of Public Works. Those responsible for this planning assumed that they could locate a landfill in an area where no solid waste disposal had taken place in the past and use adjacent property owners' lands to dissipate the normal releases that occur from landfills. This obviously represents a significantly detrimental approach to those who own or use lands near the landfill. Why should they have to give up the right to future development of these properties and any associated income that would arise from such development because the County chose to construct and operate a landfill in a region without adequate and appropriate consideration of the adjacent property owners' rights, health, welfare or other interests?

Page 74, last paragraph, states,

"These adverse impacts may very well subside if the landfill operation eventually becomes perceived as a `good neighbor'."

EIR-77 commits, through its mitigation measures, this Landfill to being a good neighbor. This is a misleading statement in that this Landfill has been a poor neighbor to adjacent property owners since its initial development in the late 1970's.

Overall, EIR-77, as part of the County's proposal to develop the WRSL, repeatedly claims that this Landfill will be operated in accordance with regulatory requirements and that this operation will not be adverse to those who own or use properties near the Landfill. However, as discussed

elsewhere in this report, once the County was able to establish the Landfill, its approach became one of operating the Landfill in such as way as to be significantly detrimental to those who own or use properties near the Landfill.

EIRS-85

EIRS-85 is a supplement to EIR-77 which is designed to cover the expansion of this Landfill.

On page 9, last paragraph, it states,

"The operating and reclaimed area of the landfill would be lined with impermeable materials (meeting the requirements of The California Administrative Code, Title 23, Chapter 3, Sub-Chapter 15) so that the water table would not be affected by deep infiltration. Where necessary, impermeable clay would be used as a lining material to prevent horizontal movement of water through highly permeable sand lenses found in the Victor sandstone [sic] *formation."*

This statement is more of the inaccurate information that prevails throughout the EIR's and their supplements on the ability of a couple of feet of compacted soil installed as plugs in the sandy lenses to prevent migration of landfill leachate and gas along such lenses. As discussed in this report, these clay plugs at the location where the sandy lens enters the Landfill area will only slow down for a period of a couple of years the migration of leachate through it.

Further, it is obvious to anyone who understands the elements of Darcy's Law that the Sub-Chapter 15 minimum design requirements of one foot of 10^{-6} cm/sec clay will only slow down for about a period of one year the pollution of the groundwater aquifer system underlying the Landfill. The authors of EIRS-85 either knew or should have known that the statements they made about being able to protect groundwater resources with these approaches are unreliable since this is common knowledge to those who are familiar with Darcy's Law governing the movement of groundwater through porous media - groundwater aquifers. Further, as discussed in the enclosed comments, meeting the minimum design requirements set forth in Sub-Chapter 15 does not necessarily meet the overall performance standards set forth in this regulation of protecting groundwater from impaired use for as long as the wastes in the Landfill represent a threat.

Pages 13b through 13m present well logs for the few wells that were drilled as part of developing EIRS-85. These well logs contain some permeability data. No information is provided, however, as to how this permeability data was developed. If it was based on remolded samples, then it is likely to be unrepresentative of the natural *in situ* permeability of the area and underestimate the real permeability of the natural strata. These well logs show the presence of sandy, silty, clay lenses. It appears, however, in selecting samples for permeability testing, that they did not test any of these areas. Only taking eight test borings on a site as complex as the WRSL site is inadequate to properly characterize the geology under this site.

On the bottom of page 21 to the top of page 22, it states,

"Logs from both of these borings indicate sandy silt to clay sand lenses predominate the soil columns above the water level and that adequate protection of this minor water resource can be accomplished if state of the art engineering practices are utilized."

It is inappropriate to classify the water resources under the Landfill as a *"minor water resource."* The State Water Resources Control Board requires protection of all groundwater resources for domestic water supply use that have total dissolved solids less than 3,000 mg/L. Further, while the statement, *"...if state of the art engineering practices are utilized,"* is correct, far from state of the art engineering practices were proposed for utilization in connection with the development of this Landfill expansion. Therefore, this is a misleading statement about the approaches being used at this Landfill for protection of groundwater due to the Landfill expansion.

Many parts of EIRS-85 copy incorrect information that was present in EIR-77, such as on the bottom of page 24 where a discussion is presented on how rodent populations could become significant if earth cover is not kept over the waste. By 1985 it should have been possible for a properly developed supplemental EIR to examine the records of what the landfill operator had been doing between when the landfill opened and the time of the supplemental EIR preparation to see if it would be reasonable to expect that earth cover would be placed on the site as required by regulatory requirements. It was obvious then that the way this Landfill was being operated was such that daily cover was not necessarily placed over the wastes each day as required.

Page 25, last paragraph, repeats the same material as EIR-77 about toxic substances not being disposed of at this Landfill site. By incorporating these materials into EIRS-85, the authors of this supplemental EIR either do not know the topic area or are deliberately misleading the public and the Board of Supervisors on the characteristics of the waste that have been and would continue to be accepted at this Landfill. Toxic substances had been disposed of at this site and would continue to be disposed of at this site. By incorporating the statements in EIR-77 into this EIRS-85, and by the County Board of Supervisors certifying EIRS-85, the County Board has committed the County to these mitigation measures. However, many of them have not been adequately carried out.

Page 47, last paragraph, under a discussion of economic impacts states,

"Buyer resistance might tend to reduce property values surrounding the Western Regional Site though it is not conceivable that they would be reduced due to any adverse impact of the operation of agricultural pursuits on these properties."

It appears that the County, since it was able to establish this Landfill, has concluded that those who own adjacent properties must always use those properties for agricultural purposes. This is condemnation of use rights and a taking of property. The owners of those properties should have the right to develop them in any manner that is appropriate for similar properties in other locations if the Landfill had not been sited next to them.

EIRS-85 contains a copy of the Conditional Use Permit, CUP-757, adopted in August 1984 governing this Landfill expansion. Page 74, item 13, of the CUP states,

"A minimum 6" layer of earth shall be spread over the compacted solid waste layer by the end of each day's operations. If no additional refuse is to be placed in an area for a period of 6 months or longer, a minimum of 12" of intermediate cover shall be placed."

The LEA inspections of this site have on several occasions found where the daily and intermediate cover required in the Conditional Use Permit were not adequately placed and maintained on the Landfill by the operators.

Page 75 of CUP-757, item 25, states,

"A monitoring program shall be carried out in order to monitor surface and underground water at locations to be agreed on by the Department of Water Resources, the County Division of Environmental Health, and the Central Valley Regional Water Quality Control Board to be certain that the water has not become contaminated."

While a monitoring program for groundwater resources was undertaken, this monitoring program consisted of only two vertical monitoring wells down groundwater gradient at the property line. This is grossly deficient compared to what is necessary to detect groundwater pollution by landfill leachate in accord with regulatory requirements for the WRSL site.

On page 75, item 27, a discussion of the Conditional Use Permit requirement covering dust control is presented. However, a review of this CUP shows that the County Department of Planning did not establish a Conditional Use Permit condition governing odor releases from the Landfill. Odors associated with sanitary landfills are one of the primary adverse impacts during active life. It is unbelievable that a county planning department would issue a CUP without addressing the odor problem. This appears to be more of the internal manipulation of the operations of this Landfill to lessen the cost of waste management at the expense of those who own or use properties near the Landfill.

On page 82 is a listing of incompatible uses where it is stated,

"Some examples of land uses which are particularly sensitive to potential impacts resulting from solid waste disposal activities and which should therefore usually not be allowed to encroach upon solid waste facilities, are listed below:"

Various facilities such as schools, hospitals, churches, and other public and private facilities are listed. It appears now that while the Landfill can encroach on the rights of adjacent property owners to use their lands as the County did in the late 1970's when the Landfill was established, in 1985 after the Landfill has been established, it is inappropriate for these individuals to use adjacent properties as they may wish and should be able to do so if the Landfill were operated properly.

It is important to note as discussed above that as part of establishing the Landfill, the County Department of Public Works through the development of EIR-77 and the Board of Supervisors certified that this Landfill would be a good neighbor, i.e. not be adverse to those who own or use property near the Landfill. By 1985, however, the County was now admitting that it must restrict

the use of adjacent properties because the Landfill was not being a good neighbor where releases of hazardous or otherwise deleterious materials were occurring which precluded the use of adjacent lands for certain purposes.

Overall, EIRS-85 is a grossly superficial document that does not conform to CEQA requirements for full disclosure of the potential impacts of this Landfill on the public health, the environment and other interests of those who own or use properties in the vicinity of the proposed Landfill expansion.

EIRS-89

EIRS-89, which was developed by EMCON for the County Department of Public Works for the WRSL, covers the potential expansion of this Landfill on to the Lastufka property located to the west of the existing Landfill.

Page I-1, paragraph two, states,

"This information indicates that a properly designed and operated sanitary landfill does not have significant adverse environmental impact."

That statement is true, however, it is misleading when presented in this document since it is clear that the WRSL is not a properly designed and operated landfill. There is no reason to believe that the Landfill expansion onto the Lastufka property would be any different.

Page II-2, mid-page, states,

"The Lastufka Property complies with all geologic and siting criteria. The Article 4 construction standards required for Class III sanitary landfills can also be complied with at this site. The standards are:

Natural low permeability (<1 x 10^{-6} cm/sec) soil of substantial thickness

Availability of on-site soil for landfill uses

Capability of providing drainage facilities to handle runoff from a 100-year, 24-hour storm

Landfill, excavation, and earthfill slopes can be designed to withstand the maximum probable earthquake"

EMCON's assessment of substantial thickness is an issue that deserves critical review. Sub-Chapter 15, adopted in 1984, which is applicable to this proposed Landfill expansion, requires protection of the groundwater quality from impaired use for as long as the wastes represent a threat. This is the standard that EMCON should have used in judging the suitability of the Lastufka property for a landfill of this type. As discussed above, the natural permeability of the soils underlying the Landfill does not protect the groundwaters from impaired use for as long as

the wastes are a threat. Therefore, this site is not a suitable site for this Landfill expansion, or for that matter, for the original Landfill that was constructed in the area.

Page V-1, second paragraph, states,

"Landfilling at the Lastufka site should have no impact on the residents in the area due to continued agricultural and industrial zoning in the area. Through the continued mitigation measures for control of vectors, odors, dust, noise, and fire, a landfill on the Lastufka site will also be a good neighbor."

This is a self-serving statement on behalf of the County Department of Public Works that does not reliably describe the past operations of the WRSL. These operations would hardly be classified as a good neighbor for someone who tried to use the properties at the property line in accord with what would be possible at other locations if the Landfill were not present. The mitigation measures that were originally prescribed in EIR-77 and EIRS-85 have not, based on the LEA and other reports, controlled the releases of the Landfill in accord with regulatory requirements, much less those associated with being a good neighbor.

Page VI-1, under "Mitigation Measures," states,

"The natural setting of the landfill site with over 80 feet of low-permeability silts and clays provides adequate protection by the standards in the regulations controlling landfill development."

This is another of the highly misleading statements that occurs repeatedly throughout EIRS-89. First, the issue of what is adequate needs to be addressed. Is EMCON using a definition of adequate standards that only postpone when groundwater pollution occurs so that the County Department of Public Works can continue to dispose of the county's garbage at less than real cost, considering long-term impacts of such disposal? The regulatory requirements set forth in Chapter 15 require the protection of groundwater from impaired use for as long as the wastes are a threat. This is the standard that should have been used to determine the adequacy of the so-called natural setting.

The natural setting, first of all, is not 80 feet of low-permeability silts and clays. As shown in well logs, this setting has areas of high permeability. The net result is that even if there were 80 feet of low permeability 10^{-6} cm/sec soil, it would still only be a matter of time until groundwater pollution occurs. Since the wastes are a threat to groundwater pollution forever, it is only a matter of time until the proposed Landfill expansion violates Chapter 15's overriding requirements of protection of groundwaters from impaired use.

In this same paragraph, mention is made about quarterly groundwater monitoring and unsaturated zone monitoring as well as several other issues as additional so-called mitigation measures. A review of the efficacy of these mitigation measures, however, shows that they only delay when groundwater pollution occurs; they are not protective of the groundwater resources of the region for as long as the wastes are a threat. The groundwater monitoring program that has

been developed is obviously grossly deficient compared to that needed to detect pollution of the groundwater system in accord with regulatory requirements.

Overall EMCON EIRS-89 is a highly superficial document that falls far short of reliably and adequately discussing the impacts of the proposed Landfill expansion on public health, the environment and the interests of those who own or use properties near this proposed Landfill expansion.

Appended to EMCON EIRS-89 is the transcript of a public hearing on this supplemental EIR that was held January 19, 1989. The public who testified at this hearing indicated that their property values would be decreased by the proposed expansion of the Landfill. They expressed concern about groundwater pollution by Landfill leachate and the reliability of the information being provided by the County and its consultants on the potential for such pollution and the impact of the Landfill on animals owned by nearby property owners through the transmission of disease organisms from the Landfill via vectors to these animals. They also discussed the fact that the operators of the existing Landfill did not control litter; the litter was scattered considerable distances. Further, several members of the public discussed the odor problem associated with the current Landfill operations.

One of the residents of the area a little over a mile from the existing Landfill pointed out the inconsistency of the County's approach toward the protection of groundwater resources in the region. The County claimed that constructing a large landfill in this area would not result in groundwater pollution, yet when there was an application to add additional homes to the development at a distance of a little over a mile from the Landfill, the application was denied because the additional homes would have septic tank waste water disposal systems which would pollute the groundwater. The existing Landfill and proposed Landfill expansion represent far greater threats to groundwater resources in the area than additional homes with septic tank waste water disposal systems.

On page VI-2 is a discussion of the gas migration problem that is occurring at the existing Landfill. Unfortunately, this problem still continues today. This demonstrates the ineffectiveness of the County in properly addressing real problems associated with this Landfill.

EMCON staff's responses to the public's concerns were highly superficial and did not provide adequate or necessarily reliable information on the issues raised by the public.

In summary, the residents who were within the sphere of influence of the existing Landfill as well as the proposed Landfill expansion found that EMCON's statement about the existing Landfill being a "good neighbor" was highly inaccurate. From a review of the situation, it is clear that the public who own or use land in the vicinity of the Landfill had considerable justification to be concerned about any further expansion of this Landfill. The Landfill had been a poor neighbor; there was no reason to believe that the County would do any better in operating this Landfill in the future than it had in the past.

One of the comments that is made in response to the public's questions is whether the existing Landfill as well as the proposed Landfill expansion would meet regulatory requirements. I have

worked for many years in helping to review and develop regulations for landfills and other waste management units. I am highly familiar with the inadequacy of the implementation of many regulatory requirements. Regulatory requirement implementation is often a compromise between cost to the public in general and the protection of the health and welfare of those who are near the waste management unit. Compromises are often made in order to keep the costs low to the general public at the expense of those who own or use properties near a waste management unit such as a landfill. This is what is happening in western Placer County with respect to the WRSL. In the case of the WRSL, significant deficiencies in the enforcement of regulatory requirements have existed throughout the period of time which the Landfill has been in operation. One of the highly significant problems that exist in California is that the regulatory agencies are not provided adequate funds to hire the qualified personnel and to enable these personnel to carry out and enforce the regulatory requirements. This situation can be significantly detrimental to those who own or use properties near landfills.

EIRS-91

EIRS-91 is a supplemental EIR to EIR-77 and its supplement, EIRS-85, as well as EIRS-89. EIRS-91 is designed specifically to address the acceptance of septage/sewage sludge, incinerator ash, friable asbestos and the increased tonnage that is being accepted at the WRSL. EIRS-91 incorporates into it the previous EIR's -- EIR-77, EIRS-85 and EIRS-89 -- and therefore contains the same errors and misleading statements that were made in the previous EIR's. The increased amounts of waste received at this Landfill represent additional adverse impacts on adjacent property owners and users. As discussed by Lee and Jones-Lee (1993e, 1994a), the rate of receipt of waste at a landfill is a potentially important factor in determining the adverse impacts of the Landfill during its active life, i.e. the period that it receives waste.

FEIRS-91

Page two, item 1.e., water quality, states that,

"...Impacts can be reduced to a Less than Significant Level through implementation of the mitigation measures contained in the SEIR as well as enforcement of the State Minimum Standards and the Waste Discharge Requirements by the County LEA and the Regional Water Quality Control Board."

Since the minimum requirements are to protect groundwater from impaired use for as long as the wastes represent a threat, enforcing these requirements will protect groundwater. However, this is a superficial statement since the Landfill has been designed and constructed with liner systems that will not protect groundwater quality, but only postpone when groundwater pollution occurs.

In their Response to Comments beginning on page one, the authors (County Department of Public Works) have misled the readers to believe that these various provisions will, in fact, be carried out and therefore there should be no problems in any of the potential areas of concern. The facts are that these provisions have not been carried out. There are numerous problems with the operation of this Landfill. The County has failed to fulfill its commitments made as a result of certification of the EIR's for this Landfill.

At the end of FEIRS-91 is a mitigation monitoring program. As discussed in these comments, this program has not been reliably carried out.

The site map appended to FEIRS-91 shows that the County plans to deposit waste within a few tens of feet of a public road and adjacent properties. This is an inappropriate approach which should not be allowed based on the approach that the County has followed in Landfill operations where repeated violations of regulatory requirements have occurred at adjacent property property lines.

MBA-94

In 1994 Michael Brandman Associates (MBA-94) presented an "Initial Study for the Western Regional Sanitary Landfill." Presented below are comments on the adequacy of this initial study in serving as a basis for an EIR for expansion of the WRSL.

According to MBA-94 the Western Placer Waste Management Authority (the Authority) *"...has determined that based on the information provided in this Initial Study, significant adverse impacts could be anticipated with the proposed project and the preparation of an Environmental Impact Report will be necessary."*

This is a highly appropriate determination since there is no doubt that landfills of this type can have a significant adverse impact on public health, the environment and the interests of those who own or use properties near them unless special precautions are taken to ensure that the landfill is designed, constructed, operated, closed and postclosure care is provided in accord with strict regulatory requirements.

MBA-94 on page 1-6, first paragraph states,

"None of the modules have final cover in place; however, several have two feet of intermediate cover that could be used as the foundation layer."

This situation points out the highly inappropriate approach that the County has followed toward closing the waste modules that are no longer accepting wastes. By the County failing to properly close these modules and place a low-permeability cover on them, the County has created a situation which has contributed to increased aquifer pollution and increased landfill gas production. The landfill modules that are filled (Modules 1, 2, 10, 11 and 12) should be properly closed in which a testable, leak-detectable cover is placed on those modules to prevent moisture from entering the Landfill.

MBA-94 states on page 1-7 under discussion of the proposed project, that one of the tasks that the County wishes to achieve with this EIR is to cover modules with clay imported from off-site. As discussed in this report, a clay cover on modules will not be effective in preventing moisture from entering the Landfill generating landfill gas and leachate. A leak-detectable cover that prevents moisture from entering the Landfill should be constructed on all modules.

Beginning on page 2-1 through 2-5, MBA-94 presents the environmental evaluation checklist. A review of this checklist shows that it is grossly deficient in addressing one of the most important issues that should be addressed in any Environmental Impact Report associated with the continued operation of the WRSL. In the "Water" section, no mention is made of the potential impact of this Landfill on groundwater quality. The primary reason why the US Congress required the US EPA to develop regulations for municipal solid waste landfills is because of the large amounts of pollution of groundwaters by municipal solid waste that has occurred over the years. Any EIR for a proposed Landfill expansion should include a discussion of the potential impacts of this Landfill on groundwater quality. Without it, the EIR has to be judged as being non-certifiable.

On page 2-4 is a listing, "Human Health." Mention is made here that this Landfill has the potential to expose people to potential health hazards. One of the routes of exposure is groundwater pollution which, however, is not discussed in this section.

Also, no consideration has evidently been given to all the classical adverse impacts of sanitary landfills of this type, such as odor, litter, landfill gas, etc.

While MBA-94 states on page 1-8 that the various previous EIR's and EIR Supplements are incorporated by reference in the proposed EIR, MBA should not be allowed to incorporate the highly inappropriate conclusions and the grossly inadequate investigation that was done, principally by the County or its consultants, in developing the previous EIR's. These are certainly not credible documents as is readily demonstratable by the fact that many of the certified mitigation measures have not been carried out. Further, there have been repeated violations of the regulatory requirements covering operations of this Landfill. The County should be required to conduct a proper EIR providing full disclosure in accord with the requirements of CEQA on the continued operation of this Landfill considering all aspects of the potential impacts of the Landfill. An employee of the Western Placer Waste Management Authority signed the checklist. It is therefore not surprising that this checklist does not include some of the most important adverse impacts of this Landfill. It is clear that the Authority does not want to have these issues reviewed.

On page 3-1 in the first paragraph, MBA-94 has concluded that the potential adverse impacts of this Landfill on human health are less than significant. This is highly inappropriate and certainly not a proper evaluation of the situation. The wastes in this Landfill contain a large number of hazardous or otherwise deleterious chemicals that through emissions from the Landfill can be adverse to public health and the interests of those who own or use properties near the Landfill.

On page 3-3 MBA-94 indicates in paragraph 2.a. that the area of the Landfill is in a non-attainment area of the state for PM 10 particles. This means that by current standards, the highly hazardous PM 10 particles in this area already exceed the standards. Certainly, the operations of this Landfill should not be allowed to increase the PM 10 particles discharged off-site.

Pages 3-3 through 3-4 present a discussion of potential impacts on water-related issues. In this section there is no discussion of groundwater quality issues. This is another of the deficiencies in the MBA-94 review of topics for inclusion in the proposed EIR.

Page 3-8, first full paragraph discusses the household hazardous waste issue with respect to the WRSL. MBA-94 states,

"Disposal of household hazardous waste is not permitted at the landfill. To ensure household hazardous waste is not accepted for disposal at the landfill, a hazardous waste detection program has been implemented."

To someone not familiar with the real situation with respect to household hazardous waste management, one can gain the impression from this statement that there would be no household hazardous waste - materials deposited in this Landfill. Those knowledgeable in the topic area know, however, that household hazardous waste will be deposited in this Landfill and cannot be kept out of it. Further, there would be large amounts of hazardous materials from such things as street sweepings, etc. that will be deposited in this Landfill. The EIR should reliably discuss this issue and not persist as previous EIR's have of making blanket statements about how hazardous or toxic materials will not be present in the Landfill. That situation has not been and will not be fulfilled.

On page 3-12 MBA-94 provides unreliable information on the human health impacts with respect to household hazardous waste.

On page 3-13, end of the first paragraph, a statement is made by MBA-94 that, *"A chain link fence would also be installed on the landfill's perimeter."* EIR-77 in the late 1970's promised a chain link fence around the Landfill. This still has not been done.

EMCON-87

EMCON in its study of the Lastufka Property geologic characteristics (EMCON-87) found that this area is underlain by heterogenous sediments consisting of clay, silty fine grained-sand and fine to course gravel occasionally containing minor fine gravel-sized clast. They found that the remolded permeabilities of the clay and clay silts ranged from 1×10^{-6} to 3×10^{-7} cm/sec. These remolded permeabilities will likely be much lower than the natural permeability of the area.

EMCON-87 reported high-quality groundwaters below the Lastufka Property that would be suitable for domestic water supply. EMCON-87 concludes on page 18 that

"...the Lastufka Property offers a geologic and hydrogeologic setting which, if engineered and operated properly (as in the existing Western Regional Sanitary Landfill), provides an environmentally sound landfill site."

As discussed in these comments, the WRSL is not located on an environmentally sound site, nor has this Landfill been designed and operated to provide an environmentally sound landfill. The information provided in this EMCON-87 report is misleading with respect to the suitability of this site for further expansion of the WRSL across Feddyment Road.

WSWAT-88

In May 1988 EMCON submitted the results of a Solid Waste Assessment Test (SWAT) report to the WRSLA and the Placer County Department of Public Works (WSWAT-88) covering groundwater pollution at the WRSL. This SWAT report was certified by EMCON on June 29, 1988 and included the following signed statement:

"I hereby certify that this Solid Waste Assessment Test (SWAT) report prepared for Western Regional Sanitary Landfill Authority contains analyses of the surface and ground water on, under, or within 1 mile of the facility and that these analyses provide a reliable indication of whether hazardous waste is leaking from the Western Regional Sanitary Landfill."

As discussed below, that certification is obviously not valid because of the inadequate testing that was done by EMCON in evaluating leachate leakage from the Landfill. Further, the issue that should be addressed is far more than hazardous waste leaking from the Landfill. Water Resources Control Board regulations (Chapter 15) prohibit the impairment of use of groundwaters by all constituents, not just those that are characterized for administrative purposes as being hazardous. This characterization process as used in the WSWAT report allows a groundwater to contain 100 times drinking water standards for a number of highly hazardous constituents and be classified as a non-hazardous waste.

On page 3, the first paragraph, mention is made that,

"The approved SWAT testing program at the WRSL consisted of sampling and analysis of water from one upgradient and two downgradient ground-water monitoring wells, and two downgradient surface-water sampling locations. In addition, leachate and downgradient and crossgradient unsaturated zone soil samples were collected and analyzed."

EMCON, as part of conducting this SWAT, should have critically examined the efficacy of the two downgradient monitoring wells to be able to detect leachate containing hazardous or deleterious components leaking from the Landfill. The facts are, which are obvious, that these monitoring wells which are two thousand feet apart along one side of the Landfill property have a very low probability of detecting hazardous or deleterious chemicals in the groundwaters, much less, they have no ability to detect leakage from the waste modules as was certified in the SWAT report.

This SWAT contains Figure 2 which is a map of the site which shows the areas of the waste modules, the location of the monitoring wells and the direction of groundwater flow. MW-2, which is one of the two downgradient monitoring wells, is not in the anticipated flow path of leachate-polluted groundwater that could be generated at this Landfill from the waste management units that had been filled at the time that the SWAT was prepared. Therefore, there is only one monitoring well (MW-3) downgradient of the Landfill waste modules.

MW-3 is located about 2,000 feet downgradient from the southwestern corner of the waste management module. The EMCON report indicates on page 8, second paragraph, that the estimated groundwater flow velocity is 1.4 feet/year. This is a value that was developed by EMCON. This means that it could take over 1,000 years for groundwater contaminated by leachate to proceed from the nearest waste management module to the monitoring well (MW-3).

Since the Landfill had only been in operation at that time for about 10 years, it is obvious that that monitoring well would not be a reliable indicator of whether groundwater pollution was occurring by landfill leachate.

The unsaturated monitoring device (UZ-2) samples a very small area compared to the areas of the waste modules through which leakage could take place. This device sampled only a few inches from this location while there are very large areas at the bottom of the Landfill as well as along sandy lenses into which leachate and landfill gas could enter which could contribute to leakage from the Landfill. A properly conducted SWAT which contained that certification would have to have included a proper analysis of the efficacy of the monitoring devices sampled in being able to detect leakage from the Landfill modules. If such an analysis had been conducted as it should have been, it would be obvious that that certification could not be made with any degree of reliability.

This SWAT contains numerous inadequate or inaccurate statements about this Landfill and its impacts on groundwater quality. Page 18, item 1., under "Conclusions," states,

"The WRSL has not adversely impacted ground-water quality in the vicinity of the landfill."

This statement cannot be reliably made because the sampling program that was used for groundwater quality assessment was highly deficient compared to that necessary to be able to reliably make such a statement.

Page 21, under "Conclusions,", item A., states,

"The Western Placer Recovery Company does not accept and has not accepted hazardous wastes for disposal at the Western Regional Sanitary Landfill."

This statement is not true. Hazardous waste has been accepted at this Landfill and cannot be prevented from entering the Landfill. Further as discussed in these comments, the FEIR-93 prepared by the WRSLA staff for the MRF, on page 34 admits that there is no way to totally prevent hazardous waste from being accepted at this Landfill. The conclusion set forth in the statement quoted above is obviously not valid.

As discussed below, the air SWAT studies by EMCON conducted in 1987 and 1988 (ASWAT-88) show that the landfill gas present at this Landfill contains a wide variety of highly hazardous, carcinogenic VOC's. These VOC's would certainly be present in leachate that is migrating toward the groundwater table under the waste modules that existed at the time of the 1988 studies.

Under "Conclusions", item B., it states,

"Sampling and analysis of ground water, surface water, leachate, and vadose zone soils show that the WRSL is not leaking hazardous wastes and has not adversely impacted ground water."

Again, that statement is inappropriate based on the magnitude of the sampling. All that can be said is that in the samples collected and analyzed there is no indication that the Landfill is adversely affecting groundwater. However, such a limited sampling was done compared to the magnitude of pollution/impairment which could have taken place as to make the analysis of whether the Landfill is leaking or not inadequate.

Figure 6 in this SWAT report shows that sandy lenses extend for considerable distances across the WRSL property and could readily result in off-site transport of leachate and landfill gas through the lenses.

Page 14 of the SWAT states that acetone and 2-butanone were found in leachate sampled at the time of the study. Both of these substances are on the US EPA Superfund list of "hazardous" substances. Also Table 7 of this report shows that several heavy metals were present in the leachate at concentrations above drinking water standards. There is no doubt that highly hazardous chemicals and a wide variety of other deleterious chemicals that can impair the use of a water groundwater for domestic purposes have leaked out of this landfill and are on the way to polluting the groundwaters in the vicinity of the landfill.

A review of the analytical data presented as an appendix to the SWAT report shows that this program was set up inappropriately with respect to providing sufficient sensitivity in the analytical methods used to detect various potentially hazardous constituents at or below what are widely recognized as hazardous levels based on federal and state drinking water standards (MCL's). For example, for the hazardous organics, the data sheets in the appendix to the report show that the reporting limit was 10 µg/L for vinyl chloride. The detection limit reported for vinyl chloride in the appendix tables is 7 µg/L. The federal drinking water standard is 2 µg/L, and the state drinking water standard is 0.5 µg/L. Obviously, inadequate analytical methods were used in this study to determine whether the Landfill was releasing hazardous chemicals to the groundwaters that could be a threat to public health and the environment.

There is also confusion about the concentration units in Table 7. While footnote 1 states µg/L it appears that at least for some and maybe all of the constituents the units are actually mg/L. A review of the appendix tables confirms that the units in Table 7, should have been mg/L not µg/L. This is further confirmed based on the MCL listed in Table 7 for lead. Therefore, the analytical method used to determine lead in the groundwater samples was not sufficiently sensitive to measure lead at the drinking water standard. Lead could be released from this Landfill, above drinking water standards, and not be detected by the analytical methods used.

This SWAT program was set up incorrectly with respect to properly analyzing for groundwater pollution by the Landfill. Not only were inadequate numbers of samples collected from a sufficient number of monitoring points to properly describe whether the Landfill was leaking hazardous or otherwise deleterious chemicals, but inadequate detection limits were used for the analytical methods used to detect some of the chemicals of greatest concern at hazardous levels. This SWAT is technically invalid and should never have been certified or proposed as a reliable assessment of the leakage of landfill derived constituents to the aquifer system underlying the Landfill.

This SWAT has been the origin of many of the statements that have subsequently appeared in EIR's and other consultants' reports claiming that the WRSL is not polluting groundwaters. Obviously, all of these documents where this statement has been made are unreliable because of the unreliability of the original SWAT investigation.

ASWAT

In October 1988 EMCON issued a report "Air Quality Solid Waste Assessment Test Report, Western Regional Sanitary Landfill" (ASWAT 1988). The approach used in the October 1988 report is based to a considerable extent on information provided in the July 1987 ASWAT report by EMCON. The 1988 data was similar to the November 7, 1987 data for some of the VOC's where readily measurable concentrations of vinyl chloride and several other VOC's were found in landfill gas.

In the October 1988 study, sampling of a gas well at WRSL showed that volatile organic compounds were present in readily detectable amounts in the WRSL Landfill gas. Many of these VOC's are either known or suspected human carcinogens and are known animal carcinogens. This landfill is similar to other municipal solid waste landfills of the type that Hodgson, *et al.* (1992) investigated in that potentially hazardous amounts of VOC's are present in landfill gas. The WRSL sample contained vinyl chloride; benzene; methylene chloride; tetrachloroethylene; 1,1,1-trichloroethane; trichloroethylene; and chloroform. Many of these chemicals are the primary chemicals of concern in the US EPA Superfund site cleanup program. There is, therefore, significant evidence that landfill gas containing highly hazardous chemicals could be migrating to pollute groundwaters in violation of the Regional Board's WDR's. Further, there can be little doubt that hazardous chemicals are present in leachate that is migrating toward the groundwater table under waste modules 1 and 2 and likely several other modules.

The EMCOM 1988 studies (ASWAT 1988) also included measurement of the gases emitted through the waste module cover material where measurements were taken 2-3 inches above the landfill surface. While the sampling of the gas above the surface of the Landfill did not detect significant quantities of these highly hazardous gases, the approach that was followed in sampling allows considerable dilution of the gases present at the Landfill surface and does not necessarily represent what terrestrial life living on the surface of the soil would be exposed to where landfill gas is migrating.

It is important to note that EMCON in 1988 reported on page 6-2, *"Since the refuse is relatively close to the boundary at these locations, the probes are indicating gas migration."* In 1988 there was clear indication of gas migration; yet it was not until 1994 before proper sampling was done to determine the widespread extent of this migration. This clearly shows the inability of the regulatory agencies to properly evaluate and monitor the impacts of the Landfill that are important to public health and the environment.

EMCON-88

In the discussion of the EMCON "Periodic Site Review" (Engineer's Report) October 6, 1988, on the bottom of page 4, last paragraph, a statement is made,

"A thorough search of existing records revealed that no hazardous or potentially hazardous materials have been disposed of at the landfill."

Those who developed this statement do not understand the nature of the distinction between hazardous wastes and hazardous materials. Substantial amounts of hazardous materials have obviously been disposed of at this Landfill. This is another of the highly misleading statements that have been made by the County or its consultants on behalf of the County in support of this Landfill.

On page 16 of this report, under Landfill Gas Monitoring, it is stated that the fine-grained soil beneath the site and the low permeability of the liners would tend to impede lateral migration of methane gas from the fill. It also mentioned that gas probes would be installed in order to detect this migration. Someone not knowledgeable in this topic area might believe that landfill gas migration would therefore not be a problem at this Landfill. However, as has been found and discussed elsewhere in this report, Lawrence & Associates (1994b) have found, as expected, widespread gas migration in violation of regulatory requirements at the property line with the Landfill and adjacent properties. A proper definition of landfill gas migration should have been initiated years ago.

EMCON (1988) in its "Periodic Site Review of the WRSL" states on page 26, under one of the so-called "Health Factors,"

"A properly operated landfill does not present health hazards to adjacent land uses because the sanitary landfill method does not create conditions that attract and encourage breeding of such potential disease carriers as rodents and flies. Rodents generally cannot survive because compaction and covering refuse daily with soil eliminates both habitat and food."

However, if the waste is not adequately covered each day, which has been the case at the WRSL, then rodents can readily survive in the exposed wastes. These rodents could carry a number of diseases such as Bubonic Plague and the hantavirus which was only recently recognized as a significant disease that is carried by rodent populations.

EMCON in its 1988 report on page 28 mentions the groundwater monitoring in which three monitoring wells are used (one upgradient and two downgradient). A properly developed report on groundwater monitoring would have discussed the adequacy of these three monitoring wells relative to being able to comply with Chapter 15, Article 5 requirements. A properly conducted analysis of the adequacy of these wells would come to the conclusion that the groundwater monitoring program is grossly inadequate in complying with Chapter 15 requirements.

Overall, the EMCON report fails to reliably discuss many of the areas of potential problems associated with this Landfill that should have been discussed in a report of this type.

SWMP-89

The Placer County Solid Waste Management Plan (SWMP, 1989) under which the current WRSL is operating, which was approved by the County Board of Supervisors in 1989, contains a

number of highly misleading or inappropriate statements about how the WRSL would be operated. Examples of this misleading or inaccurate information are presented below.

Page 3, under II, B., Objectives, mentions that one of the objectives of the Plan is to eliminate litter. Based on the LEA reports and driving by the Landfill, it is clear that this objective has not been fulfilled. Litter is a significant problem at this Landfill.

Page 4, item 14, mentions plans to *"Pursue opportunities for use of methane gas..."* Someone not knowledgeable in that which has actually transpired would believe that the County was serious about controlling methane gas migration and utilizing methane gas. However, as discussed in the recent Lawrence & Associates (1994b) report, methane gas migration through the soil is widespread in violation of regulatory requirements.

On Page 13, item 7, second paragraph mentions that the Solid Waste Management Plan (SWMP) shall be reviewed every three years and be revised if necessary. This has not been done. There have been significant changes in the operations of the Landfill since 1989, yet the revisions of the SWMP reflecting these changes has not been made. This is yet another example of the inappropriate approach that the County has followed in its operations of the WRSL.

Page 17, II, C., mentions insuring compatibility of land use within their respective jurisdictions to solid waste facilities. Based on 1994 Placer County Planning Department proposed approaches, the way they are ensuring compatible land use is to declare that adjacent and nearby property owners cannot use their lands as they were originally intended, but must donate some of the intended uses of these lands for public use to dissipate the effects of the inappropriate operations of the Landfill through its emissions to the air and water.

Pages 21 through 27 list the types of wastes that are to be accepted at this Landfill. While these wastes are classified as non-hazardous wastes, they contain large amounts of highly hazardous and otherwise deleterious chemicals that through escape from the Landfill to air and water can be significantly adverse to those who own or use properties near the Landfill. This issue is not discussed in this Plan. This is a significant deficiency in the development of this Plan and shows that the Department of Public Works staff who developed this Plan did not bring to the attention of the public, as they should have, the potential hazards associated with accepting non-hazardous wastes of this type at this Landfill. For example, on page 25, mention is made about including street sweepings as materials to be disposed of at this Landfill. Street sweepings contain a variety of hazardous or otherwise deleterious chemicals and, while they are not classified as hazardous waste, they do represent significant threats to public health and the environment for those within the sphere of influence of the Landfill.

On page 45, a discussion is presented about used motor oil handling. The Landfill owner/operator has been cited for inappropriate handling of the used motor oil at the Landfill by the County Department of Health and Medical Services.

Page 49 discusses infectious wastes that are accepted at the Landfill. These are wastes that contain disease organisms or disease agents. The failure of the operator of the Landfill to properly cover the wastes means that these organisms and agents can be readily spread to the

wildlife population on the Landfill property and people and animals on adjacent or near-by properties by vectors and vermin present at the Landfill.

Similarly, the sewage sludge that is accepted at this Landfill, which is discussed on page 59 of the Plan, contains a wide variety of pathogenic organisms that, where inadequate landfill cover is placed on the waste such as occurs at this Landfill, represent a hazard to the public health and environment.

On page 63 it is stated in the second paragraph that,

"Placer County has determined that there is a need for an ongoing Household Hazardous Waste Program that would provide for the safe and efficient collection, treatment, and disposal of hazardous waste from households in Placer County."

This is another of the misleading statements that prevail throughout this Plan where someone not knowledgeable in what has actually happened could believe that the County is, in fact, preventing household hazardous waste from entering the Landfill. This is certainly not the case. Only a small part of the household hazardous wastes that are generated within the County municipal solid waste stream are actually collected in the household hazardous waste collection program operated by the County. This should have been discussed in the Plan.

The Plan mentions on page 114 that the disposal fees at the WRSL are $10/ton. This was in 1989. The current disposal fees appear to be on the order of $20/ton. This is a very low figure compared to what is well-known to be the true cost of solid waste management in such a landfill to prevent significant adverse impacts on those who own or use properties near the Landfill. Fundamentally, the County and the Landfill operator are trying to operate this Landfill at far less than real costs of what would have to be paid to comply with regulatory requirements of not being adverse to those who own or use properties at the Landfill property-adjacent property property line.

On the bottom of page 114, item c., mention is made that the WRSL Authority is in the process of implementing a landfill gas recovery system. Someone not knowledgeable in what is actually occurring would believe that by 1994 there should not be widespread landfill gas migrating onto adjacent properties in violation of regulatory requirements, as has been recently found by Lawrence & Associates (1994b).

Page 115, item d., states, *"An ongoing program of water quality monitoring has been implemented."* This could readily lead someone who is not knowledgeable in the characteristics of this program into believing that the County is properly monitoring the leachate releases from this Landfill and would be able to detect them before the trespass under adjacent properties. The facts are that the water quality monitoring program implemented by the County has very little probability of detecting pollution of groundwaters under adjacent properties, much the same way as the soil gas monitoring program that has been conducted prior to 1994 failed to detect pollution of soils under adjacent properties with landfill gas.

Beginning on page 119 is a discussion of inactive, closed or abandoned landfills in the County. Recently, the *Sacramento Bee* carried an article about an inactive landfill in Auburn that is polluting groundwaters and has landfill gas migration problems. This is a situation that likely exists at all of the Placer County Landfills and represents the inadequate approach the County Board of Supervisors and Department of Public Works has been using to protect public health and the environment near closed landfills. A properly conducted program would have been actively investigating landfills in the county that represent a threat to public health and the environment for those who own or use properties near the landfill. The County's approach seems to be one of only doing something if it is forced to do so. There is no reason to believe that the County or other political jurisdictions within the County will be any more protective of public health and the environment of those who own or use properties near the WRSL than they have been with respect to the other landfills in the County.

On page 138 of the SWMP, a discussion is presented of a Solid Waste Enforcement Program Plan where the LEA or the Environmental Health Division of the County of Placer Department of Health and Medical Services would be empowered to take enforcement action. It is well-known, however, that the system that is set up in the state of California in which LEA's work for health departments which have responsibilities for salaries, budget, etc. to the Board of Supervisors often have great difficulties enforcing regulations. The Integrated Waste Management Board - LEA - department of health - county board of supervisors relationship for enforcing landfill regulations is highly suspect. This is one of the reasons why significant problems exist at some landfills in the state where the LEA's do not aggressively, adequately enforce the regulations so that problems like landfill gas migration, inadequate daily cover, litter problems, odors, etc. go on year after year in violation of regulations without being stopped by the enforcement agencies.

While recently the County of Placer Department of Health and Medical Services has finally begun to take action in a Stipulated Agreement (DHMS 1994), this action still does not cover a number of the areas that need to be addressed to get this Landfill into proper operating compliance.

The statement on page 140 of the Plan where the Solid Waste Management goals and programs are set forth includes under item B., Objectives, 3.,

"All active disposal sites and transfer stations will be inspected monthly to insure compliance with State and local requirements. A standardized inspection form will be completed and kept on file in the County Environmental Health Division office."

This is another of the misleading statements that is self-serving on behalf of the County Board of Supervisors and Department of Public Works. All one has to do to see that the Plan contained a lot of verbiage which has very little meaning is to examine the orders that have been issued by the County of Placer Department of Health and Medical Services. If the so-called Objective 3 quoted above had been carried out, there would be no need for these Orders.

Further, on page 140, item B. Objectives, item 4.,

"All unstabilized inactive disposal sites will be inspected at least quarterly to insure that health, safety or environmental problems do not develop due to inattention."

The validity of that statement is shown by the recent newspaper article on the Auburn landfill where gas and leachate migrations have been occurring and continue to occur. Why did this quarterly inspection that supposedly takes place for the inactive, unstabilized landfills in the County not detect these problems? While at this time it is not known whether these inspections have occurred in accord with the Plan, it is certain that these inspections, if they have occurred, are ineffective in detecting what are obvious significant problems.

On the bottom of page 148, last sentence, mention is made that Figure 10 on page 163 conceptualizes the ideal landfill. Examination of Figure 10 shows that this landfill has a clay liner consisting of 2 feet of 10^{-6}cm/sec clay. Someone reading this who is not knowledgeable in the characteristics of clay liners could be led to believe that this landfill would be protective of groundwater resources for as long as the wastes are a threat, i.e. the requirements set forth in Chapter 15. However, it has been known for many years and is obvious to anyone who understands Darcy's Law that two feet of 10^{-6} cm/sec clay will do nothing more than slow down the rate of leachate penetration by several years. This is another example of the highly misleading information that the County officials and Board of Supervisors have provided to the public on the WRSL. While this so-called idealized landfill conforms to minimum design requirements set forth by the State, it is far from an ideal landfill unless it is the County's position that all that landfill liners should do is to temporarily slow down the rate of landfill leachate leakage through the liner. The state regulations require the prevention of use impairment of groundwaters for as long as the wastes represent a threat.

The statement in the last paragraph of page 148 that all liquid and solid waste disposal sites must be situated, designed and operated to provide protection and not to degrade surface or groundwater is highly misleading, in that the WRSL does not conform to this requirement.

Page 149, under K.3., discusses the landfill final cover. The description of the landfill final cover could lead someone to believe that this would be protective. As discussed in this report, it is clearly not protective. The final cover will crack due to desiccation, differential settling, etc., and allow moisture to enter the landfill which would ultimately lead to groundwater pollution and gas generation.

On page 151 under "County/State Solid Waste Facility Permit," item 2. mentions, *"Cannot adversely affect drinking water and industrial water supply."* This is another of the misleading statements since it is obvious that the existing Landfill has adversely affected or will soon adversely affect domestic water supplies that could be developed on groundwaters that are passing under this Landfill onto adjacent properties.

Similarly, on page 151 under "THE PERMIT REVIEW," it mentions, *"Preventing environmental damage and providing long-term protection of the environment..."* This is another of the self-serving, misleading statements developed by the County Department of Public Works to mislead the public into believing that this Landfill will be protective. Clearly at the time the Plan was developed an objective review of how the County had operated this Landfill and would

be expected to operate it in the future would not lead to the conclusion that the Landfill would provide long-term protection of the environment. Just the opposite conclusion would be developed from such a review.

More of the self-serving, misleading information is provided on page 153 where in the second paragraph it states that the Periodic Site Review will ensure that this facility operates within the terms and conditions of the permit. All one has to do is examine the permit conditions compared to what has been found to show that this is not a reliable assessment for what has been or, for that matter, what would have been expected.

On page 158, last paragraph, the last sentence states that the LEA should initiate immediate enforcement action to cause the operator to cease and desist from unpermitted practices. A review of Order Nos. 92-01 and 94-01 shows that the LEA has not followed that approach, but problems have been allowed to continue year after year at this Landfill without effective enforcement action. This is part of the conflict of interest that exists within the current state regulatory program where LEA's who aggressively pursue compliance with regulations find themselves in conflict with other governmental entities and other departments within the County, all of which report to the Board of Supervisors. While there are many LEA's in the state of California who are doing a good job in enforcing regulations, there are situations where this enforcement is lax or does not proceed as it should to force the landfill owner/operator to comply with regulations or face shutdown of the landfill. There are few LEA's who have the authority and will within the state and the backing of their supervisors to tell a landfill owner/operator that if they do not come into regulatory compliance and stay within compliance, they will be shut down.

The discussion of regulatory compliance issues starting on page 164 through the next several pages is highly misleading in that it gives the impression that there is a vigorous enforcement of regulations so that the kind of situation that has existed over the period of time that the WRSL has operated would not occur, yet examination of the WRSL operations shows that this situation has been allowed to occur where numerous, repeated violations of regulations occur routinely. The system, as stated in the Plan, does not work in Placer County. The system is fundamentally flawed; this is one of the reasons why, as discussed elsewhere in this report, it is necessary to have third-party independent review of the Landfill and its operations to ensure that the health, environment, welfare and interests of those who own or use property near the Landfill are, in fact, protected in accord with regulatory requirements.

Page 184, mid-page, item 5 discusses household hazardous waste where it is stated under item b, that

"A load-checking program for hazardous wastes will be implemented at the WRSL in the short-term planning period."

This is another of the misleading statements. While it is true that a program was initiated, what is of concern is the potential effectiveness of this program in preventing hazardous or deleterious materials from being disposed of at this Landfill. A properly developed solid waste management plan would have discussed this issue. This is a self-serving, highly biased Plan designed to

promote the Department of Public Works' interests with little or no regard to the interests of those who own or use properties near the Landfill.

Overall, the Solid Waste Management Plan developed in 1989 is grossly superficial, highly self-serving by the County Department of Public Work's presentation of information that does not reliably inform and protect the interests of those who own or use properties within the sphere of influence of the Landfill.

RDSI-90

RDSI-90 (Report of Disposal Site Information) prepared by EMCON incorporates into it the RDSI prepared by EMCON in October 1988.

On page 1, last paragraph, it states,

"The WRSLA Sanitary Landfill has operated in substantial compliance with all permit and regulatory requirements since permits were issued in 1979."

That statement is highly inaccurate. There have been numerous violations of operating permits.

On page 8, second and third paragraphs, EMCON has stated that the so-called *"...seals combined with in-place low permeability soils will satisfy RWQCB containment structure requirements."* They do not satisfy Chapter 15 requirements of protection of groundwater quality from impaired use for as long as the wastes represent a threat. This is the issue that should have been addressed. As discussed in this report, a permeability of 1×10^{-6} cm/sec in the liner is not an effective barrier to prevent leachate from transport through it to eventually pollute the groundwaters in the vicinity of the Landfill.

On page 10, second paragraph, a discussion is presented of the characteristics of the landfill cover. The landfill cover described is well-known to represent an ineffective cover for preventing significant moisture from entering the landfill generating leachate that can lead to groundwater pollution.

The statement on page 12, mid-page, under "Leachate Control Facilities," states,

"When the absorptive capacity of the refuse is exceeded, leachate is generated."

It is important to understand that leachate can be generated, even though the so-called absorptive capacity of the refuse is not exceeded. This concept, that the absorptive capacity needs to be exceeded before leachate is generated, is a technically invalid approach due to unsaturated transport of leachate.

Also technically invalid is the approach used by EMCON on page 12, last paragraph, to predict leachate generation based on water balance studies. Such an approach leads to erroneous conclusions, such as those set forth on pages 14-16 that leachate generation is unlikely. Longer-term water balance calculations of this type do not reliably predict the generation of leachate. A

proper discussion of this issue would have included a comparison between the predictions and what was actually found in landfills with similar climatic conditions that have leachate collection and removal systems. It is well-known that these landfills do produce leachate.

On page 16 a discussion is presented on Landfill gas monitoring. These statements are self-serving on behalf of the County. EMCON should have discussed the problems that have existed for many years at this Landfill for gas migration. A properly developed RDSI would have provided this information.

Page 27 discusses site inspection and maintenance where in the second paragraph a discussion is presented of sealing cracks caused by settlement in the final cover. This is an ineffective way of maintaining the low-permeability layer of a final cover since the low-permeability layer cannot be inspected by visually examining the surface of the landfill cover.

Page 28 discusses leachate monitoring, groundwater monitoring and gas monitoring. EMCON is simply stating the approaches that are being used without discussing the adequacy of these approaches or their ability to protect public health or the environment as well as adjacent property owners' interests for as long as the wastes represent a threat.

Page 34 presents a discussion of groundwater issues. No mention is made, however, of the potential of this Landfill to pollute groundwaters. This is another significant deficiency in RDSI-90.

Overall, RDSI-90 is highly deficient in properly reporting the situation that existed prior to 1990 at the WRSL.

RDSI-93

In June 1993 EMCON issued the "Report of Disposal Site Information, Western Regional Sanitary Landfill, Placer County, California," on behalf of Placer County (RDSI-93). This report is an update of the previous RDSI (RDSI-90).

On page 2-2, last paragraph the statement is made,

"A review of existing records revealed that no hazardous or potentially hazardous materials have been disposed of at the landfill, other than those which have been approved for disposal by either the CIWMB, RWQCB, or DHS such as nonfriable, nonhazardous asbestos."

This statement is not accurate. Substantial amounts of hazardous materials have been disposed of at this Landfill. These agencies do not restrict the disposal of hazardous material; they do restrict the disposal of hazardous waste. Hazardous waste has a very narrow definition that does not include the disposal of hazardous materials at this Landfill. This is another of the numerous errors that have been made by the County Department of Public Works and their consultants on the kinds of wastes that have been disposed of at this Landfill that mislead the public into believing that there is no hazardous material in the solid waste that has been disposed of at the WRSL.

On page 2-3, in the first full paragraph, RDSI-93 states that the Landfill has an order that enables up to a peak of 900 tons/per day of garbage to be accepted at the Landfill but has actually accepted over 1,200 tons/day in violation of the total tonnage permitted by the regulatory agencies. This is an example of the kinds of operations that have occurred at the WRSL where operating permit conditions have been violated.

Page 3-1 under the first paragraph discusses the types of covers that will be used for the Landfill modules. As discussed elsewhere in this report, none of these covers will prevent moisture from entering the Landfill and generating leachate for as long as the wastes represent a threat. If these waste modules are to be anything more than temporary storage of waste, a different type of cover will have to be installed such as a leak-detectable cover that can, in fact, prevent moisture from entering the Landfill and thereby generating leachate.

Page 3-3, fourth paragraph provides more of the unreliable information that has prevailed throughout all of the EIR's and various reports on behalf of the County Department of Public Works where it is stated that,

"Sand lenses encountered in the perimeter slopes or base of the excavation will be over excavated by at least 2 feet and sealed with compacted low-permeability soil ($k < 1 \times 10^{-6}$ cm/sec) as required by WDR order no. 90-272, Section B.19. The placement method for seals is described in Section 3.1.5, Earthfill. These seals combined with in-place low-permeability soils will satisfy RWQCB containment structure requirements."

That statement is not reliable in that the RWQCB's containment system requirements have the overriding requirement set forth in Chapter 15 of preventing groundwater use impairment for as long as the wastes represent a threat. This is more of the unreliable information provided by the Department of Public Works to the RWQCB on the ability of the proposed containment system that the County has chosen to use to conform to regulatory requirements. Obviously, based on a simple Darcy's law calculation it is possible to show that the so-called seals of where the sandy lenses enter the waste modules will do nothing more than temporarily slow down leakage of landfill leachate and gas through these so-called seals. When an engineering firm states that something will be "sealed," the public will interpret this to mean that it is, in fact, impermeable. Obviously, these seals of the sandy lenses are not impermeable but can leak at a high rate, eventually leading to groundwater pollution in violation of Chapter 15 requirements.

Page 3-3, mid-page under section 3.1.4. "Landfill Base and Perimeter Slope Construction and Quality Control" states,

"The WDR (order no. 90-272) for the WRSLA site require either 2 feet of clayey soil ($k < 1 \times 10^{-6}$ cm/sec) or a 60-mil HDPE liner underlain by at least 6 inches of clayey soil ($k\ 10^{-4}$ cm/sec) on the bottom and sides of each waste disposal cell."

The statement in this section is not a reliable statement with respect to the requirements of the WDR's. The WDR's are explicit in preventing leachate from polluting groundwaters, impairing their use for as long as the wastes are a threat. The WDR's indicate that any containment structure system that is constructed must comply with that requirement. While the WDR's would

allow as the minimum design containment structure that was specified in the quoted section, they do not state that they are equivalent to the overall performance standards set forth in the regulations and WDR's.

The WDR's are also explicit in requiring that the County and a registered civil engineer certify that the design of the containment structure will achieve the performance standard set forth in the regulations and the WDR's. This performance standard is explicit about protection of groundwaters from impaired use. Therefore, this section is an unreliable statement of the regulatory requirements for the WRSL.

Page 3-4 under Section 3.1.5 "Earthfill," second paragraph states at the end of the paragraph,

"The material used for sealing will be a low-permeability soil which, when compacted, exhibits a laboratory permeability of less than 1 x 10^{-6} cm/sec for undisturbed soil samples."

Again, this type of information is misleading to the public and others who would review this in believing that the materials used to "seal" will be a low-permeability soil that will, in fact, seal the area. A 1 x 10^{-6} cm/sec permeability "seal" can, as discussed in this report, leak at a very high rate of many thousands of gallons/acre/day under one foot of head. Further, the laboratory testing of undisturbed soils mentioned in this section can significantly underestimate the actual permeability that is achieved.

Page 3-7 under section 3.1.8 "Leachate Control Facilities" states,

"Leachate, excess water containing soluble substances, is released from the refuse fill when the infiltration of moisture into the landfill exceeds the moisture-holding capacity of the refuse fill. In some portions of the United States where precipitation is high or cover on landfills is poor, rain may infiltrate through the landfill surface. When the absorptive capacity of the refuse is exceeded, leachate will migrate."

This is an unreliable presentation of what is known about leachate formation in landfills and the role of surface precipitation - rainfall in generating leachate in various parts of the US. There is no place in the US where landfills do not generate leachate because of low precipitation. Desert areas which have average low precipitations do have periods of high rainfall. During these periods moisture enters the landfill and generates leachate. Second, as discussed in this report, contrary to the statements made in RDSI-93 on page 3-7, leachate is transported even though the so-called moisture holding capacity of the waste is not exceeded. This transport occurs through unsaturated transport.

In the next paragraph it is stated,

"The potential for leachate migration at the site was evaluated using the water balance method developed by C.W. Thornthwaite."

As discussed in this report, the water balance method used by EMCON is an unreliable method to estimate leachate generation. It is stated on page 3-8, first full paragraph,

"The water balance study conducted for the Western Regional Sanitary Landfill, using the final cover profile proposed for the landfill, indicated that normal rainfall will not cause the percolation of water into the completed fill, making leachate generation unlikely."

While that may be what was found by the methods used, the methods used are incorrect if this is the conclusion developed from them. Leachate has been and continues to be generated in this Landfill through infiltration through the covering material. This would occur even if the cover and low-permeability layer were to be maintained at the design specs. It is well-known that the design specs, if constructed properly, will be maintained for a very short period of time before the cover greatly increases in permeability compared to that which is designed and constructed.

On page 3-9, under section 3.1.9 "Landfill Gas Monitoring," it is stated,

"The presence of predominantly fine-grained soils beneath the site and construction of low-permeability liners over previous [sic] *zones on the site perimeter will tend to impede lateral migration of methane gas from the fill. The absence of development in the site's vicinity should allow any gas that migrates laterally off site to vent naturally without incident."*

These are more of the inappropriate approaches used by EMCON and the County where adjacent property owners' lands are used to dissipate the adverse impacts of landfill emissions to the environment. The so-called venting of gases on off-site properties can damage vegetation in that area and also represents a threat to wildlife that inhabit the area. The 1994 finding of the large-scale migration of landfill gas in violation of various regulatory requirements shows the inappropriateness of the County's approach toward control of landfill gas at the site.

In this same section, mention is made,

"Additional gas monitoring probes will be installed along the perimeter of the site as final cover is placed over filled modules."

While this document was prepared in 1993, these gas monitoring probes were not developed until Placer County Department of Health and Medical Services ordered them to do so in July 1994. Further, as MBA-94 has recently pointed out, the County has not yet prepared final closure plans for any of the waste modules, even though such plans should have been prepared many years ago. It is certainly inappropriate to propose that gas monitoring probes should only be installed after the final cover is placed over the filled modules.

On page 3-9, third paragraph, it is stated,

"The following specific program of gas monitoring system inspection and maintenance will be performed for all gas probes placed on-site during the landfill site's active life and for the duration of the postclosure maintenance period (30 years or until an operating exemption is granted by the Placer County Air Pollution Control District, CIWMB, and the LEA.)"

It is highly inappropriate to suggest that only a 30-year period of maintenance of gas monitoring, etc. would be required at this site. It is obvious that the period of time will be much longer than

this. RDSI-93 should have discussed the fact that the "dry tomb" landfilling of the type that is practiced at the WRSL can lead to virtually infinite periods of time during which gas monitoring has to be conducted.

Another problem with this statement is that the period of time during which gas monitoring has to be conducted is also controlled by the Central Valley Regional Water Quality Control Board through its WDR's. These WDR's require that the postclosure care which would include maintenance of gas collection and monitoring systems would have to occur for as long as the wastes represent a threat.

Page 3-10 under "Landfill slopes and soil cover" states in the final paragraph,

"The final 1-foot vegetative layer will be made thicker if the selected vegetation has more than a 1-foot rooting zone."

While it is possible to select vegetation for planting on this landfill cover which has a root zone less than the thickness of the soil vegetative layer, to assume that this approach will be maintained throughout the postclosure period, i.e. *ad infinitum*, is highly misleading. What should have been presented in a properly developed discussion of this topic is to address what is going to be done when native grasses and other vegetation develop on the cover which have roots longer than the thickness of the vegetative layer. Will the layer be thickened at that time? Will anyone examine the plants on the cover every few months to determine if they have roots which are likely to penetrate the low-permeability clay layer? If that is not done, then there will be vegetation developed on the cover which will penetrate the low-permeability layer which will eventually serve as conduits for rapid transport of moisture through the low-permeability layer into the waste, generating leachate. Those familiar with transport of precipitation on the surface of soil in the vadose zone know that root channels are one of the most dominant pathways for rapid transport of moisture through this layer to considerable depths, in some cases many feet to tens of feet below the surface.

Page 3-13 under 3.2.3 "Daily Cover" states,

"A minimum of 6 inches of soil shall cover the refuse at the end of each operating day."

This is the same statement made by EMCON in their previous RDSI (RDSI-90). A review of LEA inspection reports, though, shows that this has not been accomplished on a consistent basis. It is certainly highly misleading and inappropriate to state that the 6 inch cover will be placed each day when, in fact, it has not been placed each day, and there is no reason to believe that the County, the Landfill operator and the enforcement agencies will be any more diligent in actually accomplishing the placement of daily soil cover on this Landfill than they have been in the past.

Page 3-15 states at the end of the first paragraph,

"Used oil will be stored in a suitable container either near the landfill entrance or at the equipment maintenance building."

However, the County has been cited for improper used oil storage at this Landfill which did not conform to this statement.

Page 3-18 under 3.2.9 "Septage/Sewage Sludge Disposal" states that the sewage sludge and septage will be laboratory tested to be sure that they are not hazardous waste. This should not be interpreted to mean that the sewage sludge or septage will not have large amounts of highly hazardous materials ranging from pathogenic organisms through various chemical constituents that represent significant threats to public health and the environment.

On the bottom of page 3-18 it states,

"In addition, the natural setting of the landfill site with over 80 feet of the low-permeability silts and clays will mitigate against the possible impairment of beneficial uses of groundwater during the landfill operation, closure, and the postclosure maintenance period. Additional mitigation measures include the following:

The landfill has been equipped with a LCRS (see Section 3.1.8).

The operator has lined current modules with either 24 inches of compacted clay (or in situ material), or a 60-mil HDPE liner overlain by a blanket-type LCRS (see Section 3.1.1).

Drainage from the landfill will flow off site through existing perimeter drainage pathways. Proper landfill operating procedures, such as covering wastes daily and constructing temporary ditches and berms as necessary during wet weather, should prevent wastes, such as sludge, from contaminating runoff.

Monitoring for leachate, monitoring ground-water quality, and monitoring gas probes will be performed as an integral part of site operations and will be performed at frequencies required by the RWQCB.

Periodic unsaturated zone monitoring.

Verification testing of landfill base low-permeable natural liners.

Ongoing operational efforts to minimize factors which could produce leachate."

Someone reviewing this who is not knowledgeable in the characteristics of each of the bulleted items could be led to believe that the likelihood of groundwater pollution at this Landfill is very small to virtually non-existent. The facts are that the statement as presented is highly misleading and inaccurate. With respect to each of the bulleted components, the LCRS will collect only part of the Landfill leachate when new. Over time the LCRS plastic sheeting, which is the key component, will deteriorate in its ability to collect leachate and eventually become essentially non-functional for this purpose.

With respect to the second bulleted item devoted to the liners, the 24 inches of compacted clay will only prevent leachate from migrating through it for a couple of years. The 60-mil HDPE

liner will have holes in it at the time of construction and will over time deteriorate to the point where eventually it will become non-functional as an effective barrier to leachate transport through it. The monitoring for groundwater quality and gas will be highly ineffective in detecting leachate pollution of the aquifer system under the Landfill and groundwater pollution before widespread pollution occurs under adjacent property owner's lands. The periodic unsaturated monitoring is highly ineffective in serving as an early warning system for detection of leachate passing through the liner system into the underlying aquifer system. There is an insufficient number of monitoring devices to even describe the variability of the natural strata in this region, much less to detect leachate at all of the areas where leachate can pass through the liner into the underlying aquifer system. Overall, it is concluded that the so-called mitigation measures and the natural strata will not enable the WRSL to conform to the state's Chapter 15 and now Landfilling Policy of protection of groundwaters from impaired use for as long as the wastes are a threat. These mitigation measures only slow down when groundwater pollution will occur.

Page 5-1 under 5.3 "Control of Nuisance Factors" discusses such things as dust control, odor control, litter, and noise where it is stated that *"The following actions will be taken to minimize nuisance conditions:"*. First, RDSI-93 has not properly presented the regulatory requirements. It is not simply to minimize these conditions of off-site odor, etc. The regulations are explicit in requiring that there be no off-site odor associated with this operation. Further, since this is a non-attainment area for PM 10 particles associated with dust, certainly any increase in dust as a result of this Landfill on adjacent properties at the property line would be considered a threat to public health. Further, a number of these things, such as*"Odor will be controlled by placing soil cover over refuse fill daily."* is misleading in that soil cover has not been adequately been placed over the refuse each day based on LEA inspection reports. The control of litter has been sloppy, at best, at this landfill since litter has been found scattered throughout the Landfill property and on adjacent properties.

Page 5-2 under section 5.4 "Health Factors" repeats again from earlier EIR's and reports about how daily cover can eliminate the problems due to vectors, vermin, etc. Of course, such a statement has no validity whenever the wastes are exposed through the daily cover as has been found a number of times in the LEA inspections of the Landfill.

Page 5-4 under section 5.5 "Site Inspection and Maintenance," second paragraph, states,

"Sealing cracks caused by settlement in the intermediate or final cover and repairing erosion damage from extremely heavy rainfall will be a primary concern of the maintenance program. Such action, to be undertaken as part of routine site operations, should effectively minimize problems associated with leachate generation from surface-water infiltration, gas venting through the cracks or eroded cover, and insects and rodents that could be attracted by exposed refuse."

The LEA inspection reports show that the County and Landfill operator have not carried out this maintenance program. There are reports of wide cracks occurring in the intermediate cover layer with exposed waste being present there. There have been repeated problems with lack of adequate erosion control at the site. As discussed in this report, the inspection of the surface of the Landfill will not detect problems in the low-permeability layer which is buried at least a foot

below the vegetative layer of the final cover. This is another of the highly misleading statements that prevails throughout the Department of Public Works and the consultants' reports on behalf of the Department on how this Landfill will be operated to protect public health and the environment.

Pages 5-6 and 5-7 discuss the load checking program to check for illegal wastes. It states that a minimum of 5 loads per week will be inspected. Five loads of garbage per week is grossly deficient compared to that needed to effectively inspect wastes to identify prohibited wastes. Further, this inspection will not detect highly hazardous chemicals, such as lead from street sweepings, mercury batteries, and a wide variety of other household hazardous materials that are disposed of in MSW.

Page 6-1, last paragraph, states,

"Fine-grained silts and clays encountered in site borings provide an excellent protective cap over deep ground water beneath the site."

The author of this RDSI-93 section has chosen to ignore that previously the County's geologist has concluded in the 1970's that recharge of groundwaters occurs naturally through this so-called "excellent protective cap." If groundwater recharge occurs through this so-called cap, then certainly leachate can migrate through it. This is more of the highly unreliable information presented in this RDSI-93 in support of the County. If this so-called cap were, in fact, a true barrier to leachate migration, then the County would not have to install liner systems for the waste modules. However, it has been recognized as not being a reliable barrier to prevention of leachate migration to the groundwater for as long as the wastes represent a threat. Therefore, the County has had to develop a liner system for waste containment.

While in the same paragraph mention is made of permeabilities as low as 2.35×10^{-9} cm/sec and averaging in the 10^{-8} cm/sec being recorded for silt and clay samples, there are silty sands with permeabilities of 10^{-6}cm/sec. The issue is not what the average permeability is for a specific type of material; it is the maximum permeability of the strata that is the key to groundwater pollution. 10^{-6} cm/sec is about 1 foot per year. The groundwater is reported to be 55 to 65 feet below the surface. This means that it would be in the order of 60 years, if the strata were in fact no greater than 10^{-6} cm/sec, before groundwater pollution occurs. It is more likely that there are higher permeability zones which would enable leachate to reach the groundwater table in shorter periods of time. The regulations are explicit in requiring protection of groundwater from pollution by leachate that impairs use for as long as the wastes are a threat. The wastes are a threat forever; therefore, these requirements have to be maintained forever. RDSI-93 has chosen to ignore the regulatory requirements when it describes the so-called excellent properties of the cap. This is highly misleading and inappropriate.

On page 7-1, the last sentence states that the anticipated future use of the groundwaters is the same as is current. No one can reliably describe what will be the future use of groundwaters in this area. Future generations will decide this. It certainly could be different than what is there today. This generation has an obligation to protect this water's quality for future generations' use.

On page 9-1 EMCON presents its statement of limitations on the quality of the work done. The approach that has been adopted of attempting to limit the liability of EMCON for inaccurate, inappropriate, or misleading statements considered in light of the numerous inaccurate, inappropriate or misleading statements in RDSI-93 raises serious questions about the overall approach that was used in developing RDSI-93. RDSI-93 serves as a document through which the County informs the public, regulatory agencies and others about this Landfill. The information contained therein has to be reliable and not just conform to the "generally accepted professional consulting principles and practices." It must be of high quality to protect public health and the environment.

CVRWQCB-90

In 1990, the Central Valley Regional Water Quality Control Board issued a new order covering waste discharge requirements for the WRSL. This is the order that is covering current operations of the WRSL. There are a number of misleading statements in the CVRWQCB Order No. 90-272.

Item 26 in this Order states that, *"....this Order implements prescriptive and performance goals of Subchapter 15."* While it implements prescriptive, minimum standards, it does not implement the performance goals. The waste in this Landfill will be a threat forever. Inadequate attention has been given in developing this Order to the long-term threats that the wastes in the WRSL represent.

On page one, Order 92-272, item 2 states,

"The Report of Waste Discharge requests modified waste discharge requirements to allow the use of a synthetic liner in place of clay materials presently required for the bottom liner. The synthetic materials have been demonstrated to provide equivalent protection of water quality and will enhance the effectiveness of the leachate collection and removal system."

Order No. 88-108 was the order that was applicable to this Landfill prior to order 90-272. It specified the soil layer as a bottom liner. Neither the synthetic liner as it is called (plastic sheeting) or the soil layer are effective barriers to transport of leachate through them for as long as the wastes represent a threat. The County has made a significant error in using this liner system. The County should have determined that the minimum Sub-Chapter 15 of 1×10^{-6} cm/sec clay will not do anything more than slow down for a few months, i.e. less than a year, the transport of leachate out of the Landfill into the underlying aquifer system. As discussed in this report, this compacted soil liner can leak at high rates if the original design permeability is maintained. It is well-known, however, that the designed permeability of such liners deteriorates over time and allows even greater passage of leachate through it than that predicted based on the designed permeability.

With respect to substituting the so-called synthetic liner consisting of plastic sheeting for the clay liner, as discussed in this report, synthetic liners without low-permeability soil backing, i.e. a composite liner, can lead to high rates of leaking which are even greater than those of the soil liner.

Page two, item 5, "Wastes and their Classification," mentions so-called non-hazardous waste and inert waste. No mention is made, however, of the fact that the CVRWQCB has not yet developed the key aspects of the determination of whether a waste is inert or not, i.e. the leaching of the soluble constituents from the waste which exceed water quality objectives. CVRWQCB has been classifying wastes as inert without properly evaluating the appropriateness of this classification.

Page two, item 8, discusses the continued discharge of leachate into the waste management unit as long as the moisture holding capacity of the waste is not exceeded. This is another error made in that such practices increase the hydraulic loading on the Landfill which ultimately can generate leachate that can pollute groundwaters. Even though the moisture holding capacity of the waste is not exceeded, transport of leachate can occur through the waste at less than the moisture holding capacity through unsaturated transport.

On page three, item 11, a discussion is presented which states that,

"Lenses of poorly graded sands are minimal in size in both the horizontal and vertical directions."

The geological investigation that has taken place at this site is not sufficient to determine the extent, either vertically or horizontally, of sandy lenses at the site.

Page three, item 19, continues the highly inappropriate approach of allowing two feet of 1×10^{-6} cm/sec compacted soils to be used to try to plug sandy lenses that enter the Landfill bottom area.

The statement on page four, item 22, that the geological materials in the base of the Landfill unit and the groundwater will prevent the impairment of beneficial uses of groundwater is incorrect. The natural materials have sufficient permeability so that they only slow down for a period of a few tens of years when pollution occurs. These materials will not prevent it.

Page four, item 24, mentions the use of lysimeters beneath the LCRS sumps to monitor the unsaturated zone as required in Section 2559 of Chapter 15. Chapter 15 does not restrict the use of lysimeters to the areas under the sumps. They are supposed to be used throughout the bottom of the landfill, not just under sumps. The approach that is used for unsaturated monitoring at the WRSL does not conform to the unsaturated monitoring requirements of Chapter 15.

Page five, item 1, under "Prohibitions," discusses the prohibition of discharging hazardous waste at this Landfill where it states that,

"...the terms `hazardous waste' and `designated waste' are defined in Chapter 15."

It is important to understand that this definition does not preclude the addition of hazardous substances or toxic substances to this Landfill. Hazardous waste has a very narrow, specific definition which does not exclude hazardous substances which make hazardous waste hazardous. This issue is discussed in the paper by Jones-Lee and Lee (1993).

Page six, item 5, under "Discharge Specifications," states that,

"Landfill gas shall be controlled, vented, or otherwise prevented from migrating to neighboring properties, causing danger of explosion, adverse health effects, nuisance conditions, or impairment of beneficial uses of water."

This is one of the significant violations of the current operations of the WRSL that has not yet been adequately addressed since, as discussed in this report, methane at well above explosive limits is present at the boundary between the Landfill property and adjacent properties.

Page seven, item 7, states,

"Materials used to construct liners shall have appropriate physical and chemical properties to ensure containment of discharged wastes over the operating life, closure, and post-closure maintenance period of the WMU."

It was obvious at the time the Order was issued that the plastic sheeting liners and, for that matter, the soil liners that had been used cannot ensure containment of discharged wastes over the operating life, closure and post-closure period. This post-closure period is infinite because the wastes in the Landfill will be a threat forever.

On page seven, item 8, there is a similar problem with respect to the leachate collection and removal system where it stated,

"Materials used to construct leachate collection and removal systems (LCRS) shall have appropriate physical and chemical properties to ensure the required transmission of leachate over the life of the WMUs."

Again, the leachate collection and removal system will initially collect part of the leachate. Ultimately, due to natural deterioration, the amount of leachate collected will be decreased. Eventually the LCRS will become ineffective. The leachate that is not collected is leachate that passes into the underlying groundwater aquifer system and eventually will pollute the groundwaters underlying the Landfill.

With regard to page eight, item 9, allowing of soil liners with hydraulic conductivities of 10^{-6} cm/sec represents an inappropriate interpretation of Sub-Chapter 15 requirements. Such requirements are the minimum requirements that may be appropriate at some sites; they are certainly not appropriate at this site. The containment structures' liners for any site must be able to prevent groundwater use impairment for as long as the wastes are a threat.

Page eight, item 17, discusses the minimum thickness of cover soil for all areas except the active disposal area. This requirement has been violated based on the LEA inspections of the Landfill.

Also, page eight, item 18, regarding area Landfill gas migration, this requirement has also been violated since the adoption of this Order.

Page nine, item 21, contains the same mistake referred to above on moisture holding capacity of the wastes.

Page nine, item 25, states,

"Daily soil cover of not less than six inches shall be applied to the active face of the waste management unit."

As noted elsewhere in this discussion, there have been repeated violations of this requirement.

Page 11, item 7, presents a discussion of the groundwater monitoring requirements. A review of these requirements shows that a very limited number of monitoring wells are to be used for this type of landfill and area geology. This proposed approach for detection monitoring does not comply with Chapter 15 requirements of detection of releases from the landfill at the earliest possible time.

Page 12, item 11, mentions that the County shall update annually the closure and post-closure maintenance plans. It appears that this has not been done.

Page 12, item 13, explicitly states,

"The post-closure maintenance period shall continue until the Board determines that remaining wastes in all WMUs will not threaten water quality."

This threat will exist in perpetuity as the wastes in this Landfill will always be a threat, unless they are removed from the Landfill.

Page 13, item 18, states,

"The Discharger shall assure the Board that other agency and regulatory requirements are met."

This appears to be another of the violations of regulatory requirements that have occurred.

On page 3, under "Ground Water Monitoring," only two downgradient monitoring wells are used. This is grossly inadequate for the type of landfill modules and geological strata at this site.

A review of the various monitoring parameters for detection of leachate pollution of groundwater shows that some of the key parameters, such as sodium, are not required to be monitored. This is a significant deficiency.

A part of this Order is the so-called "information sheet." This sheet provides inadequate, unreliable information on the characteristics of this Landfill in a number of areas which have been discussed above. In this discussion, however, there is mention on the bottom of the first page and the top of the second that,

"These low permeable materials, coupled with use of the HPDE liner, LCRS, and the removal of any sand stringers in the upper two-feet of landfill base, minimizes potential impacts on ground water quality."

It is important to note that the regulations do not require only minimization of adverse impacts; they prohibit the impairment of use for as long as the wastes are a threat.

The Central Valley Regional Water Quality Control Board have relied on the County to provide reliable information on the characteristics of the area in which the Landfill is located and the Landfill itself in developing this Order. However, as discussed in these comments, the County has provided substantial unreliable information on this Landfill with the result that aspects of this Order are highly inappropriate.

EMCON-90

The EMCON January 1990 report of Disposal Site Information on the Western Regional Sanitary Landfill states, on page 8, that six inches minimum of cover will be placed on the wastes each day. However, the County and the Landfill operators have not placed six inches of cover on the wastes each day. This is another of the misleading statements that prevail throughout the County Department of Public Works and their consultants' reports on behalf of the County Department of Public Works for this Landfill.

EMCON-92

EMCON in a September 1992 report submitted the results of the "Third Quarter 1992 Groundwater Monitoring of the Western Regional Sanitary Landfill" to the Central Valley Regional Water Quality Control Board (EMCON-92). Page 3 of the EMCON-92 report presents a discussion of the water quality protection standard evaluation for the unsaturated flow measurements. The downgradient unsaturated flow lysimeters show considerably higher concentrations of constituents than the corresponding upgradient lysimeters. EMCON-92 states on page 4 in the next to last paragraph, *"As with the high EC value in the downgradient lysimeters, the high TDS value may be a result of spatial variations in the soil."* This situation is a clear admission that the unsaturated monitoring program as is being conducted is grossly deficient. If the unsaturated monitoring program cannot distinguish between landfill liner leakage and spatial variability of the natural strata for TDS, then there is an insufficient number of sampling devices (lysimeters) in the natural strata to define its characteristics. Placer County is operating with far fewer lysimeters than is necessary to reliably describe the natural characteristics of the vadose zone under the waste modules, much less detect leachate leakage through the liners.

The mechanical approach that has been used by the County in developing its monitoring program represents one of the most inappropriate approaches for landfill emissions monitoring that the author has encountered. A properly developed monitoring approach considers the natural variability of the system which is being monitored and requires that a sufficient number of monitoring points or devices are used to reliably characterize this natural variability. Without this

approach, the leakage of leachate through the liner system cannot be reliably detected at the earliest possible time as required by Chapter 15.

On page 5, mention is made about insufficient sample volumes to do certain analyses. This again is a reflection of the inappropriate approach in the selection and use of the sampling devices. If insufficient volume to do the analyses that should be conducted is being collected, then additional devices or increased collection efforts should be made. Overall, the current groundwater monitoring program for both the vadose zone and the saturated zone is grossly deficient compared to what is necessary to reliably detect leachate pollution of the aquifer system and to conform to Chapter 15 requirements.

CUP-225

The County Department of Planning Conditional Use Permits CUP 225 dated 1978 give the impression that litter control at the Landfill will be effected. However, all one needs to do to determine the reliability of the CUP in discussing this issue is to drive by the Landfill. At the time that the author of the comments did this last summer, there was significant litter scattered throughout the properties on either side of the public roads near the Landfill as well as obvious dumping of garbage along the roads that was not being adequately addressed by the Landfill owner/operator.

CUP-957

Conditional Use Permit 957 dated 1986 states under item 3 that the mitigation measures from the EIR are made part of the conditions for approval of this project. This requirement clearly delineates the regulatory requirements and should have been monitored and enforced to ensure that the mitigation measures set forth in the various EIR's are, in fact, being carried out.

CUP-957 states in item 26, *"Dust shall be controlled so that there is no threat to public health or safety from wind-borne pathogens."* What monitoring was done to ensure that this CUP requirement was carried out? As far as can be determined, none.

WRSLA

In June 1993 the WRSL Authority developed a report covering stormwater discharges from the Landfill property (WRSLA 1993). This report presents the data from a sample collected on December 10, 1992. Data is presented for only a few inorganic parameters. The sampling and analytical program conducted for fulfilling the requirements of the NPDES stormwater permit is highly deficient compared to the one that should be conducted to measure constituents in stormwater runoff from the Landfill. Potentially significant amounts of hazardous or otherwise deleterious chemicals could be transported off the site in stormwater and could have been present in the samples that were analyzed and not be detected by the program that has been conducted. This is more of the highly ineffective and inappropriate monitoring program that is being conducted at the WRSL by the County that serves as the fundamental basis for protecting public health and the environment from emissions from the Landfill.

FEIR-93

This Final EIR (FEIR-93) covers the WRSL Authority's proposed construction of a recycling, composting and household hazardous waste facility on the southeast corner of Feddyment Road and Athens Avenue. Beginning on page iv are the conclusions with respect to the potential significance of various impacts of the proposed operations. Based on past operating experience of the WRSL, there is little reason to believe the assessments provided in this section are any more reliable than they have been in previous EIR's and their supplements for the WRSL.

Page 17 lists the various agencies that would be permitting or concerned with this facility. Since this facility is identified as containing a pond for the leachate runoff produced from the compost piles, certainly the Central Valley Regional Water Quality Control Board should have been listed here as an agency that has regulatory authority over this operation. This is a significant omission in this FEIR-93.

This document describes in a number of places, including page 5, paragraph 3, that the household hazardous waste management part of this facility is a collection site for drop off of household hazardous waste. The County is depending on the individual homeowners to bring household hazardous waste to the Landfill as part of its control of hazardous waste that would normally be deposited in the WRSL waste modules with the normal garbage. The acceptance of household hazardous waste would be only on four designated Saturdays over the year. Such an approach severely limits the amount of household hazardous waste that will be collected and therefore diverted from the waste stream that will enter the WRSL waste modules.

On page 16, FEIR-93 admits that the amount of materials that are anticipated to be handled in this facility as household hazardous waste will be less than the total being generated within the area. This means that substantial amounts of household hazardous waste will not be dropped off and processed separately, but will be in the mixed waste modules deposited in the Landfill.

On page 34 of the FEIR-93, paragraphs 2 and 3, mention is made that there will be household hazardous waste and some commercial hazardous waste present in the wastes that are accepted at the Landfill. This material has been and will continue to be part of the waste buried at the Landfill with the municipal solid waste and commercial - industrial solid waste. Overall, and contrary to the various EIR's, consultants reports, etc., the WRSL has been and will continue to accept some hazardous waste. This hazardous waste coupled with waste that is not classified as hazardous, but contains hazardous chemicals will cause the leachate and landfill gas to be highly hazardous to public health and the environment.

Page 14, second and third paragraphs, describe the composting operations where the composting will be done in windrows outdoors. Such composting approaches typically generate large amounts of odors that are highly noxious and can influence public health and the environment for considerable distances.

On the bottom of page 22 it is stated,

"The nearest residential tract is far enough away (approximately two miles) and is sufficiently often upwind of the site that windblown litter should not cause significant impacts to the residences."

While litter may not carry two miles, the odors from the Landfill have been noted at this residential area. Therefore, odors from the composting could also be adverse to this, and other residences in the area.

It states on page 24 in paragraph 5 that,

"The nearest concentration of residential uses is far enough away that pests would have to become a significant problem on the project site before they would noticeably impact the residences. The project would be in violation of relevant health codes before that occurred."

First, the violation of the code seems to be no problem for the Authority, since the Authority, in managing the WRSL, has been in continuous violation of a number of regulations for many years. Second, while possibly vectors and vermin would not overrun the nearest residences so that it would be unhealthy to be outside because of rat bites, etc., there certainly could be disease transmitted through the rodent population so that those in those areas could be adversely affected if there were not adequate control of vectors and vermin, etc. at the MRF.

On page 39, the first full paragraph states,

"Because the property is the site of an operating landfill, there has been extensive hydrogeological investigation done on the site over the last 15 years. The records of these studies, including the Solid Waste Assessment Test (SWAT) and the most recent Updated Project Design, Construction, and Operating Provisions, are on file with the Central Valley Regional Water Quality Control Board and also in the files of the Permits section of the California Integrated Waste Management Board."

This is a highly misleading statement with respect to implying that the previous studies are sufficiently reliable to determine whether the existing Landfill has been polluting and continues to pollute the aquifer under the Landfill. The monitoring that has been done over the years is grossly deficient compared to what is needed to reliably determine the adverse impacts of the existing Landfill on the groundwater resources in the vicinity of the Landfill. As discussed elsewhere in this report, the water SWAT submitted by the County to the CVRWQCB was based on an inadequate and unreliable assessment of WRSL waste module leachate leakage.

Page 40, last paragraph presents unreliable information on the potential for the existing WRSL to have caused pollution where this pollution would have been detected by the monitoring wells. The efficacy of the monitoring wells in detecting groundwater pollution is so grossly deficient compared to what is necessary to reliably monitor the Landfill as to be of limited value for this purpose. A properly conducted EIR would have pointed this out where it would have stated that at this time there is a significant potential for the Landfill modules having polluted the underlying aquifer and therefore are a threat to groundwater pollution, and it is only a matter of time until groundwater pollution from these modules actually occurs.

Page 43 indicates that according to this analysis, composting could be conducted on the bare soil. It states that,

"The contaminants from compost are humic acids and particulates, primarily. The organic compounds are not toxic, but are usually contained because of their concentrations."

This is a highly biased statement of the potential for groundwater pollution and surface water pollution to occur at this site associated with the composting operations that are proposed. This statement is highly unreliable and does not adequately or appropriately conform to CEQA requirements for full disclosure. Compost contains a wide variety of constituents which can pollute both surface and groundwater besides humic acids. As an example of the inappropriateness of the statement about compost consisting of humic acids is the work that has been done on pesticides and herbicides used in home areas being present in yard waste that then contribute to groundwater pollution at landfills. The home use of certain pesticides, such as diazinon, is now recognized as a very significant problem for stormwater toxicity. The runoff from the composting piles must be routinely tested for toxicity to aquatic life before it is allowed to leave the property.

The authors of this part of FEIR-93 did not know or reliably report on the potential for compost of this type to cause water pollution. The use of compost is receiving increasing scrutiny for chemical leaching at the site of use, which leads to surface and groundwater pollution. The amount of compost at locations where it is used that can leach materials is far less than that present at the composting site. Runoff from composting sites can result in severe surface and groundwater pollution if not properly managed.

Page 53, under "Compost Emissions," discusses how odors from this facility could be carried over two miles. While not mentioned, this would be in violation of regulations. It is mandatory that this facility be operated so there are no obnoxious odors at the adjacent property lines. The operators of this facility should not be able to violate regulatory requirements and use dilution of odors on adjacent properties to dissipate the inadequate control of odors at this site. If odors cannot be controlled through the operations plan, then the composting, etc. will have to be conducted under a dome in which all gases within the dome would be treated to remove odors. The notion that this facility can operate and be offensive at the property line, including Athens Avenue and Feddyment Road is totally inappropriate and unacceptable.

Page 53 under "Odors", last sentence of the first paragraph, discusses the odor problems at transfer facilities where it states,

"The absence of substantial odor problems with the operation of those facilities indicates that the potential for significant impact is avoidable."

Again, this is a pro-County and Waste Management Authority statement that does not properly address the issue. The issue is the absolute control of odor within the property boundary of the facility. To occasionally have obnoxious odors on adjacent property owners' lands around a transfer station or a composting operation is in violation of regulations. These facilities have to be constructed, operated and maintained so that there are no off- site odors that are adverse to

those who own or use properties in the vicinity of the Landfill. As discussed in this report, these odors are more than just an aesthetic unpleasantness. There are significant public health problems associated with malodorous conditions that are now recognized and provide additional justification for the control of odors. The cost of operation of this facility must include proper odor, dust and other controls so that there is no change at the adjacent property owners' line from preconstruction conditions of the MRF and the composting operations.

On page 53, under "Mitigation," the last sentence states,

"The prevailing wind direction will also minimize the potential for any air quality impacts to the nearest residential tract approximately two miles to the west."

Again, this is an improper assessment of the situation that can be allowed to occur. The regulations require control at the property line with adjacent properties. They do not allow adjacent properties to be used to dissipate the emissions from improper operations of the facility. Someone driving along Athens Avenue or Feddyment Road should not be exposed to odors from this facility. These are public roads, and the public is entitled to use them without experiencing offensive or hazardous conditions.

Page 54 lists the mitigation measures included in the project to control airborne emissions. The composting operations at the MRF, as well as the MRF itself, must be based on conditional approvals as long as all off-site emissions are controlled. If the control is not maintained, then the facility has to be shut down. It should not continue to operate as the WRSL has been able to operate where violation after violation occurs, and little or nothing is done to stop further violations. From the past operating experience of the Authority at the WRSL and the nature of the proposed operations it is clear that the mitigation measures listed in this FEIR-93 will not be adequate to prevent violations of regulations associated with airborne transport of emissions from the operations.

Page 70, under "ALTERNATIVES TO THE PROJECT," item B.2., assumes that outdoor composting is the only approach that can be used at this site or some other site where the composting could take place. There are composting facilities that are totally enclosed vessels that are being used in this and other countries which control odors and all the other problems associated with composting. These alternatives should have been discussed. This FEIR-93 was sufficiently deficient in not considering this approach as an alternative to the proposed outdoor open composting operation as to be non-certifiable since it did not conform to CEQA requirements of adequately discussing alternatives.

Further, with respect to composting on the bare ground, the composting area could be properly lined with appropriate monitoring to protect groundwaters from leachate generated in the compost.

Overall, this FEIR-93 does not properly discuss the potential impacts of the proposed MRF and composting facilities on public health and the environment. It is a pro-project FEIR generated largely by the Authority staff who obviously are going to support the Authority's cheaper-than-real-cost approach toward addressing waste management issues that have prevailed in the

operations of the WRSL. This document should not have been certified as conforming to CEQA requirements for full disclosure.

As an appendix to FEIR-93 is a report by R. W. Beck & Associates (Beck), which contains some material pertinent to the evaluation of the proposed MRF and composting operation impacts on public health and the environment. This section repeats what has been in other EIR's and consultants' reports which are grossly deficient descriptions of the water quality issues compared to what should be reported as part of full disclosure. A properly prepared consultant's report would include an analysis of the reliability of previously included statements to determine whether it is appropriate to conclude that there were no water quality impacts at the existing WRSL. No water quality impacts have been found because of the highly deficient monitoring program that has been conducted there by the County.

Page I-18 of the Beck report discusses the construction and demolition waste processing area. It mentions the outdoor processing of this material. This material is typically classified, without proper testing, as inert. Proper testing of this material would show that there are components in what are normally so-called inert wastes, or construction/demolition wastes which have soluble components in violation of Chapter 15 requirements for the classification of such materials as inert.

Beck, on page I-19 discusses yard waste processing and composting where it states that it is possible to conduct the composting operations on the soil because the permeability of the soil is less than 10^{-6} cm/sec. That is an inappropriate assessment of the state regulations. The state regulations governing waste management of this type require, in addition to any minimum standards, that the waste management operations do not impair the use of groundwaters for as long as the wastes represent a threat. Composting on the ground at this site will represent a significant threat to groundwater resources in the vicinity of the composting area.

Beck, on page I-22 discusses stormwater runoff retention indicating that the stormwater should be maintained in a pond. No information is provided on the characteristics of this pond, however. This is important information that should have been provided in order to determine whether there is significant potential for groundwater pollution associated with the pond storage of leachate from the composting piles and runoff from other areas on the property.

Beck, on page I-34 and I-35 discusses possible mitigation measures to control airborne emissions. What the public wants to know is what will be the mitigation measures, not what are the possible measures. That is what has to be considered in the proper review of an EIR. There has been a consistent pattern with the County and the Authority of having consultants discuss what can be done, implying that these measures would be adopted. However, after the EIR is certified they are not implemented, with the result that there are violations of regulations associated with the emissions that are supposed to have been mitigatable according to the consultant's or staff's report. This is a type of misleading approach that is used in developing EIR's where the consultant has no responsibility since they have only listed possible measures, and the County is able to get by without a critical review of the proposed facility since it has never reliably defined what it is actually going to do at the site.

The public therefore is led to believe that mitigation measures will be used to prevent the problems when, in fact, this does not occur.

Page I-44, second paragraph, mentions a pond that will hold 4.2 acre feet that will be used to contain runoff from a ten-year storm from the area. No information is provided on the characteristics of the liners for the pond, etc. Such information is essential to evaluate its potential suitability to protect public health and the environment.

Beck, on page I-45, under "2. Water Quality Impacts," states,

"Compost leachate will contain suspended solids (small refractory particles such as sand, small wood chips) and water soluble organic compounds (humic acids)."

This statement is highly deficient in describing compost. The wide variety of constituents in typical yard waste and municipal solid waste compost represents significant threats to public health and the environment. This Beck report has to be determined to be deficient compared to what should have been provided in a consultant's report discussing water quality impacts of compost.

The statement on the same page in paragraph 5,

"The discharge of runoff from the compost facility will not have adverse effects on farmlands downstream from the site."

is misleading. The issue is not the impact on farmland; the issue that should have been addressed is the effect on aquatic life in the receiving water - streams. Compost will have significant amounts of materials that can adversely affect fish and other aquatic life downstream of the composting site. It can also have significant adverse effects on the wildlife that use the fish and aquatic life for food. This is another of the significant deficiencies in the Beck report in addressing water quality aspects of this facility.

On page I-46, Beck lists mitigation measures to "consider," but does not describe what actually will be done to control water quality impacts.

Beck, in "Appendix 5" presents the anticipated composting process and technology for the proposed WRSLA. In FEIR-93 the statement is repeatedly made by the County staff that prepared FEIR-93 that odors associated with composting are an indication of anaerobic conditions. However, in the Beck report, page 4 indicates under "Odor Control," the presence of odors usually indicates that the process is turning anaerobic. While there is no question that anaerobic composting releases odors, there can also be severe odors associated with compost maintained in an aerobic condition. FEIR-93 has not properly presented this issue and gives the misleading impression that if everything is kept aerobic, which is virtually impossible to do, that there will be no odors emitted from the compost piles.

On page 4 in the Beck report, the highly inappropriate approach of using adjacent property owners' air to dilute odors from the composting operation is advocated as a mitigation measure

where it states that odor problems are the result of the facility being located too close to residential neighborhoods and commercial areas or a road. The problem is not being too close to a residential neighborhood, etc.; the problem is inadequate bufferlands owned by the composting facility to dissipate the odors for the type of composting operations that are conducted there. If the composting is conducted in closed vessels, then it is possible to conduct composting with very limited bufferlands. However, if composting is to be done outside in the open, as is proposed at the WRSLA facility, then the amount of bufferland owned by the County to dissipate the adverse impacts of composting has to be much larger.

On page 7 of the Beck report, the bottom of the page lists the assumed composting system for the WRSLA. No discussion has been presented in this material, however, of in-vessel composting which is recognized as the approach that should be taken to control off- site problems. Beck simply assumes in this discussion that it would be possible to use adjacent property owners' lands to dissipate the adverse impacts of the composting operations that will result from their proposed assumed approach. Such recommendations do not properly consider the waste management requirements of various regulatory agencies that prohibit off-site adverse impacts from waste management units.

In response to comments received on the Draft EIR, the WRSLA staff on page III-6 state under item 8,

"The leachate will not be toxic and can easily be collected by an on-site holding pond."

The authors of this section do not know whether the leachate will be toxic or not. Basically, the response of the comments provided is a re-parroting of what is stated in the Draft EIR without addressing the issues raised by the commentor.

On page III-12 the commentor points out that the Draft EIR does not provide sufficient details to evaluate the MRF and composting operations potential impacts on public health and the environment. The WRSLA staff further propose that they will not have to submit the final design of this to review by the public. This is highly inappropriate. The public is entitled to know what will actually be done, not some speculation about the various techniques that could be followed. It is what is actually done that affects the environment and public health that is of concern and should be addressed by CEQA.

GENPLA-94

The "Placer County General Plan Update" dated February 18, 1994 (GENPLA-94) states on page 73, under "Policies 4.G.4.,

"The County shall ensure that solid waste disposal facilities do not contaminate surface or groundwater in violation of state standards."

While obviously the County cannot adopt a Plan that states it will construct landfills that will pollute groundwaters and surface waters, i.e., violate standards, the Plan does commit the County agencies to protection of ground and surface waters in accord with the regulations. This means

that the regulations of the State Water Resources Control Board of protecting groundwaters from impaired use for as long as the wastes represent a threat should be incorporated into all County Department of Public Works' efforts in developing and expanding the WRSL.

On page 74, "Policy 4.G.6." states that the County shall ensure that landfills and transfer stations are buffered from incompatible development. It is certainly inappropriate for the County to use adjacent property owners' lands as a buffer for the landfill and transfer station as well as the MRF operations. These buffers which make up for inappropriately designed and operated facilities should be on County-owned land. The cost of acquisition of buffers should be part of the cost of solid waste management. Certainly these costs should not have to be borne by adjacent property owners such as those in the vicinity of the WRSL, several of whom were present there before the Landfill was sited in the region.

LEA Inspection Reports

In an inspection report from April 21, 1994, the operators of the WRSL continued to have problems in failing to properly cover waste with soils. Further, there was inadequate security at the Landfill, since the fence surrounding the Landfill was in a poor state of repair. In addition, associated with the inspection is the finding of excessive working face area.

The inspection reports on January 26 and February 24, 1994, discussed the previous problems with erosion at the site, as well as the problems with fencing, inadequate signs, and problems with seagulls.

On February 26, there were landfill odors as far as Industrial Boulevard according to the LEA. The LEA has periodically reported problems of ponding of water on the top of the Landfill.

On November 24, 1993, the LEA noted a crack in intermediate cover which was one inch wide and about ten feet long. Such cracks can allow escape of landfill gas and odors and permit access to the waste by vectors and vermin. They can also serve as a conduit for transport of water into the Landfill, generating leachate.

On May 29, 1992, mention was made of hazardous waste being dumped at the wood waste area.

An inspection report on June 29, 1989, discusses problems such as erosion control, lack of timely permitting, excessive tonnage, inadequate fencing, inadequate landfill maintenance and inadequate daily cover.

On January 9, 1989, the Regional Board engineer found problems with erosion and the situation where excavation of an underground tank at the Landfill had been left open for over two years.

An inspection report from August 15, 1988, discusses the lack of daily cover and inadequate dust control.

An inspection report from December 11, 1987, discusses problems with the Landfill operator failing to segregate runoff from waste from other runoff from the Landfill property.

Attachment C
Supplemental Information on Qualifications

Attachment D
Supporting Papers and Reports

List of Enclosures

Lee, G. F. and Jones-Lee, A., "Impact of Municipal and Industrial Non-Hazardous Waste Landfills on Public Health and the Environment: An Overview," May (1994).

Jones-Lee, A. and Lee, G. F., "Groundwater Pollution by Municipal Landfills: Leachate Composition, Detection and Water Quality Significance," October (1993).

Lee, G. F. and Jones-Lee, A., "Landfill Post-Closure Care: Can Owners Guarantee the Money Will Be There?" (1993).

Lee, G. F. and Jones-Lee, A., "Geosynthetic Liner Systems for Municipal Solid Waste Landfills: An Inadequate Technology for Protection of Groundwater Quality," (1993).

Lee, G. F., "Comments on Tisinger and Giroud `The Durability of HDPE Geomembranes'," April (1994).

Lee, G. F. and Jones-Lee, A., "A Groundwater Protection Strategy for Lined Landfills," (1994).

Lee, G. F. and Jones-Lee, A., "Closed Landfill Cover Space Reuse: Park, Golf Course or a Tomb?" (1994).

Reference as: "Lee, G. F., 'Comments on Western Regional Sanitary Landfill Placer County, California Impact on Public Health, Groundwater Resources and the Interests of Those Within the Sphere of Influence of the Landfill,' Report G. Fred Lee & Associates, El Macero, CA, January (1997)."