MALIBU BAY COMPANY

October 8, 2009

Via Email & Messenger

Dr. Rebecca Chou
Los Angeles Regional Water Quality Control Board
320 West 4th Street, Suite 200
Los Angeles, Ca 90013

RE: **Comment Letter** --Amendment to the *Water Quality Control Plan for the Coastal Watersheds of Ventura and Los Angeles Counties* to Prohibit On-site Wastewater Disposal Systems in the Malibu Civic Center Area

Dear Dr. Chou,

Malibu Bay Company is pleased to provide comments on *Proposed* Prohibition of On-site Wastewater Disposal Systems in the Malibu Civic Center [MCC]. We have a long commitment to water quality issues in Malibu and believe that having clean water at Malibu's beaches is critical for Malibu to remain a vibrant community. While we oppose the *Proposed* Prohibition, we believe that it is essential for significant changes to be made in the way wastewater is handled in the MCC. We look forward to continuing a collaborative relationship with the Regional Board and other key stakeholders to further the goal of clean water in Malibu.

We do take note of a number of positive steps that both the City of Malibu and the Regional Board have taken in recent years. We applaud the Regional Board's latest efforts to assure compliance with their regulations by issuing Notices of Violations and 13260 Directives. While perhaps this effort has been overly aggressive in an attempt to make up for years of lax enforcement, we do think it will lead to more compliance and cleaner water. The City of Malibu has now started construction of a significant stormwater treatment facility at Legacy Park which should also make a major contribution to improving water quality in the MCC. We are also encouraged by the new scientific studies funded by the City. While only preliminary results are available at this time we believe they are important to assist in guiding their efforts to design a new community wastewater treatment facility

Malibu Bay Company is a significant stakeholder in the MCC. We have operated the Winter Canyon Treatment Facility that serves Malibu Colony Plaza and other adjacent properties for several decades. In addition, our holdings also include 5 undeveloped properties containing over 25 acres in the MCC. Currently, we are preparing an application for development entitlements in the MCC that will include a "zero-discharge"

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On-Site Wastewater Treatment Facility. Our experience in both operating and building wastewater plants and our ongoing analysis of the development potential of our vacant land gives us a unique perspective on water quality issues in Malibu.

We hope our comments will assist the Regional Board in making an accurate evaluation of the existing conditions. This will ensure that any *Proposed* Prohibition is based on significant evidence and guarantee the new policies can take effect in a timely manner. Everyone's objective is to implement Regulations that will improve water quality in the MCC in a fair and equitable manner and without unnecessary replacement of existing facilities.

Adoption of the Proposed Prohibition will cause financial hardship on public and religious educational institutions as well as many Malibu businesses that have recently constructed or will construct wastewater facilities in Winter Canyon at the direction of the Regional Board

In good faith, Malibu Bay Company built a new $2,000,000 wastewater plant in Winter Canyon in 2006 to comply with Board's WDR: R4-2000-0182. In conjunction with discussions with Regional Board Staff in 2008, an additional $250,000 was spent to improve the plant's reliability and performance. The plant has an estimated life of 25 years yet this significant investment will be lost in five years or sooner under the terms of the *Proposed* Prohibition. This will require over 35 Malibu businesses, which bear the cost of the wastewater facility, to abandon this investment only to be faced with the obligation to fund the cost of a new community sewer system. In addition, the Regional Board recently sent 13260 Directives to both the Santa Monica Malibu Unified School District and Our Lady of Malibu Catholic Church for elementary schools located in Winter Canyon. Based on preliminary discussions with Staff, it is likely the School District and Church will be required to undertake the costly construction of new wastewater facilities. If the *Proposed* Prohibition is adopted, these facilities will become obsolete almost as soon as they are put into service. Causing such a wasteful expenditure of educational funds at a time when there are insufficient resources to fund teachers and programs is inequitable and unwarranted.

The "Winter Canyon drainage" [see Technical Memorandum #4, pgs 9-10] is a separate groundwater basin. This requires an analysis of the justifications cited for the Proposed Prohibition be made independent of the conditions found elsewhere in the MCC if the boundaries of the Proposed Prohibition encompass this distinct groundwater basin.

It has long been established that the Winter Canyon Drainage [WCD] is a separate groundwater aquifer. Both the 2004 Stone Report and subsequent reports [Earth Consultants International Second Response to Questions Regarding the Towing Site dated 9/18/09, which discusses in detail the groundwater characteristics of the Winter

Canyon drainage] document that groundwater in WCD flows directly to the Ocean at Amarillo Beach. This has been acknowledged by Staff in Technical Memorandum #4 which notes that Winter Canyon is separated from the Civic Center by a bedrock ridge [t4- 9 & 10]. In addition, at the October 1st Community Meeting, Staff confirmed that the sole hydrologic connection between the WCD and the rest of the MCC was due to the "long shore currents" which some of the time move the ocean water at Amarillo Beach toward Surfrider Beach. Technical Memorandum #4 goes on to further state:

> *"Sector I [Winter Canyon] is subdivided into two subsectors with significant differences in contribution to the Lagoon. The greatest volume of wastewater from Sector I is discharged in the Winter Canyon drainage, but the Winter Canyon flow is assumed to have a relatively low contribution (1%) to Malibu Lagoon." [t4-9]*

Because there is no meaningful hydrologic connection between WCD and the rest of the MCC it is necessary to evaluate this groundwater basin independent of other portions of the MCC. The imposition of the *Proposed* Prohibition in the Winter Canyon drainage must be justified by scientific evidence that relates to this separate groundwater basin.

There is no significant evidence that the reasons for the Prohibition exist in the Winter Canyon drainage and therefore this groundwater aquifer should be excluded from the boundaries of the Proposed Prohibition.

The Regional Board Staff has established five reasons as justification for the imposition of the *Proposed* Prohibition outlined in the following Technical Memorandums:

> *Technical Memorandum #1: Permitted Dischargers Have a Poor Record of Compliance with Regional Board Orders*
>
> *Technical Memorandum #2: Pathogens and Nitrogen in Wastewater Impair Underlying Groundwater as a Potential Source of Drinking Water*
>
> *Technical Memorandum #3: Pathogens in Wastewater that are in Hydraulic Connection with Beaches are a Significant Source of Impairment to Water Contact Recreation*
>
> *Technical Memorandum #4: Nitrogen Loads in Wastewater flowing to Malibu Lagoon Are a Significant Source of Impairment to Aquatic Life*

Technical Memorandum #5: Dischargers with Unsuitable Hydrologic Conditions for High Flows of Wastewater Resort to Hauling Liquid Sewage and Sludge to Communities that have Sewer and Wastewater Treatment Facilities

There are multiple inaccuracies and incorrect assumptions in much of the data contained in the Technical Memorandums in regard to WCD and little evidence that the justifications listed above are present in WCD.

The Winter Canyon Treatment Plant that serves the Malibu Colony Plaza Shopping Center does not have a poor record of compliance with Regional Board Orders

Both Technical Memorandum #1 and Technical Memorandum #3 attempt to present the case that an important reason for the *Proposed* Prohibition in Winter Canyon is that there has been a poor record of compliance for dischargers in the Winter Canyon drainage as well as elsewhere in the MCC.

The Winter Canyon Treatment Plant [WCDTP] operated by Malibu Bay Company is permitted to discharge 45,000 gallons/day. This makes it one of the largest dischargers in Winter Canyon and the only one that requires disinfection. As required by the Regional Board's TSO R4-2003-0060, this plant was placed into service in the Fourth Quarter of 2006 after an 8 week start up period. Effluent is tested weekly in accordance with the WDR. Those results are reported quarterly to the Regional Board Staff along with a letter detailing other important operating information about the plant.

Table 1-4 and Table 3-1 purport to provide evidence of poor compliance with the Regional Board's WDR for the WCDTP. These Tables are inaccurate and misleading. Table 4 in Technical Memorandum #1 lists Malibu Colony Plaza and indicates a "Total Violation Count" of 62. The majority of these reported violations are simply due to an error made by Staff or the interns who assisted with the analysis of our quarterly reports and do not represent violations at all. As stated in the 4/24/09 NOV, Staff believed that the TSO required Malibu Bay Company to meet the discharge requirements in the WDR starting in January 2006. In fact, the Executive Director granted an extension to September 2006, a fact confirmed by a copy of the TSO Extension Letter that was attached to the NOV but apparently never reviewed by whoever compiled the list of violations. There are an additional 12 violations cited [late reporting by a few days] which are noted as "...minor violations..." in the Technical Staff Report Overview. These mistakes are presented as facts and an important justification for the *Proposed* Prohibition.

The mistaken belief that the discharge requirements were in effect in the first three quarters of 2006 lead to another misrepresentation of data which is contained in Technical Memorandum #3 *Table 1: End-of-Pipe Effluent Bacteria Densities reported*

for permitted Malibu Civic Center Commercial Facilities with Disinfection. Here the Staff cites Malibu Colony Plaza as an example of a system "...where disinfection has high failure rates..." and references levels of "Total", "Fecal" and "Enterococcus" which exceed "...the water quality objectives for protection of body contact recreation." While this data appears correct, it is inaccurate to imply that these bacteria levels indicate a disinfection failure because during this time period, no disinfection was required.

I have attached a detailed letter dated October 4, 2009, from IPC, the operator of the WCDTP, which reviews our exemplary compliance record. While our record is not perfect, we believe it is at least equal to or even better than the plant operators who manage the typical Community Wastewater Plants presented in the Program Alternatives found the Environmental Staff Report.

In short, Staff has not presented any substantial evidence that dischargers in Winter Canyon have a poor record of compliance and therefore, presents no justification for the imposition of the *Proposed* Prohibition.

Winter Canyon is not a potential source of drinking water and the application of the water quality standards for drinking water to this groundwater basin is flawed.

Technical Memorandum #2 seeks to make the case that pathogen and nitrogen contamination in excess of the limits for drinking water in the MCC, including the separate WCD, is caused by wastewater disposal. The memo concludes that this wastewater disposal needs to be eliminated or reduced. This analysis is flawed, since drinking water wells in WCD are unsustainable.

The Memorandum begins with a reference to the *Basin Plan* and alleges that "...it designates this area [the entire MCC] as having a Potential Beneficial Use for Municipal and Domestic Supply [MUN] and Industrial Supply [IND]." [t2-1]. While this is apparently true for some parts of the MCC, as indicated earlier Winter Canyon is a separate groundwater basin and is not designated as "MUN" in the *Basin Plan.*

Reference is correctly made to the fact that groundwater in the MCC is not currently a source of drinking water but goes on to assert that there is a history of drinking water wells up until the early 1960s. While this may be true in some parts of the MCC it is not the case for Winter Canyon. There is no evidence presented that shows the presence of drinking water wells in Winter Canyon. In fact, development in Winter Canyon did not begin until after the arrival of imported drinking water in 1963.

Finally, and most importantly, the use of drinking water wells in Winter Canyon is not sustainable and therefore the use of drinking water quality standards is inappropriate. A detailed hydrological analysis of the WCD is contained in both the 2004 Stone report as well as in Earth Consultants International's September 19, 2009 letter referenced earlier.

These sources agree and Staff concurs that significant groundwater recharge comes from the wastewater disposal that occurs in Winter Canyon.

The objective of the *Proposed* Prohibition is elimination of all or at least a significant portion of this recharge. If this happens the current groundwater levels will drop considerably, causing even more saltwater intrusion into the aquifer at Malibu Road. More importantly, extracting groundwater, without the beneficial recharge from wastewater disposal, will quickly drain the aquifer as there is negligible natural recharge. Therefore Winter Canyon is not a feasible source for drinking water wells.

There is no relevant evidence that there is any exceedance of Pathogens or Nitrogen limits for Water Contact Recreation is caused by wastewater disposal in the WCD.

As noted above, it is clear that the WCD is a separate groundwater basin separated from the greater Civic Center area by a bedrock ridge. The only hydrologic connection to surrounding areas is from the "long shore currents" which intermittently move ocean water from Amarillo Beach toward the Lagoon and Surfrider Beach. While a number of surrounding beaches are on the list of the Clean Water Act Section 303(d) *List of Impaired Water Bodies*, Amarillo Beach is not. No evidence of any impairment to the waters at Amarillo Beach is presented in any of the Technical Memorandum. This is to be expected since the impaired adjacent beaches are fed by separate groundwater basins. Each groundwater basin has distinct hydrology, geology and wastewater disposal influences.

There are a number of unique characteristics of the WCD that are important to the analysis of the role wastewater plays in causing pathogen and nitrogen impairment to water contact recreation. First, as shown in the 2004 Stone Report, groundwater travel times significantly exceed the accepted 6 month period that bacteria can survive. Groundwater travel time in the WCD is estimated to be a minimum of 3 to 5 years and even longer for the upper portion of the drainage. The WCDTP treats high strength commercial effluent. It is a significant source of wastewater disposal in the WCD and the closest large source to the ocean. Since the 2006 completion of a new treatment facility that provides disinfection in 2006, this plant has routinely treated its effluent to levels significantly below the bacteria standards for water contact recreation and this is at the source, not the canyon mouth at the ocean.

Technical Memorandum #2 includes water quality data from the 2004 Stone Report taken for the period April 2003 through March 2004. Among the numerous test results presented are the test results taken from the SMBRP-11 [t2-67], the groundwater well located in Malibu Road at the lower end of the Winter Canyon aquifer. The location of this well is important in being able to assess whether or not bacteria from WCD wastewater disposal could be the source of bacteria impairment at Malibu Beach, Surfrider Beach and the Malibu Lagoon. While the 2003-2004 tests show some bacteria

levels well above the REC-1 limits we believe these results are now out of date. Since the Winter Canyon Treatment Plant was upgraded in 2006 to include disinfection, the earlier results are no longer reflective of the current conditions. Also, since the 2004 Stone test results were taken, a large Animal Hospital and Boarding facility nearby [23915 Malibu Road] has closed and the building is scheduled to be demolished and replaced with four homes which will have their own advanced wastewater treatment plant.

To test our hypothesis we had SMBRP-11 and three up gradient wells tested a few days ago. The test results are shown in the attached October 7, 2009 letter from Earth Consultants International. They clearly demonstrate that there is no bacterial impact from wastewater disposal in the WCD.

As previously referenced, Technical Memorandum #4 indicates that the WCD is not a source of Nutrients which contribute to impairments found in the Malibu Lagoon or Surfrider Beach.

Lastly, we believe Technical Memorandum #4 contains a typographical error when it states, "Most of the wastewater discharged in Winter Canyon is assumed to discharge to *Malibu Beach"* [t4-9]. We believe the author meant to cite *Amarillo Beach* as the discharge point for Winter Canyon because there is ample evidence of this in the 2004 Stone Report and the 9/18/09 Earth Consultants International letter cited above. If indeed the author meant *Malibu Beach* then that assumption is not supported by any evidence and is in fact contradicted by ample evidence that Winter Canyon discharges to Amarillo Beach.

Wastewater disposal flows in Winter Canyon have shown a net reduction not a net increase. Also, the hauling of liquid sewage and sludge from the WCDTP does not indicate the existence of unsuitable hydrologic conditions.

Technical Memorandum #5 points to the significant increases in the volume of wastewater disposal between 2004 and 2008 in the MCC and concludes that the capacity of the groundwater basin to properly handle wastewater disposal has been compromised as a result. It goes on to suggest this conclusion is confirmed by the amount of liquid sewage and sludge that is hauled. The effluent hauling volumes for the WCDTP shown represent the largest single contribution to the purported "...unsuitable hydrologic conditions..." alleged in Technical Memorandum #5. Both the data shown and the analysis are flawed.

Malibu Bay Company has submitted quarterly reports of effluent volumes for the WCDTP since the 4th Quarter of 2006. The effluent volumes presented in Appendix A [t5-12] for 2007 and 2008 are simply not correct. Since there are no reported effluent volumes prior to the 4th Quarter of 2006 the Table contains estimates for the years of

2004, 2005 and 2006. The footnotes to Appendix A indicates the estimate used for 2006 was arrived at by annualizing the reported 4th Quarter volume [i.e. multiplying the actual volume by 4]. Since there are significant seasonal variations in effluent flow simply annualizing the 4th Quarter flows does not result in an accurate estimate for the 2006 flows. There is no explanation of the methodology used for the 2004 and 2005 estimates. Staff has not responded to requests for an explanation how these estimates were prepared. Appendix A suggests there has been over a 1.5 million gallon increase in effluent volumes from 2004 to 2008. This data is not correct.

By analyzing the operating records from the lift station at Malibu Colony Plaza, IPC, the plant operator has assembled the actual effluent volumes for 2004, 2005 and the first three quarters of 2006. These flows were corroborated by examining actual water meter data from Water District #29 for Malibu Colony Plaza. The attached October 4, 2009 letter from IPC shows that contrary to the data in Appendix A the effluent flows at the WCDTP have actually declined by over 2 million gallons since 2004.

Appendix A also contains incorrect values for the "Annual Total Hauling" of the WCDTP. IPC has prepared a Table in its October 4th letter which compares the actual reported hauling volumes with the incorrect data presented in Appendix A. More importantly since completion of the new WCDTP, there have not been any disposal problems. In fact, to provide a margin of safety for the groundwater disposal system the WCDTP has 10 reserve seepage pits. If has never been necessary to utilize any of these reserve pits.

While increases in hauling volumes can indicate seepage pit failures in conventional primary treatment septic systems, such failures rarely occur in plants like the WCDTP that utilize advanced treatment processes. Fluctuations in hauling activities can occur for various reasons, including construction activities as is noted in Appendix A. IPC's letter provides detailed information on the hauling activities at the WCDTP. None of the hauling at this plant is the result of any problems in the groundwater disposal system.

As documented above, the Technical Memorandums contain inaccurate and misleading data, unsupported assumptions and flawed reasoning. They do not present any significant evidence that the Proposed Prohibition boundaries should include the WCD. Furthermore, there is no basis for the Statement of Overriding Consideration and Determination [Environmental Staff Report, page 23] as it pertains to Winter Canyon.

Please let us know if we can provide any addition information.

Very Truly Yours,

David Reznick

DR:ss
Enclosures

cc: Jim Thorsen, City of Malibu

INTEGRATED
PERFORMANCE
CONSULTANTS

October 4, 2009

David Reznick
Malibu Bay Company
23705 Malibu Road, Suite D-2
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SUBJECT: Errors in RWQCB Technical Memoranda for Winter Canyon WTP

Dear David,

In reviewing the Technical Memoranda presented by the RWQCB in support of their proposed ban on onsite wastewater treatment systems in Malibu, I have discovered many errors, which are important as they pertain to the evaluation of Winter Canyon WTP. The errors are detailed below:

Inaccurate Representation of Sewage Flows

Technical Memorandum #5 lists incorrect flow volumes for Winter Canyon. Representative sections containing the erroneous information has been cut and pasted below for reference:

Technical Memorandum #5: Page T5-12

Discharger	Year	Annual Total Hauled(gal)	Monthly Average (gal)	Annual Waste Flow (gal)	Daily Capacity (gal)	Monthly Capacity(gal)	Percent Annual Flow Hauled
Malibu Shores Motel							
	2004			647,928	2,500		
	2005			647,928	2,500		
	2006	6,500		631,629	2,500		
	2007			625,494	2,500		
	2008	3,000		706,767	2,500		
Malibu Colony Plaza							
*	2004	918,500	76,542	5,000,000	45,000	1,350,000	18.37
*	2005	752,450	62,704	5,000,000	45,000	1,350,000	15.05
*	2006	2,359,700	196,642	5,753,176	45,000	1,350,000	41.02
	2007	515,600	42,967	6,099,999	45,000	1,350,000	8.45
*	2008	625,500	104,250	7,616,840	45,000	1,350,000	8.21

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Malibu Colony Plaza

2004: Annual waste flow estimated to be 5 million gallons

2005: Annual waste flow estimated to be 5 million gallons

2006, Q4: Hauled volume estimated to be the same as Q3

2006: Annual waste flow estimated as four times the value reported in Q4 (the only quarter with data provided)

2008: Annual waste flow estimated as two times the sum of Q1 and Q2 (Q3 and Q4 waste flow data missing)

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The Annual waste flow estimates of 5 million gallons each year for 2004 and 2005 are inaccurate.

Records of sewage volumes pumped from Malibu Colony Plaza to Winter Canyon became available for the last four months of 2004 when a new flow meter was installed at the Malibu Colony Plaza pump station. The total volume pumped from September through December 2004 was 2,982,172 gallons. Assuming similar flow volumes for the first 8 months of the year, the total flow for 2004 would have been 8,946,516 gallons, so an estimate of 5,000,000 gallons is unjustifiably low. Further substantiating this assertion is the Malibu Colony Plaza water use record for 2004, which indicates a total potable water consumption of 13,126,161 gallons.

Records of sewage volumes pumped from Malibu Colony Plaza to Winter Canyon are available for the first 11 months of 2005. December 2005 flow meter data was lost due to a computer hard disk crash. Assuming similar flow volumes for December, the total flow for 2005 would have been closer to 11,753,171 gallons, so an estimate of 5,000,000 gallons is unjustifiably low. Further substantiating this assertion is the Malibu Colony Plaza water use record for 2005, which indicates a total potable water consumption of 11,743,673 gallons.

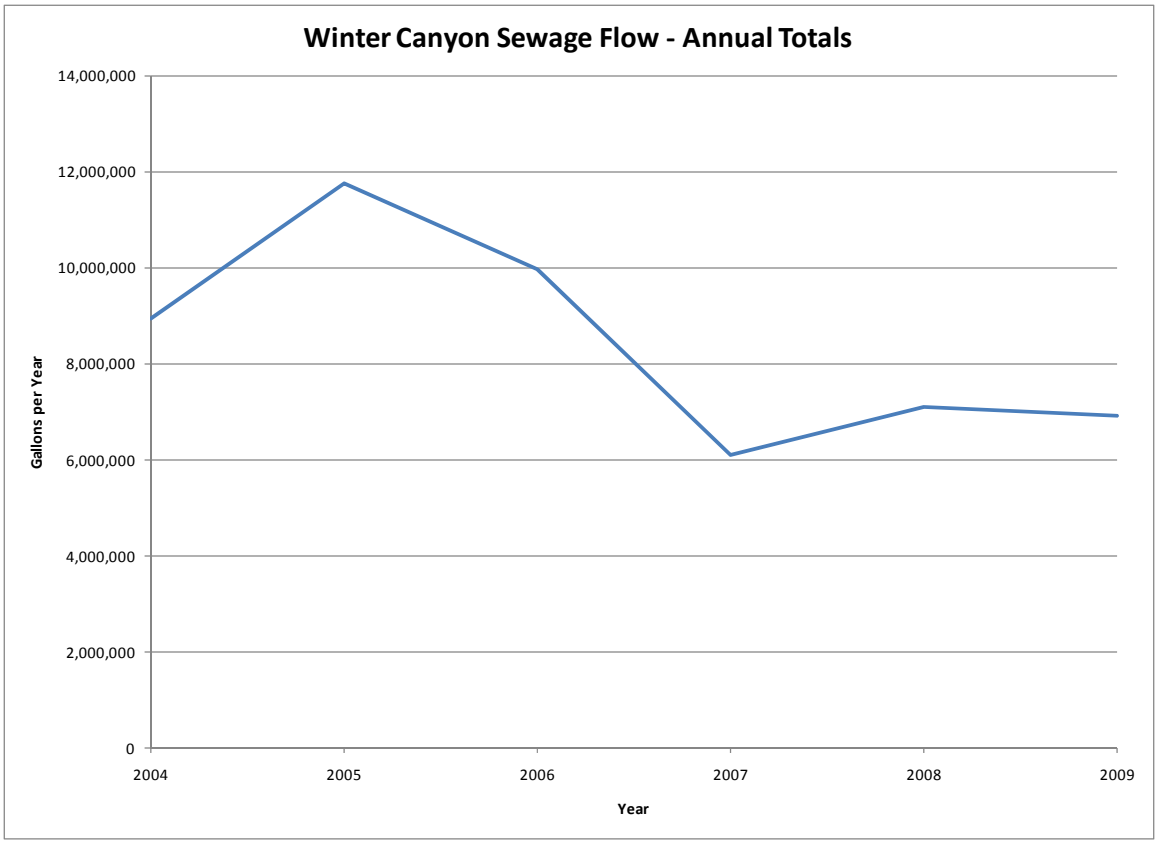
Records of sewage volumes pumped from Malibu Colony Plaza to Winter Canyon are available for all of 2006. Additionally, the new influent flow meter at Winter Canyon was placed into service in the last quarter or 2006 when the new treatment plant was finished. The metered influent sewage flow volume at Winter Canyon for the last quarter of 2006 was consistent with the flow values reported from the Malibu Colony Plaza pump station, indicating the validity of using Malibu Colony Plaza pump station flow data to determine Winter Canyon flows in previous years. Adding the first three quarters of flow data from Malibu Colony Plaza pump station to the last quarter of flow data at Winter Canyon yields an annual sewage flow of 9,962,321 gallons, so an estimate of 5,753,176 gallons is unjustifiably low

Taking the above information into account, the actual Winter Canyon influent sewage flow is summarized below:

YEAR	GALLONS
2004	8,946,516
2005	11,753,151
2006	9,962,321
2007	6,099,997
2008	7,099,977
2009	6,920,605

Note: 2009 total is projected from recorded flow through Q3.

Contrary to the general assertion in Technical Memorandum #5, subsurface discharge of OWTS effluent is not increasing. It is decreasing. This is easily seen in the graph provided below:



This is important because one element of the Technical Memoranda is that the prohibition is necessary because of an increase in discharge volumes from onsite wastewater treatment systems.

Inaccurate Representation of Hauled Volumes

Technical Memorandum #5 is similarly inaccurate in regard to reported volumes of sewage and sludge hauled off site from Winter Canyon for disposal. Our records differ significantly from those presented by the RWQCB, as indicated below:

HAULED VOLUMES

	RWQCB	ACTUAL
YEAR	*gal*	*gal*
2004	918,500	670,800
2005	752,450	752,450
2006	2,359,700	1,550,700
2007	515,600	515,600
2008	625,500	508,350
2009	No Data	250,000

Correcting the influent sewage and hauled volumes present a different picture than that portrayed in Technical Memorandum #5.

RATIO OF HAULING TO INFLUENT

	INFLUENT	HAULED	RATIO
YEAR	*gal*	*gal*	*%*
2004	8,946,516	670,800	7.50%
2005	11,753,151	752,450	6.40%
2006	9,962,321	1,550,700	15.57%
2007	6,099,997	515,600	8.45%
2008	7,099,977	508,350	7.16%
2009	6,920,605	250,000	3.61%

Note: The 250,000 gallons shown for 2009 on both tables immediately above is projected from the mid-year trend. System modifications were completed in the first quarter that allow sludge to be concentrated prior to hauling, resulting in a reduction in the volume hauled off site.

Some explanation of the hauled to influent ratio is important as it pertains to the general theme of the technical memoranda, which is that hauled volumes are increasing, and increasing hauled volumes are indicative of system failures.

The table above encompasses two distinct periods. The first period is prior to the fourth quarter of 2006, when there was only conventional treatment at Winter Canyon. Sewage was pumped to a large septic tank. Septic tank effluent was discharged to seepage pits and separated solids were hauled off site. The hauling to influent ratios shown above for the first period are typical for septic tanks serving high strength commercial systems, with the exception of the first three quarters of 2006. This was during installation of the new system, when additional volumes were pumped to accommodate construction.

The second period began in the fourth quarter of 2006, when the new treatment system was placed into service. Although the hauling to influent ratios for 2007 and 2008 are similar to the typical years of the first period (2004 and 2005), this is somewhat misleading because advanced treatment results in greater solids capture. Greater solids capture results in additional solids to haul. The only way to reduce the hauled volume is to provide a means of further concentrating solids prior to hauling. This was done in the first quarter of 2009, and the currently projected benefit is a 50% reduction in annual hauled volume.

Conclusion that the Disposal System is Failing

Technical Memorandum #5 cites increased hauling volumes as evidence that disposal systems are failing. Since the evidence is clear that hauled volumes are actually decreasing, this assertion is incorrect. In addition to the faulty overall premise, is the reality of the condition of the seepage pits at Winter Canyon WTP. Winter Canyon WTP has 75 seepage pits distributed among 15 zones. Zone flow distribution is precisely controlled by a sophisticated programmable logic controller, with level feedback. A high level in any zone disables flow to that zone until it is back within limits. Although this feature exists as a safety measure, it has never been invoked. No zone has ever been high since the new wastewater system was put into service. Zone water levels typically range between 10 and 25 feet below grade. Additionally, 2 of the 15 existing zones (10 total seepage pits) that were installed shortly before the new wastewater system was put into service have never even been used. The wastewater disposal system at Winter Canyon WTP is not failing. On the contrary, it is in excellent condition.

Inaccurate Representation of Disinfection Failures

Technical Memorandum #3 is incorrect in stating *"End-of-pipe bacteria measurements are reported for four permitted commercial sites in the Malibu Civic Center, where disinfection has high failure rate."*, on Page T3-2. The table that was provided to support this statement is shown below:

Technical Memorandum #5: Page T3-3

Table 1: End-of-Pipe Effluent Bacteria Densities (MPN/100mL) reported for permitted Malibu Civic Center Commercial Facilities with Disinfection.

Site	Total	Fecal	Enterococcus
Malibu Creek Preservation	1,600	350	46
	1,600	140	110
Malibu Beach Inn	Not measured	2	2
	Not measured	2	2
Malibu Colony Plaza	105	2	2
	4,000	2	2
	1,600	1,600	2,419
	1,600	1,600	2,419
Fire Station 88	1,600	1,600	2,419
	9,000	Not available	90,000
	24,000	24,000	24,000
	30,000	2,400	50,000
	240,000	Not available	240,000
	300,000	50,000	1,600,000

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The values shown for Malibu Colony Plaza are irrelevant. These values were obtained before there was treatment and disinfection. It's a foregone conclusion that end of pipe bacterial results will be high without treatment and disinfection, so representing this data as evidence of disinfection failures is not appropriate.

What is appropriate is a critical analysis of bacteria removal performance since the new wastewater system with disinfection was put into service. Since the treatment system was installed and started up, there have been only two results in excess of the limits. One was on 4/27/2007, when the maximum enterococcus limit of 104 was exceeded. The reported value was 190. The other was in August 2008, when the median enterococcus limit of 24 was exceeded. The reported value was 30. Both of these violations were noted in monitoring reports, along with the causes and corrective actions taken.

Since placing the treatment system into service, we have analyzed approximately 456 samples for the indicated bacteria, with only two limit exceedences. Contrary to the assertion in Technical Memorandum #3, this is an outstanding performance record, and it is certainly not evidence of chronic disinfection system failures.

Inaccurate Representation of Nitrogen Contribution to Malibu Lagoon

Technical Memorandum #4 attempts to determine the relative contribution of nitrogen to Malibu Lagoon from a number of sources in the Civic Center. In support of this, the following table is presented:

Technical Memorandum #5: Page T4-31

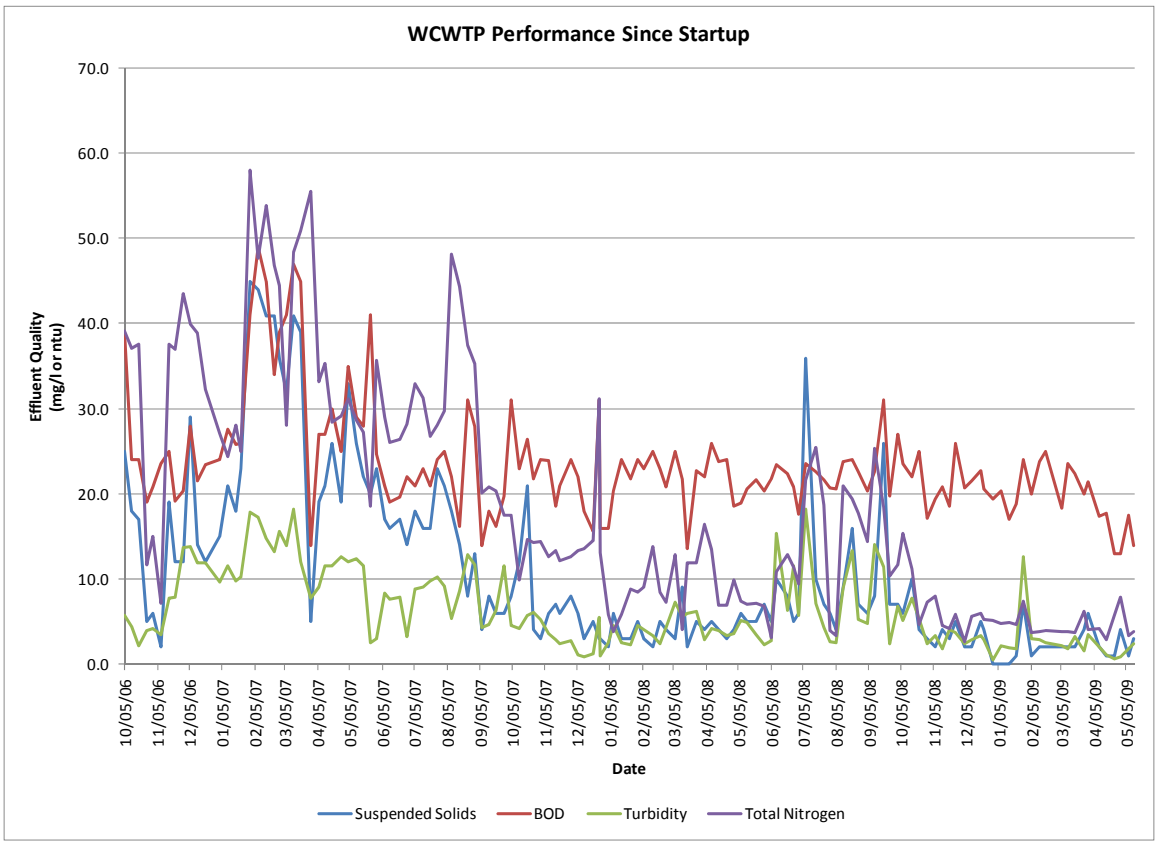
Table 3 Total Nitrogen Loading to the Lagoon After Adjustment of Flow and Leach Field Reduction

Sector/1	Discharge (gpd)	Estimated Percentage of Flow to Lagoon	Estimated Flow to Lagoon (gpd)	Effluent Concentration of Nitrogen (mg/L)	Depth to GW	Soil Type	Leach Field Reduction	Effluent Conc at the Lagoon (mg/L)	Nitrogen Load to the Lagoon (lb/day)
*HRL^ -3011 Malibu Cyn Rd	3,428	45%	1,542.6	45.0	>10	soil & bedrock	0%	45.0	0.58
L.A. Co. Main. Yard -3637 Winter Cyn Rd	252	1%	25.2	40.0	10	sand, sill & clay	20%	32.0	0.01
*Malibu Colony Plaza^^ -Disposal in Winter Cyn	16,617	1%	1,661.7	18.1	varies	sand & silt	0%	18.1	0.25
*Malibu WPCP^^ -3260 Vista Pacifica	22,500	1%	2,250.0	20.4	varies	sand & silt	0%	20.4	0.38
Webster Elementary^ -3962 Winter Cyn Rd	5,000	1%	500.0	75.0	15	sand & silt	20%	60.0	0.25
Our Lady of Malibu^ -3625 Winter Cyn Rd	2,500	1%	250.0	75.0		sand & silt	0%	75.0	0.16
Malibu Presbyterian Nursery School - 3324 Malibu Cyn Rd	1,500	45%	675.0	75.0		sand & silt	0%	75.0	0.42
Commercial - 7 Business Facilities	51,797		6,904.5						2.05
Residential 61 homes	17,800	45%	8,900.0	45.0				45.0	3.34
Total									5.39

*Seepage Pit Disposal or Failed Leachfield = 0% soil treatment
^Cafeteria food waste

The table indicates that Malibu Colony Plaza is weighted at 1%, meaning that only 1% of the flow from Winter Canyon is assumed to be travelling to Malibu Lagoon. This 1% assumption is also referenced in the text of the memorandum on Page T4-9. The table then proceeds to erroneously calculate based on 10%, probably due to an error in the spreadsheet formula. All sources that are supposed to be weighted at 1% show the same error, so the total nitrogen load from the Winter Canyon area is substantially overstated.

Additionally, the stated Total Nitrogen concentration of 18.1 is incorrect. To demonstrate this, I have cut and pasted a copy of a performance chart from my NOV response in May 2009:



This chart clearly indicates that Total Nitrogen (purple line) has been predominantly lower than 10 for the last two years, and closer to 5 for the last year. The Total Nitrogen concentration is closer to one third of the 18.1 value stated in Technical Memorandum #4. This improvement is a consequence of putting the new system in service and optimizing it through subsequent modifications and experience. Note that Winter Canyon WTP does not have a nitrogen limit, so the system was not designed with nitrogen removal in mind. Nonetheless, it is performing very well in this regard.

Summary

The Technical Memoranda argue that onsite systems should be banned in the Civic Center for various reasons and supply data to substantiate the premise. As the operator of one of the largest onsite systems in the Civic Center, Winter Canyon WTP – serving Malibu Colony Plaza, I have direct access to all data that has been collected and reported since operation of the new system began in Q3 2006. Comparison of the data I reported with the data presented in the Technical Memoranda indicates significant errors have been made in the RWQCB presentation. These errors should be corrected in the permanent record, since they portray Winter Canyon WTP as a contributor to the environmental problem in Malibu. This is not correct. Winter Canyon WTP is operating very reliably and at an unusually high level of efficiency for the employed technology.

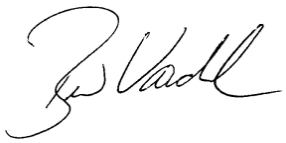
To summarize the main points:

1. Influent sewage flow to Winter Canyon WTP is not increasing. It is decreasing.
2. Hauled volumes of sludge and sewage from Winter Canyon WTP are not increasing. They are decreasing.
3. The disposal system at Winter Canyon WTP is not failing. It is in excellent condition.
4. Winter Canyon WTP does not suffer from chronic disinfection failures. The disinfection system is reliable and efficient.
5. Winter Canyon WTP does not contribute 0.25 lbs per day to Malibu Lagoon. The actual value is closer to 1/30th of that (10% flow volume error X 33% concentration error), or 0.08 lbs per day.

In light of these facts, Winter Canyon WTP cannot be portrayed as having any adverse impact on nitrogen loading in Malibu Lagoon or bacterial contamination in the Ocean.

Please feel free to contact me if you have any questions regarding this matter.

Sincerely,



Ric Vardel, IPC Inc.
Chief Plant Operator, License V-4467

Integrated Performance Consultants, Inc.
Contract Operator, License CO-0083

October 7, 2009

To: **AZ Winter Mesa LLC**
C/O Big Rock Partners, LLC
315 S. Beverly Drive, Suite 315
Beverly Hills, CA 90212
Attn: Mr. Robert Gold

and

Malibu Bay Company
23705 W. Malibu Road, Suite D2
Malibu, California 90265
Attn: Mr. David Reznick

Subject: Summary of groundwater sample collection from Winter Canyon monitoring wells on October 1, 2009

Introduction

Earth Consultants International (ECI) was retained by AZ Winter Mesa LLC and Malibu Bay Company to collect groundwater samples from 4 groundwater monitoring wells (TY-MW-1, TY-MW-5, MBCWC-MW-2 and SMBRP-11) on October 1, 2009. Monitoring wells TY-MW-1, TY-MW-5 and SMBRP-11 are screened in the shallow section of the unconfined aquifer in the lower reaches of Winter Canyon (south of Pacific Coast Highway). Monitoring well MBCWC-MW-2 is screened in a deeper section of the same aquifer. The deeper well is screened from a depth of approximately 65 feet below top of casing (btoc) to the bottom of the well (102 feet btoc).

Groundwater sampling from the above-referenced wells was conducted by ECI at the request of the above-referenced entities. It was reported to ECI that the goal of the sampling event was to collect groundwater quality data for the unconfined aquifer of the lower reaches of Winter Canyon. Groundwater samples collected from these wells were analyzed by a State of California-certified analytical laboratory for the following constituents; Boron, Chloride, Nitrate, Nitrite, Sulfate, Total Dissolved Solids (TDS), Total Coliform and Fecal Coliform. In addition to the laboratory analyses, ECI collected several water quality parameters in the field.

Field Activities

ECI personnel arrived at the Tow Yard site at approximately 12:30 PM on the afternoon of October 1, 2009. In order to collect groundwater samples that are representative of aquifer conditions ECI purged the wells prior to the collection of groundwater samples

that were sent to the analytical laboratory. Purging was conducted with the use of a 2-inch submersible water pump or polyethylene bailers, depending of the recharge conditions of the well.

Prior to purging of each well, groundwater levels (depth to groundwater) were collected from each well. Well purging consisted of removing of at least 2 well volumes from each well. A well volume consists of the volume of water within the saturated section of the well casing and the volume of water within the well pack (sand between the well casing and the borehole sidewalls). The well volume was calculated for each well prior to purging.

The first well that was purged and sampled on October 1, 2009 was monitoring well TY-MW-1. The depth to groundwater in this well was measured to be 28.10 feet btoc at 12:40 PM prior to purging. The water pump was set at a depth of 35 feet btoc at 12:45 AM. The pump was set at a pumping rate of approximately 1 gallon per minute (gpm). In order to determine when the well was properly purged of standing water, ECI began collecting water samples from the pump discharge line after 1 well volume (calculated to be 16 gallons of water). Water samples were collected after the purging of the following volumes of water; 1 well volume, 1.5 well volumes, 2 well volumes and 2.5 well volumes. Each of these water samples were analyzed for the following water quality parameters with the use of field equipment; temperature, TDS, Electrical Conductivity, pH and Salinity. These parameters were monitored in order to determine if the well was properly purged. The well was considered to be properly purged when subsequent parameter readings varied by less than 10%. The results of the field parameter monitoring for well TY-MW-1 are presented in Table 1 below. The maximum drawdown observed within the well during purging was 1 foot.

Table 1. Field Parameter Results for Well TY-MW-1

Volume Removed (well volume)	Time	Temperature °C	TDS (ppm)	Electrical Conductivity (µS)	pH	Salinity (ppt)
1	13:05	27.4	1,650	3,250	6.53	1.7
1.5	13:15	26.8	1,628	3,262	6.58	1.7
2	13:25	27.8	1,611	3,224	6.55	1.7
2.5	13:35	27.8	1,605	3,197	6.53	1.7

ppm – parts per million ppt – parts per thousand

After purging of the well was completed and the water level in the well had recovered to 80% of the initial level a water sample for the previously established analytes was collected with the use of a new 0.5 liter disposable polyethylene bailer. The water sample was transferred to laboratory-supplied containers with the use of the water removal tool provided with the bailer. The water sample was labeled as required by the analytical laboratory, placed in a zip-top bag and placed in a cooler with ice in preparation for transportation to the analytical laboratory (TestAmerica) in Colton, California.

After collecting a groundwater sample from monitoring well TY-MW-1, ECI personnel began the purging process of monitoring well TY-MW-5. At 2:30 PM ECI measured the depth to water in well TY-MW-5 to be 14.20 feet btoc. The pump was set a depth of 20 feet btoc at 2:35 PM. The pump was set at a pumping rate of approximately 1.7 gallons per minute (gpm). A well volume was determined to be approximately 12 gallons. The maximum drawdown observed within the well during purging was 1.2 feet. The results of the field parameter monitoring for well TY-MW-5 are presented in Table 2 below. A groundwater sample was collected for laboratory analysis after purging was completed.

Table 2. Field Parameter Results for Well TY-MW-5

Volume Removed (well volume)	Time	Temperature °C	TDS (ppm)	Electrical Conductivity (µS)	pH	Salinity (ppt)
1	14:45	26.0	1,972	3,970	6.49	2.1
1.5	14:49	24.8	1,967	3,941	6.49	2.1
2	14:53	24.9	1,988	3,935	6.55	2.1
2.5	14:58	24.6	1,992	3,999+	6.53	2.1

ppm – parts per million ppt – parts per thousand

After collecting a groundwater sample from monitoring well TY-MW-5, ECI personnel began the purging process of monitoring well SMBRP-11 on Malibu Road directly south of the Tow Yard site. At 3:40 PM ECI measured the depth to water in well SMBRP-11 to be 8.60 feet btoc. The pump was set a depth of 15 feet btoc at 3:45 PM. The pump was set at a pumping rate of approximately 1 gallon per minute (gpm). A well volume was determined to be approximately 12 gallons. After the removal of approximately 3 gallons from the well, the well pump stopped producing water. A water level measurement at that time revealed that the water level had dropped to the level of the pump. It was determined that the recharge from the aquifer to the well was much lower than 1 gallon per minute, so the purging method was modified. The pump was removed from the well and hand bailing was used to complete the well purging. It was determined that bailing rate would need to be less than 0.5 gallons per 5 minutes in order to keep the well from going dry. Hand bailing continued until approximately 6:55 PM in order to purge 2.5 well volumes from the well. The results of the field parameter monitoring for well SMBRP-11 are presented in Table 3 below. The field parameters revealed that the water quality conditions in the well were still changing after 2.5 well volumes were removed, but due to time constraints and lack of light, a groundwater sample was collected for laboratory analysis at this point.

Table 3. Field Parameter Results for Well SMBRP-11

Volume Removed (well volume)	Time	Temperature °C	TDS (ppm)	Electrical Conductivity (µS)	pH	Salinity (ppt)
1	16:40	23.9	1,501	3,004	7.30	1.6
1.5	17:20	21.9	1,428	2,830	7.16	1.5
2	17:55	22.1	1,271	2,536	7.09	1.3
2.5	18:55	21.8	1,178	2,362	7.37	0.6

ppm – parts per million ppt – parts per thousand

The purging of Well MBCWC-MW-2 was conducted simultaneously with the purging of Well SMBRP-11. At 4:25 PM ECI measured the depth to water in well MBCWC-MW-5 to be 19.20 feet btoc. The pump was set a depth of 80 feet btoc at 4:35 PM. The pump was set at a pumping rate of approximately 2 gallons per minute (gpm). A well volume was determined to be approximately 82 gallons. The maximum drawdown observed within the well during purging was 3.55 feet. The results of the field parameter monitoring for well MBCWC-MW-2 are presented in Table 4 below. A groundwater sample was collected for laboratory analysis after purging was completed.

Table 4. Field Parameter Results for Well MBCWC-MW-2

Volume Removed (well volume)	Time	Temperature °C	TDS (ppm)	Electrical Conductivity (µS)	pH	Salinity (ppt)
1	17:03	21.8	1,434	2,809	6.91	1.5
1.5	17:25	21.4	1,434	2,874	6.91	1.5
2	17:40	21.7	1,426	2,861	6.92	1.5
2.5	18:05	21.7	1,428	2,851	6.93	1.5

ppm – parts per million ppt – parts per thousand

Analytical Results

The groundwater samples collected from the above-referenced monitoring wells on October 1, 2009 were transported to TestAmerica Laboratories in Colton, California by ECI personnel under strict Chain-of-Custody protocol. The samples were kept in a cooler with ice during transportation and delivered to the laboratory at 8:47 AM on the morning of October 2, 2009.

TestAmerica issued two analytical reports for the groundwater samples on October 6, 2009. The Chain-of-Custody document appended to this report indicates that the samples were delivered intact and on ice, as required by the laboratory. The analytical results, as reported by the laboratory, are presented in Table 5 below.

Table 5. Analytical Results for Groundwater Samples

Analyte	MBCWC-MW-2	SMBRP-11	TY-MW-1	TY-MW-5	MCL
Boron (mg/l)	0.43	0.40	0.41	0.39	N/A
Chloride (mg/l)	**270**	**260**	**370**	**460**	250*
Nitrate (as N) (mg/l)	6.5	8.9	9.0	2.9	10
Nitrite (as N) (mg/l)	<0.30	<0.30	<0.75	<0.75	1
Sulfate (mg/l)	**690**	**470**	**490**	**1,000**	250*
TDS (mg/l)	**2,100**	**1,600**	**1,900**	**2,900**	500*
Total Coliform (MPN/100 ml)	<2.0	2.0	13	<2.0	
Fecal Coliform (MPN/100 ml)	<2.0	<2.0	<2.0	<2.0	

MCL – Maximum Contaminant Level for Drinking Water; *Secondary MCL; **Bold** – Above MCL; mg/l – milligram per liter; TDS-Total Dissolved Solids; MPN/100 ml) – Most Probable Number per 100 ml of sample (bacteria density)

The analytical results suggest that the aquifer waters do not meet Secondary drinking water standards due to elevated concentrations (above MCL) of chloride, sulfate and TDS. Additionally Total Coliform was detected in the groundwater samples collected from the northern-most and southern-most monitoring wells in the study area. The absence of Total Coliform in the groundwater samples collected from the two wells between the northern-most and southern-most monitoring wells suggest that Coliform entering the system from up gradient sources (north of Pacific Coast Highway) are removed before the groundwater reaches Malibu Road. The source of Coliform in the groundwater sample collected from Well SMBRP-11 appears to be the septic systems of homes directly south of Malibu Road.

Respectfully Submitted,

EARTH CONSULTANTS INTERNATIONAL, Inc.

Dr. W. Richard Laton, PG 7098
Senior Consultant

Otto Figueroa, PG 8351
Staff Consultant

Attachments: 1) Figure 1 Groundwater Sampling Location Map
2) Analytical Reports

Aerial Photo: USGS High Resolution State Orthoimagery for Los Angeles County, California, 2006.

Earth Consultants International

Project Number:
October 2009

Groundwater Sampling Location Map

Winter Canyon
Malibu, California

Figure 1

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

17461 Derian Avenue. Suite 100, Irvine, CA 92614 (949) 261-1022 Fax:(949) 260-3297

LABORATORY REPORT

Prepared For: Earth Consultants
1642 East Fourth St
Santa Ana, CA 92701
Attention: Otto Figueroa

Project: Winter Canyon

Sampled: 10/01/09
Received: 10/02/09
Issued: 10/06/09 17:08

NELAP #01108CA California ELAP#2706 CSDLAC #10256 AZ #AZ0671 NV #CA01531

SAMPLE CROSS REFERENCE

SUBCONTRACTED: Refer to the last page for specific subcontract laboratory information included in this report.

ADDITIONAL INFORMATION: This is a complete final report.

LABORATORY ID	CLIENT ID	MATRIX
ISJ0107-01	MBCWC-MW2	Water
ISJ0107-02	SMBRP-11	Water

Reviewed By:

TestAmerica Irvine

Pat Abe
Project Manager

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Santa Ana, CA 92701
Attention: Otto Figueroa

Project ID: Winter Canyon
Report Number: ISJ0107

Sampled: 10/01/09
Received: 10/02/09

METALS

Analyte	Method	Batch	Reporting Limit	Sample Result	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: ISJ0107-01 (MBCWC-MW2 - Water)								
Reporting Units: mg/l								
Boron	EPA 200.7	9J05050	0.050	**0.43**	1	10/5/2009	10/5/2009	
Sample ID: ISJ0107-02 (SMBRP-11 - Water)								
Reporting Units: mg/l								
Boron	EPA 200.7	9J05050	0.050	**0.40**	1	10/5/2009	10/5/2009	

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Project Manager

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Project ID: Winter Canyon
Report Number: ISJ0107

Sampled: 10/01/09
Received: 10/02/09

INORGANICS

Analyte	Method	Batch	Reporting Limit	Sample Result	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: ISJ0107-01 (MBCWC-MW2 - Water)								
Reporting Units: mg/l								
Chloride	EPA 300.0	9J02058	25	**270**	50	10/2/2009	10/2/2009	
Nitrate-N	EPA 300.0	9J02058	0.22	**6.5**	2	10/2/2009	10/2/2009	
Nitrite-N	EPA 300.0	9J02058	0.30	ND	2	10/2/2009	10/2/2009	RL1
Sulfate	EPA 300.0	9J02058	25	**690**	50	10/2/2009	10/2/2009	
Total Dissolved Solids	SM2540C	9J05007	10	**2100**	1	10/5/2009	10/5/2009	
Sample ID: ISJ0107-02 (SMBRP-11 - Water)								
Reporting Units: mg/l								
Chloride	EPA 300.0	9J02058	25	**260**	50	10/2/2009	10/2/2009	
Nitrate-N	EPA 300.0	9J02058	0.22	**8.9**	2	10/2/2009	10/2/2009	
Nitrite-N	EPA 300.0	9J02058	0.30	ND	2	10/2/2009	10/2/2009	RL1
Sulfate	EPA 300.0	9J02058	25	**470**	50	10/2/2009	10/2/2009	
Total Dissolved Solids	SM2540C	9J05007	10	**1600**	1	10/5/2009	10/5/2009	

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Attention: Otto Figueroa

Project ID: Winter Canyon
Report Number: ISJ0107

Sampled: 10/01/09
Received: 10/02/09

COLIFORMS BY MULTIPLE TUBE FERMENTATION - MPN (SM9221/40 CFR 141.21(f)(6)(i))

Analyte	Method	Batch	Reporting Limit	Sample Result	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: ISJ0107-01 (MBCWC-MW2 - Water)								
Reporting Units: MPN/100 ml								
Total Coliform	SM9221 A,B,C,E	C9J0506	2.0	ND	1	10/2/2009	10/4/2009	
Fecal Coliform	SM9221 A,B,C,E	C9J0506	2.0	ND	1	10/2/2009	10/4/2009	
Sample ID: ISJ0107-02 (SMBRP-11 - Water)								
Reporting Units: MPN/100 ml								
Total Coliform	SM9221 A,B,C,E	C9J0506	2.0	**2.0**	1	10/2/2009	10/6/2009	
Fecal Coliform	SM9221 A,B,C,E	C9J0506	2.0	ND	1	10/2/2009	10/5/2009	

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Attention: Otto Figueroa

Project ID: Winter Canyon
Report Number: ISJ0107

Sampled: 10/01/09
Received: 10/02/09

SHORT HOLD TIME DETAIL REPORT

	Hold Time (in days)	Date/Time Sampled	Date/Time Received	Date/Time Extracted	Date/Time Analyzed
Sample ID: MBCWC-MW2 (ISJ0107-01) - Water					
EPA 300.0	2	10/01/2009 18:10	10/02/2009 08:47	10/02/2009 14:00	10/02/2009 14:37
SM9221 A,B,C,E	0	10/01/2009 18:10	10/02/2009 08:47	10/02/2009 09:26	10/04/2009 09:50
Sample ID: SMBRP-11 (ISJ0107-02) - Water					
EPA 300.0	2	10/01/2009 19:15	10/02/2009 08:47	10/02/2009 14:00	10/02/2009 14:51
SM9221 A,B,C,E	0	10/01/2009 19:15	10/02/2009 08:47	10/02/2009 09:26	10/05/2009 08:16

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Attention: Otto Figueroa

Project ID: Winter Canyon
Report Number: ISJ0107

Sampled: 10/01/09
Received: 10/02/09

METHOD BLANK/QC DATA

METALS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 9J05050 Extracted: 10/05/09										
Blank Analyzed: 10/05/2009 (9J05050-BLK1)										
Boron	ND	0.050	mg/l							
LCS Analyzed: 10/05/2009 (9J05050-BS1)										
Boron	0.510	0.050	mg/l	0.500		102	85-115			
Matrix Spike Analyzed: 10/05/2009 (9J05050-MS1)					**Source: ISJ0107-01**					
Boron	0.966	0.050	mg/l	0.500	0.434	106	70-130			
Matrix Spike Dup Analyzed: 10/05/2009 (9J05050-MSD1)					**Source: ISJ0107-01**					
Boron	0.930	0.050	mg/l	0.500	0.434	99	70-130	4	20	

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Sampled: 10/01/09
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METHOD BLANK/QC DATA

INORGANICS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 9J02058 Extracted: 10/02/09										
Blank Analyzed: 10/02/2009 (9J02058-BLK1)										
Chloride	ND	0.50	mg/l							
Nitrate-N	ND	0.11	mg/l							
Nitrite-N	ND	0.15	mg/l							
Sulfate	ND	0.50	mg/l							
LCS Analyzed: 10/02/2009 (9J02058-BS1)										
Chloride	4.97	0.50	mg/l	5.00		99	90-110			*M-3*
Nitrate-N	1.15	0.11	mg/l	1.13		102	90-110			
Nitrite-N	1.52	0.15	mg/l	1.52		100	90-110			
Sulfate	9.95	0.50	mg/l	10.0		100	90-110			*M-3*
Matrix Spike Analyzed: 10/02/2009 (9J02058-MS1)					**Source: ISJ0110-01**					
Chloride	12.6	0.50	mg/l	5.00	7.64	98	80-120			
Nitrate-N	2.01	0.11	mg/l	1.13	0.916	97	80-120			
Nitrite-N	1.51	0.15	mg/l	1.52	ND	100	80-120			
Sulfate	37.8	0.50	mg/l	10.0	27.4	104	80-120			
Matrix Spike Analyzed: 10/03/2009 (9J02058-MS2)					**Source: ISJ0131-06**					
Nitrate-N	41.7	1.1	mg/l	11.3	30.5	99	80-120			
Nitrite-N	21.0	1.5	mg/l	15.2	ND	138	80-120			*M1*
Matrix Spike Dup Analyzed: 10/02/2009 (9J02058-MSD1)					**Source: ISJ0110-01**					
Chloride	12.5	0.50	mg/l	5.00	7.64	98	80-120	0	20	
Nitrate-N	2.03	0.11	mg/l	1.13	0.916	98	80-120	1	20	
Nitrite-N	1.54	0.15	mg/l	1.52	ND	101	80-120	1	20	
Sulfate	37.7	0.50	mg/l	10.0	27.4	102	80-120	0	20	

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Attention: Otto Figueroa

Project ID: Winter Canyon
Report Number: ISJ0107

Sampled: 10/01/09
Received: 10/02/09

METHOD BLANK/QC DATA

INORGANICS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 9J05007 Extracted: 10/05/09										
Blank Analyzed: 10/05/2009 (9J05007-BLK1)										
Total Dissolved Solids	ND	10	mg/l							
LCS Analyzed: 10/05/2009 (9J05007-BS1)										
Total Dissolved Solids	1000	10	mg/l	1000		100	90-110			
Duplicate Analyzed: 10/05/2009 (9J05007-DUP1)					**Source: ISJ0107-01**					
Total Dissolved Solids	2080	10	mg/l		2080			0	10	

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Sampled: 10/01/09
Received: 10/02/09

DATA QUALIFIERS AND DEFINITIONS

M1	The MS and/or MSD were above the acceptance limits due to sample matrix interference. See Blank Spike (LCS).
M-3	Results exceeded the linear range in the MS/MSD and therefore are not available for reporting. The batch was accepted based on acceptable recovery in the Blank Spike (LCS).
RL1	Reporting limit raised due to sample matrix effects.
ND	Analyte NOT DETECTED at or above the reporting limit or MDL, if MDL is specified.
RPD	Relative Percent Difference

TestAmerica Irvine

Pat Abe
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

17461 Derian Avenue. Suite 100, Irvine, CA 92614 (949) 261-1022 Fax:(949) 260-3297

Earth Consultants
1642 East Fourth St
Santa Ana, CA 92701
Attention: Otto Figueroa

Project ID: Winter Canyon
Report Number: ISJ0107

Sampled: 10/01/09
Received: 10/02/09

Certification Summary

TestAmerica Irvine

Method	Matrix	Nelac	California
EPA 200.7	Water	X	X
EPA 300.0	Water	X	X
SM2540C	Water	X	

Nevada and NELAP provide analyte specific accreditations. Analyte specific information for TestAmerica may be obtained by contacting the laboratory or visiting our website at www.testamericainc.com

Subcontracted Laboratories

TestAmerica - Ontario, CA *California Cert #1169, Arizona Cert #AZ0062, Nevada Cert #CA-242*

1014 E. Cooley Drive, Suite AB - Colton, CA 92324

Method Performed: SM9221 A,B,C,E

Samples: ISJ0107-01, ISJ0107-02

TestAmerica Irvine

Pat Abe
Project Manager

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CHAIN OF CUSTODY FORM

17461 Derian Ave., #100, Irvine, CA 92614 (949) 261-1022 FAX (949) 260-3297
1014 E. Cooley Dr., Suite A, Colton, CA 92324 (909) 370-4667 FAX (909) 370-1046
9830 South 51st St., Suite B-120, Phoenix, AZ 85044 (480) 785-0043 FAX (480) 785-0851
2520 E. Sunset Rd. #3, Las Vegas, NV 89120 (702) 798-3620 FAX (702) 798-3621

TAL-0013(1007)

ISJ0107 Page 1 of 1

Client Name/Address: ECI
1642 East 4th St.
Santa Ana, CA 92701

Project/PO Number: Winter Canyon

Project Manager: Pat Abe

Phone Number:

Sampler: Nick Napoli

Fax Number:

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Sampling Time	Preservatives	Analysis Required: TDS	Boron	Sulfate, Nitrate Nitrite, Chloride	Total Coliform 9221	Fecal Coliform 9221					Special Instructions
MBCWC-MW2	Ground water	500ml Poly	1	10/1/09	18:10		X									
MBCWC-MW2	"	"	1	10/1/09	18:10	Nitric Acid		X								
MBCWC-MW2	"	125ml Poly	1	10/1/09	18:10				X							
MBCWC-MW2	"	Bacti Bottle	1	10/1/09	18:10					X	X					Ground water
[redacted]																
SMBRP-11	Ground water	500ml Poly	1	10/1/09	19:15		X									
SMBRP-11	"	"	1	10/1/09	19:15	Nitric Acid		X								
SMBRP-11	"	125ml Poly	1	10/1/09	19:15				X							
SMBRP-11	"	Bacti Bottle	1	10/1/09	19:15					X	X					Ground water
																10.2.09 14:05

Relinquished By:	Date/Time:	Received By:	Date/Time:
	10/2/09 8:47	Michael Rosas	10.2.09 847
Michael Rosas	10.2.09 1255		
Relinquished By:	Date/Time:	Received By:	Date/Time:
		Received in Lab By:	Date/Time: 10/02/09 1255

Turnaround Time: (Check)
same day ____ 72 hours ____
24 hours ____ 5 days ____
48 hours X normal ____

Sample Integrity: (Check)
intact X on ice X

Note: By relinquishing samples to TestAmerica, client agrees to pay for the services requested on this chain of custody form and any additional analyses performed on this project. Payment for services is due within 30 days from the date of invoice. Sample(s) will be disposed of after 30 days.

#195

0.1°C
2.7°

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THE LEADER IN ENVIRONMENTAL TESTING

17461 Derian Avenue. Suite 100, Irvine, CA 92614 (949) 261-1022 Fax:(949) 260-3297

LABORATORY REPORT

Prepared For: Earth Consultants
1642 East Fourth St
Santa Ana, CA 92701
Attention: Otto Figueroa

Project: Tow Yard

Sampled: 10/01/09
Received: 10/02/09
Issued: 10/06/09 17:11

NELAP #01108CA California ELAP#2706 CSDLAC #10256 AZ #AZ0671 NV #CA01531

SAMPLE CROSS REFERENCE

SUBCONTRACTED: Refer to the last page for specific subcontract laboratory information included in this report.

ADDITIONAL INFORMATION: This is a complete final report.

LABORATORY ID	CLIENT ID	MATRIX
ISJ0108-01	MW-1	Water
ISJ0108-02	MW-5	Water

Reviewed By:

TestAmerica Irvine

Pat Abe
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

17461 Derian Avenue. Suite 100, Irvine, CA 92614 (949) 261-1022 Fax:(949) 260-3297

Earth Consultants
1642 East Fourth St
Santa Ana, CA 92701
Attention: Otto Figueroa

Project ID: Tow Yard
Report Number: ISJ0108

Sampled: 10/01/09
Received: 10/02/09

METALS

Analyte	Method	Batch	Reporting Limit	Sample Result	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: ISJ0108-01 (MW-1 - Water)								
Reporting Units: mg/l								
Boron	EPA 200.7	9J05050	0.050	**0.41**	1	10/5/2009	10/5/2009	
Sample ID: ISJ0108-02 (MW-5 - Water)								
Reporting Units: mg/l								
Boron	EPA 200.7	9J05050	0.050	**0.39**	1	10/5/2009	10/5/2009	

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Pat Abe
Project Manager

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Earth Consultants
1642 East Fourth St
Santa Ana, CA 92701
Attention: Otto Figueroa

Project ID: Tow Yard
Report Number: ISJ0108

Sampled: 10/01/09
Received: 10/02/09

INORGANICS

Analyte	Method	Batch	Reporting Limit	Sample Result	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: ISJ0108-01 (MW-1 - Water)								
Reporting Units: mg/l								
Chloride	EPA 300.0	9J02058	50	**370**	100	10/2/2009	10/2/2009	
Nitrate-N	EPA 300.0	9J02058	0.55	**9.0**	5	10/2/2009	10/2/2009	
Nitrite-N	EPA 300.0	9J02058	0.75	ND	5	10/2/2009	10/2/2009	RL1
Sulfate	EPA 300.0	9J02058	50	**490**	100	10/2/2009	10/2/2009	
Total Dissolved Solids	SM2540C	9J05007	10	**1900**	1	10/5/2009	10/5/2009	
Sample ID: ISJ0108-02 (MW-5 - Water)								
Reporting Units: mg/l								
Chloride	EPA 300.0	9J02058	50	**460**	100	10/2/2009	10/2/2009	
Nitrate-N	EPA 300.0	9J02058	0.55	**2.9**	5	10/2/2009	10/2/2009	
Nitrite-N	EPA 300.0	9J02058	0.75	ND	5	10/2/2009	10/2/2009	RL1
Sulfate	EPA 300.0	9J02058	50	**1000**	100	10/2/2009	10/2/2009	
Total Dissolved Solids	SM2540C	9J05007	10	**2900**	1	10/5/2009	10/5/2009	

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Pat Abe
Project Manager

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THE LEADER IN ENVIRONMENTAL TESTING

17461 Derian Avenue. Suite 100, Irvine, CA 92614 (949) 261-1022 Fax:(949) 260-3297

Earth Consultants
1642 East Fourth St
Santa Ana, CA 92701
Attention: Otto Figueroa

Project ID: Tow Yard
Report Number: ISJ0108

Sampled: 10/01/09
Received: 10/02/09

COLIFORMS BY MULTIPLE TUBE FERMENTATION - MPN (SM9221/40 CFR 141.21(f)(6)(i))

Analyte	Method	Batch	Reporting Limit	Sample Result	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: ISJ0108-01 (MW-1 - Water)								
Reporting Units: MPN/100 ml								
Total Coliform	SM9221 A,B,C,E	C9J0506	2.0	**13**	1	10/2/2009	10/6/2009	
Fecal Coliform	SM9221 A,B,C,E	C9J0506	2.0	ND	1	10/2/2009	10/5/2009	
Sample ID: ISJ0108-02 (MW-5 - Water)								
Reporting Units: MPN/100 ml								
Total Coliform	SM9221 A,B,C,E	C9J0506	2.0	ND	1	10/2/2009	10/6/2009	
Fecal Coliform	SM9221 A,B,C,E	C9J0506	2.0	ND	1	10/2/2009	10/5/2009	

TestAmerica Irvine

Pat Abe
Project Manager

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THE LEADER IN ENVIRONMENTAL TESTING

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Earth Consultants
1642 East Fourth St
Santa Ana, CA 92701
Attention: Otto Figueroa

Project ID: Tow Yard
Report Number: ISJ0108

Sampled: 10/01/09
Received: 10/02/09

SHORT HOLD TIME DETAIL REPORT

	Hold Time (in days)	Date/Time Sampled	Date/Time Received	Date/Time Extracted	Date/Time Analyzed
Sample ID: MW-1 (ISJ0108-01) - Water					
EPA 300.0	2	10/01/2009 14:00	10/02/2009 08:47	10/02/2009 14:00	10/02/2009 15:15
SM9221 A,B,C,E	0	10/01/2009 14:00	10/02/2009 08:47	10/02/2009 09:26	10/05/2009 08:16
Sample ID: MW-5 (ISJ0108-02) - Water					
EPA 300.0	2	10/01/2009 15:15	10/02/2009 08:47	10/02/2009 14:00	10/02/2009 15:30
SM9221 A,B,C,E	0	10/01/2009 15:15	10/02/2009 08:47	10/02/2009 09:26	10/05/2009 08:16

TestAmerica Irvine

Pat Abe
Project Manager

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THE LEADER IN ENVIRONMENTAL TESTING

17461 Derian Avenue. Suite 100, Irvine, CA 92614 (949) 261-1022 Fax:(949) 260-3297

Earth Consultants
1642 East Fourth St
Santa Ana, CA 92701
Attention: Otto Figueroa

Project ID: Tow Yard
Report Number: ISJ0108

Sampled: 10/01/09
Received: 10/02/09

METHOD BLANK/QC DATA

METALS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 9J05050 Extracted: 10/05/09										
Blank Analyzed: 10/05/2009 (9J05050-BLK1)										
Boron	ND	0.050	mg/l							
LCS Analyzed: 10/05/2009 (9J05050-BS1)										
Boron	0.510	0.050	mg/l	0.500		102	85-115			
Matrix Spike Analyzed: 10/05/2009 (9J05050-MS1)					**Source: ISJ0107-01**					
Boron	0.966	0.050	mg/l	0.500	0.434	106	70-130			
Matrix Spike Dup Analyzed: 10/05/2009 (9J05050-MSD1)					**Source: ISJ0107-01**					
Boron	0.930	0.050	mg/l	0.500	0.434	99	70-130	4	20	

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Project Manager

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Earth Consultants
1642 East Fourth St
Santa Ana, CA 92701
Attention: Otto Figueroa

Project ID: Tow Yard
Report Number: ISJ0108

Sampled: 10/01/09
Received: 10/02/09

METHOD BLANK/QC DATA

INORGANICS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 9J02058 Extracted: 10/02/09										
Blank Analyzed: 10/02/2009 (9J02058-BLK1)										
Chloride	ND	0.50	mg/l							
Nitrate-N	ND	0.11	mg/l							
Nitrite-N	ND	0.15	mg/l							
Sulfate	ND	0.50	mg/l							
LCS Analyzed: 10/02/2009 (9J02058-BS1)										
Chloride	4.97	0.50	mg/l	5.00		99	90-110			*M-3*
Nitrate-N	1.15	0.11	mg/l	1.13		102	90-110			
Nitrite-N	1.52	0.15	mg/l	1.52		100	90-110			
Sulfate	9.95	0.50	mg/l	10.0		100	90-110			*M-3*
Matrix Spike Analyzed: 10/02/2009 (9J02058-MS1)					**Source: ISJ0110-01**					
Chloride	12.6	0.50	mg/l	5.00	7.64	98	80-120			
Nitrate-N	2.01	0.11	mg/l	1.13	0.916	97	80-120			
Nitrite-N	1.51	0.15	mg/l	1.52	ND	100	80-120			
Sulfate	37.8	0.50	mg/l	10.0	27.4	104	80-120			
Matrix Spike Analyzed: 10/03/2009 (9J02058-MS2)					**Source: ISJ0131-06**					
Nitrate-N	41.7	1.1	mg/l	11.3	30.5	99	80-120			
Nitrite-N	21.0	1.5	mg/l	15.2	ND	138	80-120			*M1*
Matrix Spike Dup Analyzed: 10/02/2009 (9J02058-MSD1)					**Source: ISJ0110-01**					
Chloride	12.5	0.50	mg/l	5.00	7.64	98	80-120	0	20	
Nitrate-N	2.03	0.11	mg/l	1.13	0.916	98	80-120	1	20	
Nitrite-N	1.54	0.15	mg/l	1.52	ND	101	80-120	1	20	
Sulfate	37.7	0.50	mg/l	10.0	27.4	102	80-120	0	20	

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Pat Abe
Project Manager

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THE LEADER IN ENVIRONMENTAL TESTING

17461 Derian Avenue. Suite 100, Irvine, CA 92614 (949) 261-1022 Fax:(949) 260-3297

Earth Consultants
1642 East Fourth St
Santa Ana, CA 92701
Attention: Otto Figueroa

Project ID: Tow Yard
Report Number: ISJ0108

Sampled: 10/01/09
Received: 10/02/09

METHOD BLANK/QC DATA

INORGANICS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 9J05007 Extracted: 10/05/09										
Blank Analyzed: 10/05/2009 (9J05007-BLK1)										
Total Dissolved Solids	ND	10	mg/l							
LCS Analyzed: 10/05/2009 (9J05007-BS1)										
Total Dissolved Solids	1000	10	mg/l	1000		100	90-110			
Duplicate Analyzed: 10/05/2009 (9J05007-DUP1)					**Source: ISJ0107-01**					
Total Dissolved Solids	2080	10	mg/l		2080			0	10	

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Earth Consultants
1642 East Fourth St
Santa Ana, CA 92701
Attention: Otto Figueroa

Project ID: Tow Yard
Report Number: ISJ0108

Sampled: 10/01/09
Received: 10/02/09

DATA QUALIFIERS AND DEFINITIONS

M1	The MS and/or MSD were above the acceptance limits due to sample matrix interference. See Blank Spike (LCS).
M-3	Results exceeded the linear range in the MS/MSD and therefore are not available for reporting. The batch was accepted based on acceptable recovery in the Blank Spike (LCS).
RL1	Reporting limit raised due to sample matrix effects.
ND	Analyte NOT DETECTED at or above the reporting limit or MDL, if MDL is specified.
RPD	Relative Percent Difference

TestAmerica Irvine

Pat Abe
Project Manager

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17461 Derian Avenue. Suite 100, Irvine, CA 92614 (949) 261-1022 Fax:(949) 260-3297

Earth Consultants
1642 East Fourth St
Santa Ana, CA 92701
Attention: Otto Figueroa

Project ID: Tow Yard
Report Number: ISJ0108

Sampled: 10/01/09
Received: 10/02/09

Certification Summary

TestAmerica Irvine

Method	Matrix	Nelac	California
EPA 200.7	Water	X	X
EPA 300.0	Water	X	X
SM2540C	Water	X	

Nevada and NELAP provide analyte specific accreditations. Analyte specific information for TestAmerica may be obtained by contacting the laboratory or visiting our website at www.testamericainc.com

Subcontracted Laboratories

TestAmerica - Ontario, CA *California Cert #1169, Arizona Cert #AZ0062, Nevada Cert #CA-242*

1014 E. Cooley Drive, Suite AB - Colton, CA 92324

Method Performed: SM9221 A,B,C,E

Samples: ISJ0108-01, ISJ0108-02

TestAmerica Irvine

Pat Abe
Project Manager

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

CHAIN OF CUSTODY FORM

17461 Derian Ave., #100, Irvine, CA 92614 (949) 261-1022 FAX (949) 260-3297
1014 E. Cooley Dr., Suite A, Colton, CA 92324 (909) 370-4667 FAX (909) 370-1046
9830 South 51st St., Suite B-120, Phoenix, AZ 85044 (480) 785-0043 FAX (480) 785-0851
2520 E. Sunset Rd. #3, Las Vegas, NV 89120 (702) 798-3620 FAX (702) 798-3621

TAL-0013(1007)

ISJ0108 Page 1 of 1

Client Name/Address:
ECI
1642 East 4th st.
Santa Ana, CA 92701

Project/PO Number: Tow Yard

Project Manager: Pat Abe

Phone Number:

Sampler: Nick Napoli

Fax Number:

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Sampling Time	Preservatives	Analysis Required: TDS	Boron	Sulfate, Nitrate Nitrite, chlorite	Total Coliform 9221	Fecal Coliform 9221					Special Instructions
MW-1	Ground Water	500 ml Poly	1	10/1/09	2:00Pm		X									
MW-1	"	"	1	10/1/09	2:00pm	Nitric Acid		X								
MW-1	"	125 ml Poly	1	10/1/09	2:00 pm				X							
MW-1	"	Bacti Bottle	1	10/1/09	2:00pm					X	X					Ground water
MW-5	"	500ml Poly	1	10/1/09	3:15Pm		X									
MW-5	"	500ml Poly	1	10/1/09	3:15Pm	Nitric Acid		X								
MW-5	"	125ml Poly	1	10/1/09	3:15 Pm				X							
MW-5	"	Bacti Bottle	1	10/1/09	3:15 pm					X	X					Ground water

10.2.09 14:54

Relinquished By:	Date/Time: 10/2/09 8:47	Received By:	Date/Time: 10-2-09 847
Relinquished By:	Date/Time: 10-2-09 1255	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received in Lab By:	Date/Time: 10/02/09 1255

Turnaround Time: (Check)
same day ____ 72 hours ____
24 hours ____ 5 days ____
48 hours X normal ____

Sample Integrity: (Check)
intact X on ice X

Note: By relinquishing samples to TestAmerica, client agrees to pay for the services requested on this chain of custody form and any additional analyses performed on this project. Payment for services is due within 30 days from the date of invoice. Sample(s) will be disposed of after 30 days.

#195

0.1°c
2-7°

TestAmerica

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CHAIN OF CUSTODY FORM

17461 Derian Ave., #100, Irvine, CA 92614 (949) 261-1022 FAX (949) 260-3297
1014 E. Cooley Dr., Suite A, Colton, CA 92324 (909) 370-4667 FAX (909) 370-1046
[illegible] South 51st St., Suite B-120, Phoenix, AZ 85044 (480) 785-0043 FAX (480) 785-0851
2520 E. Sunset Rd. #3, Las Vegas, NV 89120 (702) 798-3620 FAX (702) 798-3621

Perchlorate 10/9/09 pr DF

TAL-0013(1007)

ISJ0108

Client Name/Address:
ECI
1642 East 4th st.
Santa Ana, CA 92701

Project/PO Number: Tow Yard

Project Manager: Pat Abe

Phone Number:

Sampler: Nick Napoli

Fax Number:

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Sampling Time	Preservatives	Analysis Required: TDS	Boron	Sulfate, Nitrate, Nitrite, Chloride	Total Coliform 9221	Fecal Coliform 9221					Special Instructions
MW-1	Ground Water	500 ml Poly	1	10/1/09	2:00Pm		X									
MW-1	"	"	1	10/1/09	2:00pm	Nitric Acid		X								
MW-1	"	125ml Poly	1	10/1/09	2:00 pm				X							
MW-1	"	Bacti Bottle	1	10/1/09	2:00pm					X	X					Ground water
MW-5	"	500ml Poly	1	10/1/09	3:15pm		X									
MW-5	"	500ml Poly	1	10/1/09	3:15pm	Nitric Acid		X								
MW-5	"	125ml Poly	1	10/1/09	3:15 pm				X							
MW-5	"	Bacti Bottle	1	10/1/09	3:15 pm					X	X					Ground water

10.2.09 14:54

Relinquished By:	Date/Time:	Received By:	Date/Time:	Turnaround Time: (Check)	
	10/2/09 8:47		10-2-09 847	same day ____	72 hours ____
Relinquished By:	Date/Time:	Received By:	Date/Time:	24 hours ____	5 days ____
michael Rosas	10-2-09 1255			48 hours X	normal ____
Relinquished By:	Date/Time:	Received in Lab By:	Date/Time:	Sample Integrity: (Check)	
			10/02/09 1255	intact X	on ice X

Note: By relinquishing samples to TestAmerica, client agrees to pay for the services requested on this chain of custody form and any additional analyses performed on this project. Payment for services is due within 30 days from the date of invoice. Sample(s) will be disposed of after 30 days.

#195

0.1c
2-7c

From: Rebecca Chou
To: GW permitting team; Phillips, Wendy; student assistant team; Villar, ...
Date: 10/8/2009 2:14 PM
Subject: Fwd: Proposed Prohibition and/or Moratorium Affecting 23901 Civic Center Way, Malibu

>>> "B O Z O" <DeleteMail@msn.com> 10/8/2009 1:58 PM >>>
R. L. Embree #346
23901 Civic Center Way
Malibu, California 90265

October 8, 2009

California Regional Water Quality Control Board - Los Angeles
c/o Wendy Phillips (wphillips@waterboards.ca.gov<mailto:wphillips@waterboards.ca.gov>)
320 W. 4th Street, Suite 200
Los Angeles, California 90013
Via Email & Facsimile (213) 576-5777
copy: Rebecca Chou via email

Re: Proposed Prohibition and/or Moratorium Affecting 23901 Civic Center Way, Malibu

Dear Los Angeles Regional Board and Staff,

I own a condominium and live at 23901 Civic Center Way, Malibu that is connected to a common, package sewage treatment facility in Winter Canyon at the corner of Vista Pacifica Street and De Ville Way. This professionally built facility exclusively serves existing residential condominium development and was rebuilt and upgraded recently to disinfection standard, currently operates by permit, and only discharges to ground. Los Angeles County professionally manages and operates the facility, and has done so for more than thirty years. I outline my comments below and request that the Board act to remove this facility from the proposed prohibition area for the following reasons:

EXISTING, UPGRADED PROFESSIONALLY-OPERATED PACKAGE TREATMENT FACILITY
In its upgraded and remodeled state, it has operated only approximately one-third of that proven cycle. Our units were assessed thousands of dollars for the $1.2 million upgrade, and continue to be assessed thousands of dollars annually for operation of this facility, which is operating fine and disinfecting its discharge underground. (There is no surface discharge permit for our common sewage treatment facility, unlike the adjacent facility at John Tyler Drive/Pepperdine's approved dumping into Marie Canyon/beach.)

RECORD OF SUCCESSFUL OPERATION
Our existing sewage treatment plant has not experiences disturbing or unacceptable operation since being rebuilt approximately 1999. Virtually no overflows, daylighting, repeat failures,

mismanagement, or non-responsive service or operation can be claimed for this modernized facility. Compared to similar package treatment facilities of its size, the performance record is exemplary.

WATERSHED

This package treatment facility is physically located in Winter Canyon, a watershed that does not drain to Malibu Creek or Lagoon. It does not drains to the Civic Center area, nor to an area with similar pollutant problems or levels of Malibu Lagoon, Surfrider Beach, or Malibu Pier. All ground discharge is within the Winter Canyon area.

DISTINCT AND DIFFERENT PERMIT, OPERATION, LANDFORM, AREA, AND BEACH

The flat, near-sea-level, commercially-zoned Civic Center developments and developable vacant properties, are distant from the properties served by the functioning, recently-rebuilt and upgraded package sewage treatment facility at Vista Pacific St and DeVille Way. There is no outfall from this plant, no surface discharge permit, no significant or reliable data from the unique and different stormwater runoff beach (Amarillo Beach), and the elevation of this facility (and all residential condominiums so connected) is uniquely different than anything in the Civic Center itself. The uses, compliance, issues, test area, data, and operation are COMPLETELY DIFFERENT THAN ANY OTHER OPERATING FACILITY OR PERMITTEE. Alleged north-to-south oceanic migration of pollutants acknowledges and injects doubt that pollutant sources may not be attributable to Winter Canyon residents, permitted ground dischargers, or even wildlife. Pepperdine's expansive grounds and known deer population has stormwater drainage and treated sewage discharge permitted to Marie Canyon, directly upcoast. Further, hundreds of beachfront septics' minimally treated discharges have exponentially-higher potential bacteria oceanic impact that has no logical or scientific nexus to the existing, Los Angeles County-operated sewage treatment plant serving the condominiums.

QUESTIONABLE AND INADEQUATE DATA

Due to no permitted discharge of treated/emergency overflow to the ocean, and no monitoring station near Winter Canyon's stormwater flow to Amarillo Beach, virtually no reliable data exists supporting a cause-and-effect relationship to oceanic bacteria level, or stormwater bacteria level (which could remain even if everything in Malibu were sewered.

The causes and types of bacteria and pollutants in Malibu Lagoon and Surfrider Beach are of a completely different signature and fingerprint than the northerly beaches. In our case, hundreds of beachfront homes, all using on-site septic discharge, inject a certain, known, and calculable level of failure completely unlike our existing, controlled, professionally-operated package sewage treatment plant and its less-significant, ground discharge in a canyon far away from the Lagoon and Surfrider Beach.

OVER-REACHING RESPONSE

Prohibition against discharge by this existing, functioning sewage treatment facility serving exclusively residential condominiums is disproportionate to the exemplary record of successful operation. This supports the assertion that this facility be excluded from any moratorium area. While other dischargers from other facilities do not share the high-level of sewage treatment

and/or successful operation by Los Angeles County engineers, those facilities should be categorized and dealt with appropriately.

THE BABY WITH THE BATHWATER

One hundred feet across the common street (Civic Center Way) a major shopping center constructed in the mid 1980's, has discharged similar quantities of sewage into pits for approximately two decades. That discharge was largely untreated for two decades, and the minimal treatment in effect today requires weekly pumping by several trucks on a given day. The odor suggest daylighting and/or repeated failures, ineffective equipment, and/or an ineffective conservation/effluent reduction plan to "live within their means" of disposal. On the other hand, I know personally that Malibu Canyon Village has reduced the quantity of discharge significantly for our approved development. For nearly 20 years, California has instituted programs and regulations for 1.6 gallon/flush toilets and low-flow showerheads. As these products are all that are available for sale and installation, the 200+ toilets, and sink aerators, showerheads, and dishwashers have virtually reduced per-person usage by 40%. As technology, DOE, and EPA regulations evolve, the potential for further reductions are certain and predictable. During the same 20 year period (1989 -2009) flows from the Malibu Colony Plaza/Malibu Bay Company to the minimally-treated septic pits did not reduce in any similar fashion, and one world-class restaurant in that shopping center, Granita, has been closed for at least the last five years, artificially lowering the significance of recent failures at the site of those pits. The RWQCB maintains jurisdiction over the Malibu Bay Company/Malibu Colony Plaza pits, and could issue a cease and desist order shutting-down the problem anytime in the last 20 years of ongoing, documented failures and enforcement action (or lack thereof). During the remodel of the restrooms at Ralphs Market three months ago, conventional, water-flush urinals remain. Why? Conversely, our existing package sewage treatment facility has only recently been targeted, with virtually all other permit holders, for relatively-minor, correctable issues, while we continue to conserve and implement water-saving technologies, such as rotary-style sprinklers installed in 2008, and prohibition on hand-washing vehicles.

ADDRESS THE MOST-EFFECTIVE, QUICKEST, AND COST-EFFICIENT OUTCOME

The fact that a "gross polluter" exists across the street at the Malibu Bay Company affords the RWQCB the biggest opportunity to achieve real, substantial, and significant reductions in both discharge quantity and quality in the immediate WINTER CANYON area. Although such improvements are technically incalculable for impact to Malibu Lagoon or Surfrider Beach (there is no outfall or permit from ground discharges within Winter Canyon area), the RWQCB is capable of similarly requiring that shopping center to install an on-site sewage treatment facility. Further, the physical location of the properties that generate that sewage, are all located in the Civic Center area (near sea level or within 20' of it) and some or all could be connected to the new sewage treatment plant being proposed by the City for Civic Center-area development of vacant property and existing shopping centers.

EXISTING PROFESSIONALLY-OPERATED ON-SITE LIFT STATION

Malibu Canyon Village completely rebuilt the lift station's operating equipment 2 years ago, upgrading to technology and estimated service life of more than 20 years. The high-quality upgrade in the 1980's lasted more than 25 years.)

HARDSHIP

Of the condominiums exclusively connected to this common package treatment plant, 79% were build in the in the 1960's, and 70's. Malibu Canyon Village's units average 900 square feet and are the most-affordable real estate housing available for miles around. Many of our residents are working-class, first-time property owners trying to make ends meet. My neighbors include teachers, service workers, clerks, students, salespersons, and retirees. The current burden of sewage assessments, combined with 5 special assessments of our Homeowner Association for repairs to our 30+ years old property average a total of $43,000. One of the assessments specifically replaced the pumps and modernized our lift station and re-piped our force main. Our Association contracts for professional operation of our lift station, and we have already paid exorbitant sums to rebuild and upgrade our existing, fully-functional package sewage treatment facility.

EQUITY AND FAIRNESS

The millions of dollars already invested in the existing sewage treatment facility, and individual Association's associated on-site equipment, would have to be added to the social cost of a sewer for the commercial Civic Center properties. Further, it is just flat out unfair and unjust to strangle the responsible condominium owners into subsidizing the major commercial shopping center properties, and future shopping center developers. Such could only be accomplished by breaking-up an existing assessment district, declaring an existing fully-functional treatment plant "dead", bulldozing it, and forcing the efficient condominium owners into a financial morass that would be of virtually no benefit over existing operations, at major expense, and of only marginal cost reduction to the Commercial Developers (based on a theory of economies of scale).

The proper solution is to:

1. Enforce the Malibu Bay Company/Malibu Colony Plaza Shopping Center to solve their sewage problems by means acceptable to the RWQCB. That action is between those two parties.

2. Enforce reductions of commercial dischargers where lack of conservation is evident, demonstrable, or where industry-available improvements are obviously not being implemented.

3. Embrace the City's proposal for a sewage treatment plant for commercial properties in the Civic Center, with potential for beachfront properties' connection.

4. Incorporate the data and findings of current studies of the immediate area that are already funded and underway, into effective solutions to achieve common goals by deferring consideration of moratorium until recent, relevant data is available.

5. Exclude from moratorium the existing dischargers under current RWQCB control that have demonstrable records of substantial compliance, or that have predicted/predictable level of compliance to known standards, and/or that currently disinfect all discharge. Such should include the existing, package sewage treatment plant located on Vista Pacifica St, commonly referred to as Malibu WWTP and/or the De Ville plant that treats Malibu Canyon Village and

neighboring condominiums. This can be implemented by altering the western boundary of the proposed prohibition area eastward, and/ or by specific reference to the above facility.

6. Exclude dischargers in the Winter Canyon watershed area from moratorium. This rebuilt package sewage treatment plant is currently permitted and regulated by RQWCB, and operated by Los Angeles County via existing assessment district.

Thank you for your consideration of the above.

Sincerely,

R. L. Embree

Morton M. Gerson
535 Ocean Avenue, #4-B
Santa Monica, California 90402
310-451-5122

October 2, 2009

10/6/09 Called Mr. Gerson re flow #s. MP (DR + RT)
David, SB - response?
⇒ Follow up re fee objection.

Rebecca Chou
California Regional Water Quality Control Board
320 W. 4th Street, Suite 200
Los Angeles, California 90013

Re: 23730 Malibu Road, Malibu, CA 90265
Parcels in Lot 1, Tract 12097
Your File No. 02-088

Dear Ms. Chou:

Last night I attended the Public Hearing for a proposed amendment to the Water Quality Control Plan to prohibit on-site wastewater disposal systems (OWDS) in the Malibu Civic Center area. After reflecting on the presentation by Wendy Phillips, the questions and comments by attendees and the responses of Staff, I have the following observations:

1. Everyone desires unpolluted ground water.

2. There seems to be a conflict as to whether or not the science used by the Board is accurate.

3. With respect to my property, the Board's published findings are incorrect.

   The Board states that my water usage is 400 GPD. My water bills, copies of which have been filed with the Board for the past 6 years, show that my building's water consumption averages far less than 200 GPD and this includes irrigation of landscapting.

   The Board states that 1% of my building's wastewater contributes to pollution in Malibu Lagoon. If in fact the building's discharge actually reaches the lagoon, the correct figure, based upon the Board's own calculations for the Malibu Civic Center area, is 0.004%.

   The Board states that my building's wastewater discharges directly to the ocean. This

is patently wrong as my building is located two houses, a road and a beach from the ocean and the waste does not flow into a water table.

4. The Board's suggestions for dealing with wastewater disposal is municipality/community based. There is no suggestion as to what an individual small property owner can do to meet the Board's objectives. It is draconian for the Board to impose its suggested prohibition on individual small property owners. Such a prohibition would be punitive as to individuals who have complied for years with existing law and who have no individual ability to provide for wastewater disposal as suggested by the Board. The Board's actions should be directed toward the City of Malibu and/or the County of Los Angeles, who have the ability to comply with the Board's mandates.

5. The Board has failed to disclose what penalties would be imposed upon property owners if compliance cannot be achieved by November 5, 2014. Since individual property owners are incapable of compliance along the lines suggested by the Board, they are dependent on the City of Malibu. In the event the City of Malibu does not have an approved wastewater disposal system in effect by November 5, 2014, it becomes important for individuals to know what penalties they are faced with. In my instance, I have a 3,300 sq. ft. office building. My tenant's lease expires next year and they would like a five year extension. How can I enter into a lease extension when I do not know to what extent I will be a victim of the proposed prohibition.

6. By the Board proposing to prohibit OWDSs knowing that individual small property owners cannot comply, as they have neither the ground nor financial resources to provide the wastewater disposal system suggested by the Board, it would seem that the Board is trying to impose a hardship on individual small property owners as leverage to obtain action by the City of Malibu.

I trust that my comments will be helpful to the Board in drafting an amendment that will facilitate achieving clean ground water but will not be oppressive to small property owners as is the current proposed amendment.

Very truly yours,

Morton M. Gerson

MMG l
cc. Wendy Phillips

DANIEL R. ALLEMEIER, Secretary and General Counsel

HRL Laboratories, LLC
3011 Malibu Canyon Road
Mail Station-RL85
Malibu, CA 90265
(310) 317-5851

October 6, 2009

California Regional Water Quality Control Board - LA
ATTN: Dr. Rebecca Chou
320 West 4th Street, #200
Los Angeles, CA 90013

Subject: Resolution No. R4-2009-xx – Proposed Prohibition on On-Site Wastewater Disposal Systems in the Malibu Civic Center Area

Dear Dr. Chou:

The California Regional Water Quality Control Board, Los Angeles Region's (CRWQCB-LA) goal of improving nitrogen and bacteriological groundwater and surface water quality in the Malibu Civic Center is a valuable goal that HRL Laboratories has and will continue to support. In an effort to achieve this goal, the CRWQCB-LA has prepared Proposed Resolution R4-2009-xx *Amendment to the Water Quality Control Plan for the Coastal Watersheds of Ventura and Los Angeles Counties to Prohibit On-site Wastewater Disposal Systems in the Malibu Civic Center Area* (July 31, 2009) (The Proposed Resolution).

In accordance with CRWQCB-LA public comment requirements, this letter transmits a summary of general comments relating to The Proposed Resolution. The comments summarized in this letter refer to specific sections of The Proposed Resolution and/or the underlying technical documents used to support The Proposed Resolution. Where applicable, the following restates the relevant portion of the referenced documents (*in italics*) and then provides a general comment.

The Proposed Resolution, Attachment A, Septic Systems, second bullet:

> *"All wastewater discharges from existing on-site wastewater disposal systems are prohibited five yers (sic) from the date of adoption by the Region (sic) Board of this Basin Plan amendment."*

Comment:

It is understood that CRWQCB-LA desires to have a schedule to measure progress on attaining its goal for the Malibu Civic Center Area. However, the five

year schedule appears to be overly optimistic. For example, a similar project in the Oxnard Forebay was initiated in 1999 and is still not complete over 10 years later. According to the "Schedule for Compliance with Proposed Prohibition" section of the Draft Environmental Staff Report (July 31, 2009), which is referenced in The Proposed Resolution, there is a potential for CRWQCB-LA to issue Cease and Desist Orders to dischargers operating under Regional Board Orders that specify waste discharge requirements (WDRs). This type of action would seriously impact business operations for the existing WDR permit holders.

There is general agreement that progress should be made toward implementing the solution, but setting overly optimistic schedules for project completion that are likely to be unachievable could have serious negative impacts on the Community if either Cease and Desist Orders for existing WDRs are issued or a broader-based ban on operation of existing on-site wastewater disposal systems (OWDSs) are enacted.

The Proposed Resolution, Attachment A, Septic Systems, third bullet:

> *"A specific wastewater discharge may be permitted if a discharger can demonstrate, to the satisfaction of the Executive Officer, that reuse, evaporation, and/or transpiration will use 100% of the wastewater generated by activities on a site, will not contribute to a rise in the water table, and will contain and properly handle any brines and/or off specification wastewaters that cannot be reused/discharged in a manner that meets water quality objectives established in the Basin Plan."*

Comment:

There is agreement that specific wastewater discharges should be conducted in a controlled fashion to meet the goal of improving nitrogen and bacteriological groundwater and surface water quality in the Malibu Civic Center Area. The referenced exemption is one way to achieve on-site reuse of wastewater discharge on a specific property. There are however, several specific considerations that should be included in the Resolution that will achieve the overall goal for the Basin.

1) The concept of 100% reuse of wastewater may be difficult to achieve during all times of the year. In fact, according to the "Options for Compliance Projects" section of the Draft Environmental Staff Report (July 31, 2009), both the Integrated Water Resources and the Decentralized Wastewater Management Facilities projects rely on subsurface disposal for approximately 50% of the treated wastewater. Drawing a parallel, the 100% reuse could be reduced to 50% reuse goal provided that the operator of the OWDSs can treat wastewater to meet acceptable nitrogen and bacteriological discharge standards to a reliability that is similar to existing publicly operated wastewater treatment facilities.

2) The concept of no rise in the water table should not apply to wastewater that meets acceptable nitrogen and bacteriological discharge standards in areas with favorable hydrogeologic conditions for subsurface disposal. The water table rise for OWDSs would tend to be smaller than the water table rise for either the alternate Integrated Water Resources or the Decentralized Wastewater Management Facilities Projects.

The Proposed Resolution, Attachment A, Exemptions:

Other than the exemption described in Bullet 3 above, there are no other exemptions provided for as part of the Proposed Resolution. During the October 1, 2009, Public Meeting, Ms Wendy Phillips indicated that the apparent failure of septic systems in the Malibu Civic Center Area is related to small lot sizes. She further indicated that effective treatment can be attained with larger lot sizes. Resolution 99-13 for the Oxnard Forebay prohibition recognizes this and provides an exemption for lots over 5 acres. The Proposed Resolution should be amended to include a similar exemption in considering lot size and should also include consideration for the minimum depth to groundwater.

The Proposed Resolution and Environmental Staff Report, Program Alternatives Section:

The State Water Resources Control Board has prepared proposed state-wide regulations for OWDSs including those for impaired water bodies (AB885). The Proposed Resolution and the Environmental Staff Report do not appear to reference the proposed state-wide regulation. Program Alternatives or The Proposed Resolution Exemptions should include exceptions for individual treatment systems such as those contemplated as part of proposed state-wide AB885 Regulations for OWDSs.

The CRWQCB-LA is thanked for providing an opportunity to comment, and HRL looks forward to continued involvement in the Proposed Resolution process. Your favorable consideration of our recommendations is appreciated.

Very truly yours,

From: Rebecca Chou
To: Allemeier, Daniel R
CC: Phillips, Wendy; Villar, Rosie
Date: 10/7/2009 4:14 PM
Subject: Re: HRL Laboratories Comments to Resolution No. R4-2009-xx

Hi, Daniel

Thank you very much for your comment. We will include your comment and our response for our board's consideration on November 5, 2009.

Rebecca Chou, Ph.D., P.E.
Chief of Groundwater Permitting Unit
California Environmental Protection Agency
Regional Water Quality Control Board - Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, CA 90013
Phone: (213) 620-6156
Cellular: (213) 305-2301
Fax: (213) 576-5777
Email: rchou@waterboards.ca.gov

>>> "Allemeier, Daniel R" <DRAllemeier@hrl.com> 10/7/2009 3:49 PM >>>
Dr. Chou:

Please find attached HRL Comments. A hard copy was also sent by courier.

Sincerely,

Daniel R. Allemeier
Secretary & General Counsel
HRL Laboratories, LLC

ROSS MORGAN & COMPANY, INC.

Property Management

Sherman Oaks Calabasas Valencia Palmdale

23901 Calabasas Road, Suite 2004
Calabasas, CA 91302
P.O. Box 8782, Calabasas, CA 91372
(Please forward all mail to P.O. Box address)
(818) 225-9191
(805) 581-4833
Fax (818) 591-3044

October 6, 2009

To: CA Regional Water Quality Control Board
Attn: Dr. Rebecca Chou
320 West 4th Street, #200
Los Angeles, Ca 90013
Via Email: rchou@waterboards.ca.gov
Via Facsimile: 213-576-5777

To Whom It May Concern,

Please be advised that Malibu Canyon Village Homeowners Association (MCV) located at 23901 Civic Center Way is opposed to the Proposed Prohibition for On- Site Wastewater Disposal System in the Malibu Civic Center Area.

The Board of Directors requests that Malibu Canyon Village be exempt from this prohibition and that the boundary line be moved east of our community. Malibu Canyon Village is currently part of the Maison DeVille Sewage Treatment Plant in which the homeowners of MCV have been paying for since the year 2000 as part of their property tax bill. The new proposed system does not directly benefit MCV in any capacity and would be a financial and logistical detriment to the community. MCV feel that the proposed prohibition is not necessary due to the fact that our current treatment plant is in compliance. Therefore why would the Regional Water Quality Control Board request that Malibu Canyon Village be included and connected to this new proposed system?

If you have any further questions regarding this issue as it pertains to Malibu Canyon Village please feel free to call Ross Morgan and Company at (818) 225-9191 Ext 113.

Thank you very much for your anticipated consideration,

Micah Eigler
Community Manager

PEPPERDINE UNIVERSITY

GOVERNMENTAL AND REGULATORY AFFAIRS

Dr. Rebecca Chou
Chief Groundwater Permitting Unit
California Regional Water Quality Control Board, Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, CA 90013

RE: Water Quality Control Plan for the Coastal Watersheds of Ventura and Los Angeles Counties to Prohibit On-site Wastewater Disposal Systems in the Malibu Civic Center Area, Resolution No. R4-2009-xx

Dear Dr. Chou:

This letter presents comments by Pepperdine University ("Pepperdine" or "University") to the proposed Amendment to the Water Quality Control Plan for the Coastal Watersheds of Ventura and Los Angeles Counties to Prohibit On-site Wastewater Disposal Systems in the Malibu Civic Center Area, Resolution No. R4-2009-xx (the "Resolution"). The proposed Resolution, which would amend the applicable Basin Plan, is aimed at prohibiting, within a specific boundary, on-site wastewater disposal systems ("OWDSs") that discharge wastewater directly into the subsurface. The Resolution purports to prohibit discharges from "individual/group septic/disposal systems in the Civic Center area."

We are concerned that a portion of our property is included within the boundary of the proposed prohibition area even though Pepperdine is not a discharger of wastewater, has no OWDSs, sends all of its wastewater to wastewater treatment facilities for tertiary treatment, and retains the resulting recycled water onsite for use in irrigation. Existing wastewater treatment capacity at both the Malibu Mesa Wastewater Reclamation Facility ("Malibu Mesa") and Tapia Water Reclamation Facility ("Tapia") is sufficient to meet the University's current and planned future wastewater needs. Since there is no reason to include the University within the prohibition boundary, we ask that the boundary be moved to avoid University.

If Pepperdine is not excluded, we ask that it be made absolutely clear that the wastewater discharge prohibition does not apply to the University's use of recycled water for irrigation, which has been undertaken since the Malibu campus opened in 1972. Pepperdine University has a long history of sustainable environmental practices and the cornerstone is our use of recycled water to irrigate campus landscaping. Pepperdine is a user of this tertiary treated recycled water, which is fully permitted pursuant to California Regional Water Quality Control Board, Order No 00-167 and Order No 94-055 (W.R.R.). (See, Attachment A, RWQCB Order No. 00-167).

While we believe it is the intent of the Regional Board to prohibit wastewater discharges to the subsurface from underground OWDSs or septic systems, we are concerned that the Basin Plan amendment may be wrongly interpreted to apply to Pepperdine's irrigation system. We ask that either Pepperdine be excluded from the prohibition boundary or specific language be placed

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in the Resolution, which makes it crystal clear that the use of recycled water is not a discharge of wastewater and is outside the reach of the Basin Plan amendment. Absent such specific language, the record of these proceedings should reflect that the use of recycled water for irrigation is outside the reach of the Basin Plan amendment.

A. Pepperdine Should Not Be Included Within The Prohibition Boundary

There is no reason to include any portion of the Pepperdine campus within the prohibition boundary. The proposed boundary appears to bisect several campus facilities so the rationale for including some portions of the campus is unclear. There is no development proposed in area within the proposed boundary in Pepperdine's Long Range Development Plan nor does the University have any current plans to develop that area. There is sufficient wastewater treatment capacity at Malibu Mesa and Tapia for all existing and future planned University development so there is no need or intent to tie in to any future sewer system infrastructure proposed for the Malibu area. To the extent that the prohibition boundary is intended to help define the area requiring future wastewater treatment infrastructure, that rationale is not applicable to the Pepperdine property.

Moreover, we understand from conversations with City of Malibu environmental manager Craig George that the funding of a future regional wastewater system does not include plans to seek financial contribution from the University. Nonetheless, we are concerned that our inclusion within the boundary could leave us potentially exposed to assessment for funding a regional wastewater system which the University does not need or intend to use. This would be an unfair result as the University has already undertaken to ensure responsible wastewater treatment through the construction of Malibu Mesa, connections to Tapia, and all related infrastructure for both systems.

We understand from RWQCB staff that the prohibition is not intended to affect Pepperdine's ongoing operations. Section Chief Wendy Phillips stated publicly in a presentation at the Pepperdine campus on October, 1 2009 that "while the prohibition boundary includes a portion of the Pepperdine campus, it is not anticipated to impact campus operations." If that is the case, then is there really any reason to include Pepperdine within the boundary at all? We suggest not and ask that the University be removed from within the prohibition boundary.

B. The Recycled Water Used By Pepperdine For Irrigation Is Not A Discharge Of Wastewater And Therefore Not Subject To The Proposed Prohibition

Pepperdine's recycled water use is not a discharge of wastewater subject to the prohibition under any reasonable reading of the Resolution. First, as distinguished within the language of the W.R.R. recycled water is not wastewater. In addition, the prohibition is intended to ban wastewater discharges to the subsurface and there are no subsurface discharges of any type at the University. Moreover, use of recycled water for conservation is in the public's best interest and should not be jeopardized by a prohibition intended to improve water quality.

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The Resolution amends a section entitled "Septic Systems" found in Chapter 4 of the Basin Plan. By its terms, the ban prohibits "on-site wastewater disposal systems (OWDSs)." These systems discharge wastewater to the subsurface. Water Code § 13290 defines "onsite sewage treatments systems" as follows: "Onsite sewage treatment systems" includes individual disposal systems, community collection and disposal systems, and alternative collection and disposal systems **that use subsurface disposal** (emphasis added)." This Water Code definition includes the OWDSs that are the subject of the Resolution and is evidence of its intent to affect subsurface wastewater discharges. Pepperdine's irrigation system cannot be considered an OWDS. The irrigation system does not discharge wastewater nor does it discharge directly to the subsurface. All of Pepperdine's wastewater is sent off-site to Malibu Mesa or Tapia for treatment and returned as tertiary treated recycled water.

By its very nature, Pepperdine's recycled water irrigation system is not a discharge or disposal of wastewater and it is certainly not a discharge to the subsurface. This is made clear by the Regional Board order that authorizes the irrigation program. The recycled water used by Pepperdine is tertiary treated and used consistent with the stringent requirements of the W.R.R., which Pepperdine is in full compliance with. The recycled water program includes careful monitoring via the hydrological monitoring program (HMP) in place since 1987. The W.R.R. contains stringent effluent limitations on the recycled water and distinguishes between wastewater and recycled. According to Pepperdine's hydrogeological consultants, the recycled water does not pose the same threat to water quality as wastewater from OWDSs. (See Attachment B, Letter from Daniel B. Stephens & Associates)

In fact, the State Water Resources Control Board's ("SWRCB") Recycled Water Policy ("Policy") recognizes that the use of recycled water consistent with the Policy is presumed to have a beneficial impact. The requirements of the W.R.R. and the HMP which implements the recycled water program management protocols are consistent with the practices for landscape irrigation projects as set forth in the Policy. The beneficial use of recycled water consistent with the W.R.R. and the Policy are strong evidence that Pepperdine's use of recycled water for irrigation is not disposal or discharge of wastewater intended to be regulated by the proposed Resolution. So, there is no on-site disposal of wastewater taking place on University property.

The thrust of the Resolution is to prohibit direct on-site discharges of wastewater to the subsurface. The Resolution includes conclusions that the discharges of wastewater from OWDSs (by definition on-site subsurface discharges) in the Civic Center area fail to meet water quality objectives and contribute to impairments of existing and potential beneficial uses of water resources. In contrast, the University's irrigation system spreads water on landscaping on the surface and is designed to minimize percolation through the subsurface through the implementation of its HMP. (See Attachment B) The HMP includes management techniques for recycled water use, which ensure that irrigation avoids, to the maximum extent possible, any contribution of irrigation water to the groundwater system underlying and surrounding the University. Pepperdine's Irrigation Services Staff use HMP data to prescribe only the amount of irrigation necessary to maintain healthy vegetation accounting for evapotranspiration. Due to these and a number of other factors as outlined in the attached letter from Daniel B. Stephens &

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Associates, it is unlikely that the use of recycled water for irrigation at Pepperdine is adversely impacting water quality in the Civic Center area.

Finally, it is in the public's best interest to ensure that responsible use of recycled water under stringent requirements and as verified by an HMP is continued as a substitute for potable water. California is facing yet another year of drought. Governor Schwarzenegger has declared a state of emergency. Likewise, Senator Pavley has stated that recycled water use is one of the answers to this growing crisis. Senator Pavley recently proposed SB 565 to the SWRCB to ensure that 50% of wastewater discharged to the ocean is recycled and reused by 2030. Pepperdine has been recycling wastewater and reusing it onsite since 1972. We respectfully request that the RWQCB's efforts to improve water quality not jeopardize the equally necessary water conservation efforts of institutions like ours who have conserved for decades.

Consequently, it would not be reasonable to conclude that the use of recycled water for surface irrigation by Pepperdine is a subsurface disposal of wastewater intended to be prohibited by the Resolution.

C. Conclusion

Based on the above, Pepperdine respectfully requests that its property be excluded from the boundary affected by the Resolution. In the absence of a boundary change, Pepperdine asks that language be included in the Resolution which specifically excludes the use of recycled water for irrigation from its reach to ensure the availability of water resources for future generations. At a minimum, the record should clearly reflect that recycled water used for irrigation is not disposal of wastewater and not impacted by the Resolution.

Thank you for your attention and we look forward to working with you to resolve our concerns.

Sincerely,

Rhiannon L. Bailard
Assistant Vice President, Governmental & Regulatory Affairs

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Attachment A

State of California
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, LOS ANGELES REGION

ORDER NO. 00-167

State Of California
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION

ORDER NO. 00-167

WASTE DISCHARGE REQUIREMENTS AND WATER RECYCLING REQUIREMENTS FOR COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS AND PEPPERDINE UNIVERSITY, MALIBU CAMPUS (Malibu Mesa Wastewater Reclamation Facility) (File No. 70-060)

The California Regional Water Quality Control Board, Los Angeles Region (Regional Board), finds:

1. The County of Los Angeles Department of Public Works (Recycler) operates and maintains the Malibu Mesa Wastewater Reclamation Facility (Reclamation Facility), located at 3863 Malibu Country Drive, Malibu, California (Figure 1). The Reclamation Facility has a design capacity of 0.2 million gallons per day (mgd) and has an approximate effluent flow of 0.177 mgd. The Recycler provides tertiary treatment producing effluent that complies with the water recycling requirements of Title 22 of the California Code of Regulations. The Recycler uses a portion of the recycled water for landscape irrigation of approximately 1.6 acres of the Reclamation Facility.

2. Pepperdine University (User) uses recycled water produced by the Recycler for landscape impoundment and landscape irrigation of approximately 126 acres of the approximately 300 developed acres of the Pepperdine University, Malibu Campus, located at 24255 Pacific Coast Highway, Malibu, California. The User operates and maintains the recycled water storage reservoirs and landscape irrigation facilities.

Regulation of Discharge

3. Section 13523 of the California Water Code provides that a Regional Board, after consulting with, and receiving the recommendations of the California Department of Health Services (CDHS), and after any necessary hearing, shall, if it determines such action to be necessary to protect the public health, safety, or welfare, prescribe Waste Discharge Requirements and Water Recycling Requirements for water which is used, or proposed to be used, as recycled water. Section 13523 further provides that such requirements shall include, or be in conformance with, the statewide recycling criteria.

4. The use of recycled water for landscape impoundment or for landscape irrigation at Pepperdine University, Malibu Campus could affect public health, safety and welfare, therefore, requirements for such use are needed in accordance with Section 13523 of the California Water Code.

October 30, 2000
Revised: November 9, 2000

5. Pursuant to Section 13523 of the California Water Code, the production and use of the recycled water are regulated under Water Recycling Requirements contained in Order No. 94-056, adopted by this Regional Board on June 13, 1994.

6. The amount of recycled water used for landscape irrigation at Pepperdine University varies with demand. During summer, approximately 0.3 mgd of recycled water is needed. At peak demand, approximately 70% of the recycled water used for irrigation is produced at the Reclamation Facility, and 30% is imported from the Las Virgenes Municipal Water District (Las Virgenes), Tapia Water Reclamation Facility (Tapia). The use of the recycled water from Tapia for irrigation is regulated under separate Water Recycling Requirements contained in Order No. 94-055, adopted by this Regional Board on June 13, 1994.

7. California Water Code Section 13263(e) provides that all waste discharge requirements shall be reviewed periodically, and, upon such review, may be revised by the Regional Board. Following a review of the requirements in Order No. 94-056, and inspections of the Reclamation Facility, storage reservoirs, and irrigation areas, this Order updates Order No. 94-056 and includes additional findings, effluent limitations, updated standard provisions, updated specifications for recycled water use, and an expanded monitoring and reporting program.

8. During the wet season (November 1 through April 15 of each year), when irrigated areas are saturated and the storage reservoirs are in imminent danger of overtopping, the recycled water is discharged (emergency discharge) either to Marie Canyon or an unnamed canyon adjacent to the Reclamation Facility. This emergency discharge is currently regulated under separate Waste Discharge Requirements and National Pollutant Discharge Elimination System (NPDES) permit contained in Order No. 94-027 (NPDES No. CA0059099), adopted by this Regional Board on April 4, 1994.

Reclamation Facility Description

9. The Reclamation Facility serves a population of approximately 3,360 persons at Pepperdine University and the Malibu Country Estates. All domestic wastewater generated by Pepperdine University is collected at the flow equalization station. The majority of the wastewater is then sent to the Reclamation Facility, and any portion of wastewater over 0.165 mgd is sent to Tapia. Domestic wastewater generated by Malibu Country Estates flows directly to the Reclamation Facility.

   All laboratory waste generated by Pepperdine University is stored in 55-gallon drums and hauled offsite to a legal point of disposal.

10. The Reclamation Facility provides primary, secondary and tertiary treatment, with disinfection by an ultraviolet system (Figure 2).

11. Primary treatment consists of the headworks with a comminutor and a bypass channel with bar screen. An influent flow meter is located after the bypass channel. Secondary treatment consists of the Walker Process packaged activated sludge plant that includes an aeration basin with coarse bubble diffusers, two aeration blowers (one of which is a stand-by), an aerobic digester, and a secondary sedimentation basin. Return activated sludge and waste activated sludge are pumped by airlift pumps. Tertiary treatment is provided through coagulation, rapid mix, flocculation, and sand filtration. Filtration consists of three continuous backwash Dynasand® filters.

12. Disinfection is provided by four ultraviolet lamps in series. The Recycler began using ultraviolet disinfection on June 12, 1998. The CDHS approved the use of the ultraviolet disinfection system in a letter dated February 5, 1998.

13. The waste activated sludge is aerobically digested and pumped to a centrifuge for partial dewatering. The dewatered, digested sludge is stored in a 10,000-gallon underground storage tank prior to hauling to the Donald C. Tillman Water Reclamation Facility located at 6100 Woodley Avenue, Van Nuys, California.

14. In the event of upsets or other operational emergencies at the Reclamation Facility, wastewater from Pepperdine University can be pumped to Tapia for treatment under an agreement between Pepperdine University and Las Virgenes. The wastewater from Malibu Country Estates can be diverted to the sludge storage tank and hauled to the Donald C. Tillman Water Reclamation Facility for treatment. In the event of a power failure the Recycler has an emergency diesel-powered generator onsite to prevent the discharge of raw or inadequately-treated sewage.

Landscape Impoundments and Irrigation Facility

15. Prior to distribution for landscape irrigation, recycled water is stored in two landscape impoundments (also known as reservoirs). The reservoirs have double 20-mil polyvinyl chloride liners to prevent percolation. From the reservoirs, the recycled water is pumped into the irrigation distribution system. The distribution system is divided into two pressure zones, a lower zone and upper zone. The lower zone irrigates the lower portion of the campus through four pressure regulators. In the upper zone, the recycled water is pumped to a 10,000-gallon underground storage tank, then distributed to the irrigation system for the upper portion of the campus by gravity flow.

16. In a letter dated July 21, 2000, the User informed the Regional Board that under normal conditions the reservoirs are maintained at an equivalent of 5.2 million gallons of water. The User further stated that to maintain the pumps in the reservoirs in proper working condition, the water level can only be lowered to an equivalent of 3.5 million gallons. The reservoirs' combined storage capacity is approximately 8 million gallons. However, previous documentation made available to the Regional Board indicates the reservoirs can be filled to a level equivalent to 12 million gallons. Therefore, in the tentative

requirements for the renewal of the emergency discharge permit (NPDES No. CA0059099), the User is required to conduct a survey to determine the actual storage capacity of the reservoirs.

17. During a meeting on October 25, 2000, the User informed the Regional Board that the survey had been completed. The User stated (and confirmed in a letter transmitted via facsimile on October 26, 2000) that the total storage volume of both reservoirs is approximately 8.4 million gallons at an elevation of 245.56 feet. To maintain proper operation of the pumps, the water level can only be lowered to an elevation of 239.0 feet, which is approximately 0.6 million gallons total volume for both reservoirs. In addition, three inches of freeboard (0.25 feet) should be left in each reservoir to accommodate wind generated waves, which is approximately 0.4 million gallons total volume for both reservoirs. Therefore, the available wet weather storage capacity is approximately 7.4 million gallons at an elevation of 245.31 feet. This is equivalent to approximately 40 days of wet weather storage capacity at 0.177 mgd average effluent from the Reclamation Facility.

18. In 1985, the User initiated a hydrogeologic monitoring program to provide information on the soil moisture conditions and groundwater levels of the irrigated areas, to ensure that the infiltration due to irrigation does not affect geologic stability. The User manages the landscape irrigation system based on this hydrogeologic monitoring program.

19. The hydrogeologic monitoring program uses two direct and two indirect methods to determine how much infiltration occurs beneath the irrigated areas, either as a result of irrigation or precipitation. One of the direct methods consists of measuring soil moisture content monthly in nine access casings from 3 feet to 20 feet below ground surface using a portable neutron probe. The other direct method is measuring the depth to groundwater monthly in 17 onsite monitoring wells and five offsite monitoring wells located south of Pacific Coast Highway. The indirect methods consist of mathematical calculations for water and salt balance equations. Some of the parameters required for the water and salt balance equations include, but are not limited to: rainfall; evaporation; transpiration; runoff; subdrain outflow; deep percolation; recycled water usage; soil moisture; groundwater levels; and groundwater and runoff conductivity.

20. The Reclamation Facility and landscape irrigation areas are located within the Corral Canyon Hydrologic Subarea of the Point Dume Hydrologic Area of the Malibu Hydrologic Unit (404.31). The Reclamation Facility and landscape irrigation areas are generally located in Section 30, T01S, R17W, San Bernardino Base and Meridian at the approximate latitude and longitude of 34° 2' 31" and 118° 42' 33", respectively.

21. The Regional Board adopted a revised *Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties* (Basin Plan) on June 13, 1994. The Basin Plan contains the designated beneficial uses and water quality objectives for the groundwater within the Point Dume area.

    The beneficial uses of the groundwater in the Point Dume area are:

    Existing: Municipal and domestic supply (MUN), and Agriculture.

    Potential: Industrial service supply.

    There is no current MUN use in the immediate area due to seawater intrusion and poor groundwater quality.

22. Based on data from the *Hydrogeologic Monitoring Program, Annual Report, Water Year 1997-98*, dated August 23, 1999, the recycled water does not infiltrate to groundwater. Therefore, groundwater quality monitoring is not required at this time. The User is required to continue implementing the hydrogeologic monitoring program. In the future, if the hydrogeologic monitoring demonstrates that the recycled water is infiltrating to the groundwater, then a groundwater quality monitoring program may be required.

23. This update of the Waste Discharge Requirements and Water Recycling Requirements for an existing facility is exempt from the provisions of the California Environmental Quality Act (Public Resources Code, Section 2100 et seq.) in accordance with California Code of Regulations, Title 14, Chapter 3, Section 15301.

The Regional Board has notified the Recycler and User and interested agencies and persons of its intent to revise Waste Discharge Requirements and Water Recycling Requirements for this discharge and has provided them with an opportunity to submit their written views and recommendations.

The Regional Board, in a public meeting, heard and considered all comments pertaining to the discharge and to the tentative requirements.

IT IS HEREBY ORDERED that the County of Los Angeles Department of Public Works and Pepperdine University shall comply with the following:

I. INFLUENT LIMITATIONS

A. Waste discharged to the Reclamation Facility shall be limited to domestic wastewater only. No water softener regeneration brines, laboratory chemicals, or industrial wastes shall be discharged to the Reclamation Facility.

B. The maximum daily flow of influent from the collection system to the headworks of the Reclamation Facility shall not exceed the design capacity of 0.2 mgd.

II. EFFLUENT LIMITATIONS

A. Recycled water shall at no time contain any substances in concentrations toxic to human, animal, plant or aquatic life.

B. Recycled water shall at no time contain any substances or agents that would produce offensive or unsightly conditions in the storage reservoirs or the irrigation areas.

C. Recycled water shall not contain pollutants in excess of the following limits:

Pollutant	Units	Monthly Average	7-Day Average	Daily Maximum
$BOD_5$20°C	mg/L	20	30	45
	lbs/day[1]	33	50	75
Suspended solids	mg/L	15	40	45
	lbs/day[1]	25	67	75
Oil and grease	mg/L	10	---	15
	lbs/day[1]	17	---	25
Total dissolved solids	mg/L	---	---	1,000
	lbs/day[1]	---	---	1,668
Chloride	mg/L	---	---	250
	lbs/day[1]	---	---	417
Sulfate	mg/L	---	---	250
	lbs/day[1]	---	---	417
Boron	mg/L	---	---	1.0
	lbs/day[1]	---	---	1.7
Total organic carbon	mg/L	---	---	20
	lbs/day[1]	---	---	33

D. Recycled water shall at all times be within the range of 6.5 to 8.5 pH units.

E. Recycled water shall not contain organic chemicals, inorganic chemicals (i.e., heavy metals, arsenic, or cyanide), or general minerals in concentrations exceeding the limits contained in the current California Drinking Water Standards, Title 22, Division 4, Chapter 15, Sections 64431, 64444, and 64449, of the California Code of Regulations, or subsequent revisions.

[1] The mass-based discharge limit is based on the design flow of 0.2 mgd and remains the same during storm events.

F. Radioactivity of the recycled water shall not exceed the limits specified in Title 22, Division 4, Chapter 15, Article 5, Sections 64441 and 64443, of the California Code of Regulations, or subsequent revisions.

III. RECYCLED WATER SPECIFICATIONS FOR LANDSCAPE IMPOUNDMENTS AND LANDSCAPE IRRIGATION

A. Recycled water used for irrigation of food crops, parks, playgrounds, schoolyards, residential landscaping, and unrestricted access golf courses shall at all times be adequately oxidized, coagulated, clarified, filtered, and disinfected domestic wastewater.

1. An oxidized wastewater means wastewater in which the organic matter has been stabilized, is nonputrescible, and contains dissolved oxygen.

2. A coagulated wastewater means an oxidized wastewater in which colloidal and finely divided suspended matter have been destabilized and agglomerated, upstream from a filter, by the addition of suitable floc-forming chemicals.

3. A filtered wastewater means an oxidized, coagulated, clarified wastewater that has been passed through natural undisturbed soils or filter media, such as sand, activated carbon, or diatomaceous earth, so that the turbidity as determined by an approved laboratory method does not exceed any of the following:

   (a) a daily average turbidity of 2 NTU;
   (b) 5 NTU more than 5% of the time during any 24-hour period; and,
   (c) 10 NTU at any time.

4. The wastewater shall be considered adequately disinfected if the 7 day median number of coliform organisms in the effluent does not exceed 2.2 per 100 milliliters, as determined from the bacteriological results of the last 7 days for which analyses have been completed, and the number of coliform organisms does not exceed 23 per 100 milliliters in more than one sample in any 30-day period. No sample shall exceed the number of coliform organisms of 240 per 100 milliliters.

B. Recycled water produced at the Reclamation Facility shall not be used for purposes other than for landscape impoundment and landscape irrigation until requirements for such purposes have been established by this Regional Board in accordance with Section 13523 of the California Water Code, or unless the Regional Board finds that the above-cited standards are applicable to those purposes.

C. There shall be no cross-connection between piping used for potable water supply and piping containing recycled water.

D. Recycled water uses shall meet the requirements specified in the *California Health Laws Related to Recycled Water*, 1st Edition, dated January 1, 1998, issued by the CDHS.

E. Recycled water used for irrigation shall be retained on the areas of use and shall not be allowed to escape as surface flow, except as provided for in a NPDES permit.

For purposes of this requirement, however, minor amounts of irrigation return water from peripheral areas shall not be considered a violation of this Order.

F. To prevent erosion and earth movement of the irrigated areas, recycled water shall be applied at such a rate and volume as to not exceed the vegetative demand and soil moisture conditions as determined by the User's hydrogeologic monitoring program. Special precautions must be taken to prevent clogging of spray nozzles, to prevent overwatering and the production of runoff. Pipelines shall be maintained so as to prevent leakage and pressure build-up.

G. All areas where recycled water is used, and that are accessible to the public, shall be posted with conspicuous signs, in a size no less than 4 inches high by 8 inches wide, that include the following wording: "ATTENTION: NON-POTABLE RECYCLED WATER - DO NOT DRINK" or "RECYCLED WATER - DO NOT DRINK." Each sign shall display the international symbol for recycled water shown in Figure 3.

H. Adequate freeboard shall be maintained in all storage reservoirs to ensure that direct rainfall does not cause overtopping.

IV. GENERAL REQUIREMENTS

A. Standby or emergency power facilities or storage capacity or diversion capabilities shall be provided so that in the event of plant upset or outage due to power failure or other cause, discharge of raw or inadequately-treated sewage does not occur.

B. Adequate facilities shall be provided so that the sewage treatment and recycling facilities shall be protected from inundation, washout, or other damage caused by storm or storm flows.

C. Any increase in wastewater treatment beyond the current design capacity of 0.2 mgd will require revised waste discharge requirements.

V. PROHIBITIONS

A. The discharge or recycling of raw or inadequately-treated sewage from the Reclamation Facility and from sewers comprising the wastewater collection system for the Reclamation Facility at any time is prohibited.

B. Recycled water irrigation shall not be conducted during periods of extreme rainfall and/or runoff.

C. Irrigation or discharge of recycled water to geologically unstable areas is prohibited. Irrigation or discharge of recycled water shall not result in earth movement.

D. Recycled water shall not be used for irrigation or impoundment within 100 feet of any domestic water supply well.

E. Recycled water use shall not result in problems due to breeding of mosquitoes, gnats, midges, or other pests.

F. Recycled water use shall not impart tastes, odors, color, foaming, or other objectionable characteristics to receiving groundwater.

G. Recycled water use that could affect receiving groundwater shall not contain any substance in concentrations toxic to human, animal, or plant life.

H. Odors of sewage origin shall not be perceivable beyond the limits of the property owned or controlled by the Recycler.

I. Raw sewage or partially dried waste sludge shall not be sprayed on the ground surface.

J. The discharge of recycled water at any point(s) other than specifically described in this Order is prohibited, and constitutes a violation of this Order.

K. The storage reservoirs for recycled water shall not contain floating materials, including solids, liquids, foams, or scum, in concentrations that cause nuisance, adversely affect beneficial uses, or serve as a substrate for undesirable bacterial and algae growth and insect vectors.

VI. PROVISIONS

A. The Recycler and User shall each establish a responsible party or parties to comply with this Order and the monitoring and reporting program. This information shall be provided to the Board within 30 days of receiving this Order.

B. This Order includes the *Standard Provisions Applicable to Waste Discharge Requirements* (Standard Provisions). If there is any conflict between provisions stated herein and the Standard Provisions, the provisions stated herein will prevail.

C. The Recycler and User shall file with the Regional Board technical reports on self-monitoring work performed according to the detailed specifications contained in the Monitoring and Reporting Program, or as directed by the Executive Officer. The results of any monitoring done more frequently than required at the locations and/or times specified in the Monitoring and Reporting Program shall be reported to the Regional Board.

D. A copy of this Order including the Standard Provisions and Monitoring and Reporting Program shall be maintained at the reclamation and reuse facilities so as to be available at all times to operating personnel.

E. The Recycler shall submit to the Regional Board, within 60 days of the adoption of this Order, procedures that will be, or have been, taken to ensure that no discharge or recycling of any untreated or partially-treated sewage, will result from the Reclamation Facility, in the event of equipment failure.

F. To provide maximum storage capacity during wet weather, the User shall monitor and properly maintain the level of water in the storage reservoir.

G. The Recycler shall immediately notify the Regional Board, by telephone, of any confirmed coliform counts that could cause violations of coliform requirements in this Order, including the date(s) thereof. This information shall be confirmed in a written report within five working days of verbal notification. In addition, for any actual coliform limit violations that occurred, the report shall also include the reasons for the high coliform results, the steps being taken to correct the problem (including dates thereof), and steps being taken to prevent a recurrence.

H. The Recycler and User shall take all reasonable steps to minimize or prevent any discharge that has a reasonable likelihood of adversely affecting human health or the environment.

I. Bypass (the intentional diversion of waste streams from any portion of a treatment facility) is prohibited. The Regional Board may take enforcement action against the Recycler for bypass unless:

1. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage. (Severe property damage means substantial physical damage to property, damage to the treatment facilities that causes them to become inoperable, or substantial and permanent loss of natural resources

that can reasonably be expected to occur in the absence of bypass. Severe property damage does not mean economic loss caused by delays in the operation of the Reclamation Facility.);

2. There were no feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated waste, or maintenance during normal periods of equipment down time. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgement to prevent a bypass that could occur during normal periods of equipment downtime or preventive maintenance; and,

3. The Recycler submitted a written notice to the Regional Board for a bypass at least ten days in advance of the need for a bypass.

The Recycler may allow a bypass to occur that does not cause recycled water limitations to be exceeded, but only if it is for essential maintenance to ensure efficient operations. In such a case, the above bypass conditions are not applicable.

J. Any offsite disposal of sewage sludge shall be made only to a legal point of disposal, and in accordance with the provisions of Division 7.5 of the California Water Code. For the purpose of these requirements, a legal point of disposal is defined as one for which Waste Discharge Requirements have been established by a California Regional Water Quality Control Board, and which is in full compliance therewith. Any sewage or sludge handling shall be in such a manner so as to prevent its reaching surface waters or watercourses.

K. A revised Engineering Report which addresses the elements outlined in the CDHS *Guidelines for the Preparation of an Engineering Report for the Production, Distribution and Use of Recycled Water*, dated September 1997, shall be submitted to the CDHS and the Regional Board within 120 days of adoption of this Order. The report shall include an operation and maintenance manual that specifies operational monitoring to verify compliance with applicable ultraviolet disinfection criteria.

L. In accordance with Section 13522.5 of the California Water Code, and Title 22, Division 4, Chapter 3, Article 7, Section 60323, of the California Code of Regulations, the Recycler shall file an engineering report, prepared by a properly qualified engineer registered in California, of any material change or proposed change in character or volume of the recycled water produced, with the Regional Board and the CDHS. The CDHS *Guidelines for the Preparation of an Engineering Report for the Production, Distribution and Use of Recycled Water*, dated September 1997, or revised versions thereof, shall be followed. Revised Waste

Discharge Requirements and Water Recycling Requirements are required prior to implementation of such material change.

M. In accordance with Section 13522.5 of the California Water Code, and Title 22, Division 4, Chapter 3, Article 7, Section 60323, of the California Code of Regulations, the User shall file an engineering report, prepared by a properly qualified engineer registered in California, of any material change or proposed change in the location or volume of the recycled water used, with the Regional Board and the CDHS. The CDHS *Guidelines for the Preparation of an Engineering Report for the Production, Distribution and Use of Recycled Water*, dated September 1997, or revised versions thereof, shall be followed. Revised Waste Discharge Requirements and Water Recycling Requirements are required prior to implementation of such material change.

N. For any extension or expansion of the recycled water distribution system, the User shall submit a report detailing the extension or expansion for the approval of the Executive Officer and the CDHS Office of Drinking Water. Following construction, as-built drawings shall be submitted to the Executive Officer and the CDHS Drinking Water Field Operations Branch for approval prior to use of recycled water.

O. The Recycler or User must notify the Regional Board, in writing, at least 30 days in advance of any proposed transfer of this Order's responsibility and coverage to a new recycler or user. The notice must include a written agreement between the existing and new recycler or user, containing a specific date, for the transfer of responsibility for compliance with this Order.

P. The Recycle and/or User shall furnish, within a reasonable time, any information the Regional Board or the CDHS may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order. The Recycler and/or User shall also furnish to the Regional Board, upon request, copies of any records required to be kept by this Order.

Q. After notice and opportunity for a hearing, this Order may be terminated or modified for cause, including, but not limited to:

1. Violation of any term or condition contained in this Order;

2. Obtaining this Order by misrepresentation, or failure to disclose all relevant facts; and,

3. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

R. This Order does not alleviate the responsibility of the Recycler or User to obtain other necessary local, state, and federal permits to construct facilities necessary for compliance with this Order; nor does this Order prevent imposition of additional standards, requirements, or conditions by any other regulatory agency. Expansion of the facility from its current capacity shall be contingent upon issuance of all necessary permits, including a Conditional Use Permit.

VII. RESCISSION

Except for enforcement purposes, Order No. 94-056, adopted by this Board on June 13, 1994, is hereby rescinded.

VIII. APPEAL OF ORDER

Pursuant to California Water Code Section 13320, any aggrieved party may seek review of this Order by filing a petition with the State Board. A petition must be sent to the State Water Resources Control Board, P.O. Box 100, 901 P Street, Sacramento, California, 95812, within 30 days of adoption of this Order.

I, Dennis A. Dickerson, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Los Angeles Region, on November 9, 2000.

Dennis A. Dickerson
Executive Officer

FIGURE 1

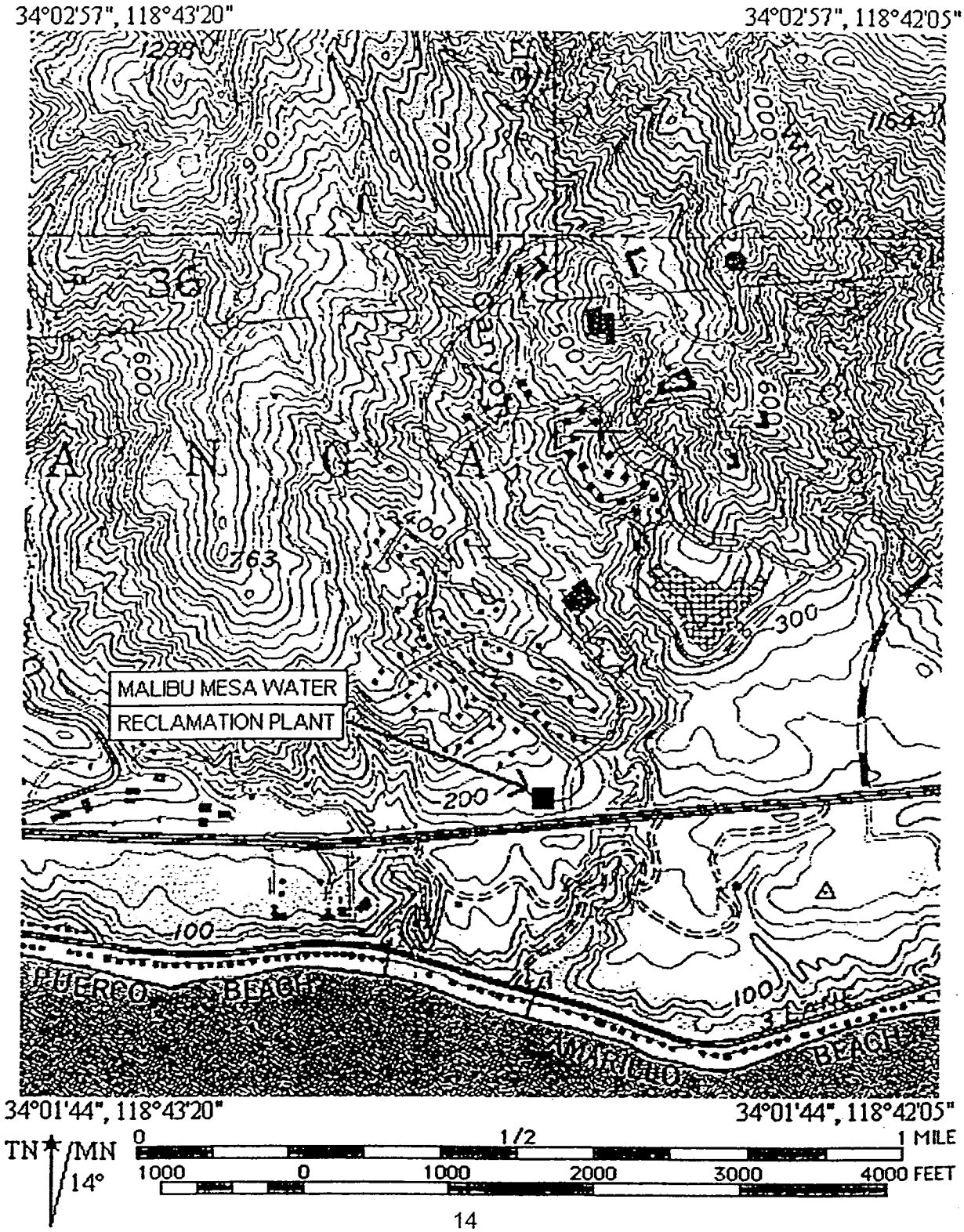

34°02'57", 118°43'20"
34°02'57", 118°42'05"
MALIBU MESA WATER
RECLAMATION PLANT
PUERCO BEACH
34°01'44", 118°43'20"
34°01'44", 118°42'05"
TN
MN
14°
0
1/2
1 MILE
1000
0
1000
2000
3000
4000 FEET

FIGURE 2

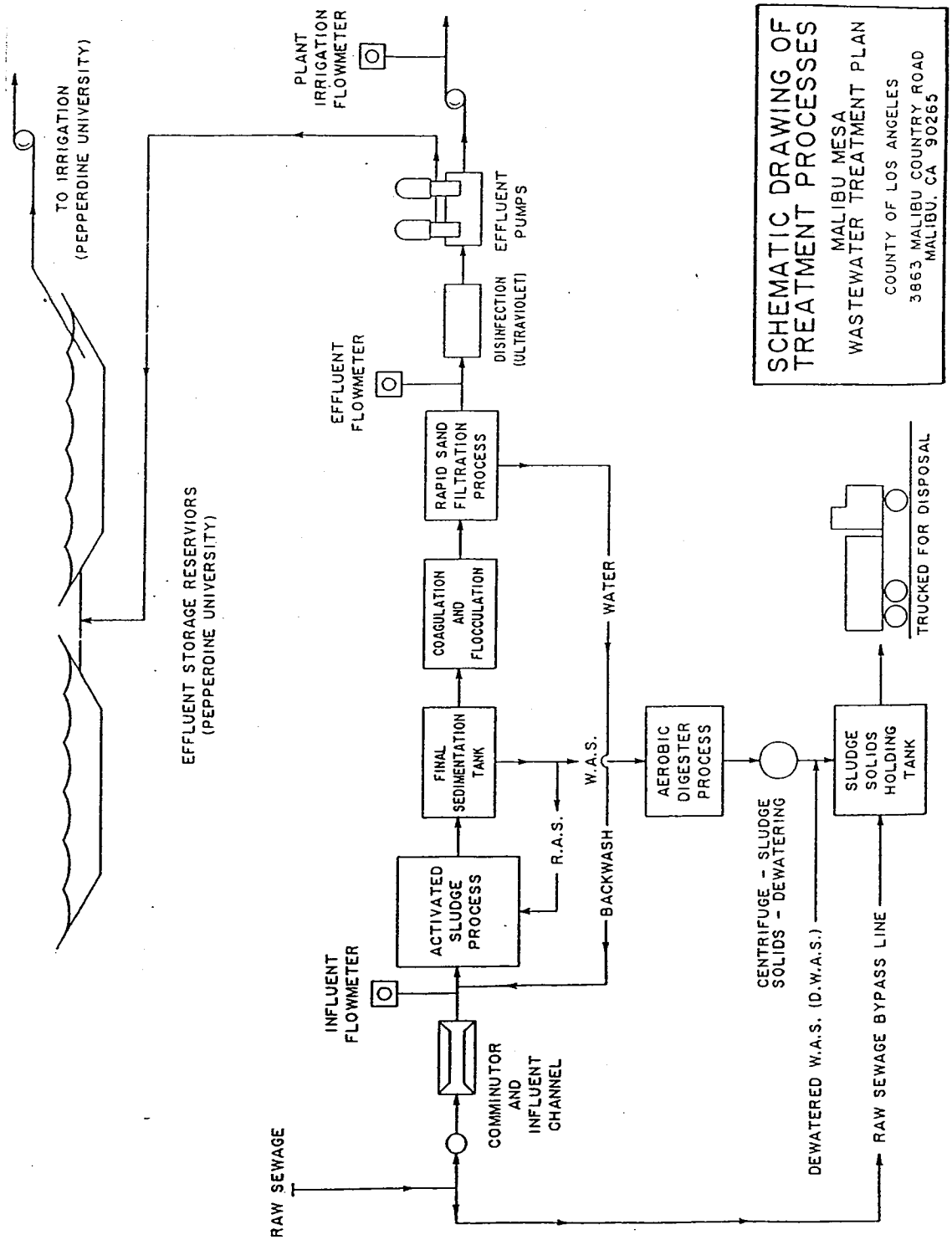

SCHEMATIC DRAWING OF TREATMENT PROCESSES
MALIBU MESA WASTEWATER TREATMENT PLAN
COUNTY OF LOS ANGELES
3863 MALIBU COUNTRY ROAD MALIBU, CA 90265
TO IRRIGATION (PEPPERDINE UNIVERSITY)
PLANT IRRIGATION FLOWMETER
EFFLUENT PUMPS
DISINFECTION (ULTRAVIOLET)
EFFLUENT FLOWMETER
RAPID SAND FILTRATION PROCESS
COAGULATION AND FLOCCULATION
FINAL SEDIMENTATION TANK
EFFLUENT STORAGE RESERVIORS (PEPPERDINE UNIVERSITY)
WATER
W.A.S.
R.A.S.
BACKWASH
AEROBIC DIGESTER PROCESS
ACTIVATED SLUDGE PROCESS
INFLUENT FLOWMETER
COMMINUTOR AND INFLUENT CHANNEL
RAW SEWAGE
CENTRIFUGE - SLUDGE SOLIDS - DEWATERING
SLUDGE SOLIDS HOLDING TANK
TRUCKED FOR DISPOSAL
DEWATERED W.A.S. (D.W.A.S.)
RAW SEWAGE BYPASS LINE

FIGURE 3

State of California
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, LOS ANGELES

ORDER NO. 94-055

State of California
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, LOS ANGELES

ORDER NO. 94-055

WASTE DISCHARGE REQUIREMENTS
WATER RECLAMATION REQUIREMENTS
FOR
LAS VIRGENES MUNICIPAL WATER DISTRICT
AND
PEPPERDINE UNIVERSITY, MALIBU CAMPUS
(Tapia Water Reclamation Facility)
(Files Nos. 64-104 & 70-060)

The California Regional Water Quality Control Board, Los Angeles Region, Finds:

1. The Las Virgenes Municipal Water District (Reclaimer) operates Tapia Water Reclamation Facility (Plant), located at 731 Malibu Road, Calabasas, California (Figure 1). The treatment plant has a design capacity of 16.1 million gallons per day (mgd). During 1993, the Reclaimer produced an average of 4.4 mgd of tertiary treated effluent for reclamation by spray landscape irrigation, agriculture, and industrial use under separate Waste Discharge Requirements contained in Orders Nos. 79-35, 79-107, 87-86 and 89-76 (File No. 64-104) adopted by this Regional Board on February 26, 1979, June 25, 1979, June 22, 1987, and February 25, 1989, respectively.

2. Pepperdine University (User) uses reclaimed water produced by the Reclaimer for landscape irrigation. The amount of reclaimed used supports approximately 60 of the 830 acres of the Pepperdine University - Malibu Campus, located at 24255 Pacific Coast Highway, Malibu, California, under Water Reclamation Requirements contained in Order No. 86-97, adopted by this Regional Board on November 24, 1986.

3. The User also receives reclaimed water produced at the Malibu Mesa Wastewater Treatment Facility operated by the County of Los Angeles - Department of Public Works, Engineering Services Division under separate Waste Discharge Requirements/Water Reclamation Requirements contained in Order No. 86-38, adopted by this Regional Board on June 23, 1986.

4. The California Water Code Section 13263(e) provides that all requirements shall be reviewed periodically, and, upon such review, may be revised by the Regional Board. A review of the current requirements, followed by a site inspection, was conducted by Regional Board staff and no violations were observed.

These Waste Discharge Requirements/Water Reclamation Requirements have been revised to include additional findings, effluent limitations, updated standard provisions, and an expanded monitoring and reporting program.

5. The Reclaimer operates a tertiary wastewater treatment plant in order to provide an effluent that complies with all Title 22 Water Reclamation Requirements.

6. The treatment plant is located in Section 19, T1S, R17W, San Bernardino Base & Meridian at latitude 34° 4' 37", longitude 118° 42' 15". The landscape irrigation areas are generally located in Section 30, T1S, R17W, at the approximate latitude 34° 2' 31" and longitude 118° 42' 33".

7. The wastewater treatment process consists of primary, secondary, and tertiary treatment. Primary treatment includes coarse screening, grit removal, and primary skimming and sedimentation using rectangular clarifiers. Secondary treatment employs activated sludge with single-stage nitrification followed by secondary clarification. Tertiary treatment includes the use of coagulation chemicals, flocculating, filtering, chlorination and de-chlorination. Sludge from the primary and secondary clarifiers is treated by anaerobic digestion, then dried in sludge drying beds at the Plant. The sludge is either transported to a landfill for disposal or composted and used for landscape soil amendment.

8. Prior to use for landscape irrigation, reclaimed water is stored in landscaped holding ponds with a combined storage capacity of approximately 12.4 million gallons. Reclaimed water is then pumped to a 10,000 gallon below-ground storage tank, that provides for gravity flow to the landscape irrigation systems.

9. The amount of reclaimed water used for landscape irrigation varies with demand, up to 300,000 gallons per day (gpd). Approximately 70% of the reclaimed water used is produced at the Malibu Mesa Wastewater Treatment Facility, and 30% is produced at the Las Virgenes Municipal Water District, Tapia Water Reclamation Facility. At times, 100% of the reclaimed water is supplied by Malibu Mesa Wastewater Treatment Facility.

These Waste Discharge Requirements/Water Reclamation Requirements have been revised to include additional findings, effluent limitations, updated standard provisions, and an expanded monitoring and reporting program.

5. The Reclaimer operates a tertiary wastewater treatment plant in order to provide an effluent that complies with all Title 22 Water Reclamation Requirements.

6. The treatment plant is located in Section 19, T1S, R17W, San Bernardino Base & Meridian at latitude 34° 4' 37", longitude 118° 42' 15". The landscape irrigation areas are generally located in Section 30, T1S, R17W, at the approximate latitude 34° 2' 31" and longitude 118° 42' 33".

7. The wastewater treatment process consists of primary, secondary, and tertiary treatment. Primary treatment includes coarse screening, grit removal, and primary skimming and sedimentation using rectangular clarifiers. Secondary treatment employs activated sludge with single-stage nitrification followed by secondary clarification. Tertiary treatment includes the use of coagulation chemicals, flocculating, filtering, chlorination and de-chlorination. Sludge from the primary and secondary clarifiers is treated by anaerobic digestion, then dried in sludge drying beds at the Plant. The sludge is either transported to a landfill for disposal or composted and used for landscape soil amendment.

8. Prior to use for landscape irrigation, reclaimed water is stored in landscaped holding ponds with a combined storage capacity of approximately 12.4 million gallons. Reclaimed water is then pumped to a 10,000 gallon below-ground storage tank, that provides for gravity flow to the landscape irrigation systems.

9. The amount of reclaimed water used for landscape irrigation varies with demand, up to 300,000 gallons per day (gpd). Approximately 70% of the reclaimed water used is produced at the Malibu Mesa Wastewater Treatment Facility, and 30% is produced at the Las Virgenes Municipal Water District, Tapia Water Reclamation Facility. At times, 100% (196,000 gpd) of the reclaimed water is supplied by Malibu Mesa Wastewater Treatment Facility.

10. Section 13523 of the California Water Code provides that a Regional Board, after consulting with, and receiving the recommendations of the State Department of Health Services, and after any necessary hearing, shall, if it determines such action to be necessary to protect the public health, safety, or welfare, prescribe Waste Discharge Requirements/Water Reclamation Requirements for water which is used, or proposed to be used, as reclaimed water.

    Section 13523 further provides that such requirements shall include, or be in conformance with, the statewide reclamation criteria.

11. The Regional Board has consulted with the State Department of Health Services (DHS) regarding the current reclamation of tertiary-treated wastewater, and has incorporated the DHS findings and recommendations.

12. The use of reclaimed water for surface impoundments or for landscape irrigation could affect the public health, safety, or welfare; requirements for such use are therefore necessary in accordance with Section 13523 of the California Water Code.

13. The Plant is located within the Monte Nido Hydrologic Subarea of the Malibu Creek Hydrologic Area. The Users storage ponds and landscape irrigation areas are located within the Corral Canyon Hydrologic Subarea of the Point Dume Hydrologic Area, and overlies the Malibu Valley Groundwater Basin.

14. Groundwater in the Malibu Valley Groundwater Basin is beneficially used for agricultural supply.

15. The Board adopted revised Water Quality Control Plan for the Los Angeles River Basin on June 3, 1991. The Water Quality Control Plan contains beneficial uses and water quality objectives for groundwater within the Malibu Valley Groundwater Basin. The requirements contained in this Order, as they are met, will be in conformance with the goals and objectives of the Water Quality Control Plan.

16. This project involves an existing facility, and, as such, is exempt from the provisions of the California Environmental Quality Act (Public Resources Code, Section 2100 et seq.) in accordance with Title 14, California Code of Regulations, Chapter 3, Section 15301.

The Regional Board has notified the Reclaimer, User and interested agencies and persons of its intent to revise Waste Discharge Requirements/Water Reclamation Requirements for this discharge and has provided them with an opportunity to submit their written views and recommendations.

The Regional Board, in a public meeting, heard and considered all comments pertaining to the discharge and to the updated requirements.

IT IS HEREBY ORDERED that Las Virgenes Municipal Water District and Pepperdine University, Malibu Campus, shall comply with the following:

A. EFFLUENT LIMITATIONS

1. Reclaimed water shall be limited to treated domestic and commercial wastewater only, as proposed.

2. Waste discharge shall not contain constituents in excess of the following limits:

Constituent	Unit	Maximum Effluent Limitations
Total dissolved solid	mg/L	2,000
Chloride	mg/L	500
Sulfate	mg/L	500
Boron	mg/L	2
BOD_5 20°C	mg/L	30
Oil & grease	mg/L	15
Suspended solids	mg/L	30
Total organic carbon	mg/L	20

3. The pH of reclaimed water shall at all times be within the range of 6.5 to 8.5 pH units.

4. Reclaimed water shall not contain heavy metals, arsenic, or cyanide in concentrations exceeding the limits contained in the current California Drinking Water Standards.

5. Radioactivity shall not exceed the limits specified in Title 22, California Code of Regulations, Chapter 15, Article 5, Sections 64441 and 64443, or subsequent revisions.

B. SPECIFICATIONS FOR USE OF RECLAIMED WATER

1. Reclaimed water used for the irrigation of parks, playgrounds, schoolyards, and other areas where the public has similar access or exposure shall be at all times an adequately disinfected, oxidized, coagulated, clarified, filtered wastewater or wastewater treated by a sequence of unit processes that will ensure an equivalent degree of treatment and reliability.

   The wastewater shall be considered adequately disinfected if the 7-day median number of coliform organisms in the effluent does not exceed 2 per 100 milliliters, as determined from the bacteriological results of the last 7-days for which analyses have been completed, and the number of coliform organisms does not exceed 23 per 100 milliliters in any sample.

   An oxidized wastewater means wastewater in which the organic matter has been stabilized, is nonputrescible, and contains dissolved oxygen. For the purpose of these requirements, an oxidized wastewater shall be equivalent to secondary effluent with the following characteristics:

   (a) a biological oxygen demand, BOD_5 20°C, value of less than 30 mg/L;

   (b) a suspended solids (SS) content of less than 30 mg/L; and

   (c) total organic carbon (TOC) value of less than 20 mg/L.

A coagulated wastewater means an oxidized wastewater in which colloidal and finely divided suspended matter have been destabilized and agglomerated by the addition of suitable floc-forming chemicals or by an equally effective method.

A filtered wastewater means an oxidized, coagulated, clarified wastewater which has been passed through natural undisturbed soils or filter media, such as sand or diatomaceous earth, so that the turbidity as determined by an approved laboratory method does not exceed an average operating turbidity of 2 turbidity units and does not exceed 5 turbidity units more than 5 percent of the time during any 24-hours period.

2. Reclaimed water shall not be directly used for uses other than those enumerated above until requirements for these uses have been established by this Regional Board, in accordance with Section 13523 of the California Water Code, unless the Regional Board waives such requirements or finds that the above cited standards are applicable to these uses.

3. Reclaimed water uses shall meet the requirements specified in the "Guidelines for Use of Reclaimed Water" issued by the State Department of Health Services.

4. Reclaimed water used for irrigation shall be retained on the areas of use and shall not be allowed to escape as surface flow, except as provided for in a National Pollutant Discharge Elimination System (NPDES) Permit.

   For the purpose of this requirement, however, minor amounts of irrigation return water from peripheral areas shall not be considered a violation of this Order.

5. Reclaimed water shall be applied at such a rate and volume as not to exceed vegetative demand and soil moisture conditions. Special precautions must be taken to prevent clogging of spray nozzles, to prevent over-watering and to exclude the production of runoff. Pipelines shall be maintained so as to prevent leakage.

6. Reclaimed water used for irrigation shall not be allowed to run off into recreational lakes unless it meets the criteria for such lakes.

7. Reclaimed water shall not be used for irrigation within 150 feet of any water well or mineral spring.

8. At locations within the facility, along the perimeter, at points of access to the area where reclaimed water is used, signs shall be posted with the following warning: "ATTENTION: RECLAIMED WASTEWATER—AVOID CONTACT - DO NOT DRINK".

C. GENERAL REQUIREMENTS

1. The discharge or use of raw or inadequately treated sewage at any time is prohibited.

2. Reclaimed water shall not be used for irrigation during periods of extreme rainfall and/or runoff.

3. Standby or emergency power facilities and/or sufficient capacity shall be provided for reclaimed water storage during rainfall or in the event of plant upsets or outages, and at times when spray irrigation cannot be practiced.

4. Reclaimed water use or disposal shall not result in earth movement in geologically unstable areas.

5. Adequate facilities shall be provided to protect the sewage treatment and reclamation facilities from damage by storm flows and runoff.

6. Adequate freeboard shall be maintained in the reclaimed water holding pond to ensure that direct rainfall will not cause overtopping.

7. Neither treatment of waste nor any reclaimed water use or disposal shall cause pollution or nuisance.

8. Water reclamation and reuse or disposal shall not result in problems due to breeding of mosquitoes, gnats, midges, or other pests.

9. Reclaimed water use or disposal shall not impart tastes, odors, color, foaming, or other objectionable characteristics to receiving groundwater.

10. Reclaimed water use or disposal, which could affect receiving groundwater, shall not contain any substance in concentrations toxic to human, animal, or plant life.

11. Odors of sewage origin shall not be perceivable beyond the limits of the property owned or controlled by the Reclaimer.

12. At a minimum, a certified Grade IV Wastewater Treatment Plant Operator shall inspect the treatment plant, on a weekly basis, to ensure that the treatment processes are working properly, and that the plant effluent wastewaters are in compliance with this Order.

D. PROVISIONS

1. A copy of these requirements shall be maintained at the reclamation and discharge facilities so as to be available at all times to operating personnel.

2. In accordance with Section 13522.5 of the California Water Code, and Section 60323 of the Wastewater Reclamation Criteria, the Reclaimer shall file an engineering report, prepared by a properly qualified engineer registered in California, of any material change or proposed change in character, location or volume of the reclaimed water or its uses to the Regional Board and to the State Department of Health Services.

3. The Reclaimer and User shall file with the Board technical reports on self-monitoring work performed according to the detailed specifications contained in the Monitoring and Reporting Program, as directed by the Executive Officer.

   The results of any monitoring done more frequently than required at the locations and/or times specified in the Monitoring and Reporting Program shall be reported to the Regional Board.

4. The Reclaimer and User shall notify this Board, by telephone within 24 hours, of any violations of reclaimed water use conditions or any adverse conditions as a result of the use of reclaimed water from this facility; written confirmation shall follow within one week.

5. The Reclaimer and User shall notify Board staff, by telephone, immediately, of any confirmed coliform counts that could cause a violation of the Waste Discharge Requirements, including the date(s) thereof. This information shall be confirmed in the next monitoring report; in addition, for any actual coliform limit violations that occurred, the report shall also include the reasons for the high coliform results, the steps being taken to correct the problem (including dates thereof), and steps been taken to prevent a recurrence.

6. These requirements do not exempt the Reclaimer and/or User from compliance with any other laws, regulations, or ordinances which may be applicable; they do not legalize this reclamation and discharge facilities, and they leave unaffected any further constraint on the use of reclaimed water at this site which may be contained in other statutes or required by other agencies.

7. The Reclaimer shall be responsible to ensure that all users of reclaimed water comply with the specifications and requirements for such use.

8. This Order does not alleviate the responsibility of the Reclaimer or User to obtain other necessary local, state, and federal permits to construct facilities necessary for compliance with this Order; nor does this Order prevent imposition of additional standards, requirements, or conditions by any other regulatory agency. Expansion of this facility from its current capacity shall be contingent upon issuance of all necessary permits, including a Conditional Use Permit.

9. For any extension or expansion of the reclaimed water discharge system, the User shall submit a report detailing the extension or expansion for the approval of the Executive Officer. Following construction, as-built drawings shall be submitted to the Executive Officer for approval prior to use of reclaimed water.

10. The Reclaimer shall submit to the Regional Board, within 60 days of the adoption of this Order, procedures that will be (or have been) taken to ensure that discharge of untreated sewage from the treatment facility, in the event of equipment failure, will not occur.

11. Raw sewage or partially dried waste sludge shall not be sprayed on ground surface.

12. Any offsite disposal of sewage sludge shall be made only to a legal point of disposal, and in accordance with provisions of Division 7.5 of the California Water Code. For the purpose of these requirements, a legal point of disposal is defined as one for which Waste Discharge Requirements have been established by a California Regional Water Quality Control Board, and is in full compliance therewith.

13. Any discharge of reclaimed water at any point(s) other than specifically described in this Order is prohibited, and constitutes a violation of the Order.

14. After notice and opportunity for a hearing, this Order may be terminated or modified for cause, including, but not limited to:

    (a) Violation of any term or condition contained in this Order;

    (b) Obtaining this Order by misrepresentation, or failure to disclose all relevant facts;

    (c) A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

15. The Reclaimer and User shall furnish, within a reasonable time, any information the Regional Board may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order. The Reclaimer and User shall also furnish to the Regional Board, upon request, copies of records required to be kept by this Order.

16. The Reclaimer and User shall take all reasonable steps to minimize or prevent any discharge that has a reasonable likelihood of adversely affecting human health or the environment.

17. Bypass (the intentional diversion of waste streams from any portion of a treatment facility) is prohibited. The Regional Board may take enforcement action against the Reclaimer for bypass unless:

    (a) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage. (Severe property damage means substantial physical damage to property, damage to the treatment facilities that causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.);

    (b) There were no feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated waste, or maintenance during normal periods of equipment down time. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that could occur during normal periods of equipment downtime or preventive maintenance; and

    (c) The Reclaimer submitted a notice at least ten days in advance of the need for a bypass to the Regional Board.

    The Reclaimer may allow a bypass to occur that does not cause reclaimed water limitations to be exceeded, but only if it is for essential maintenance to ensure efficient operation. In such a case, the above bypass conditions are not applicable.

18. The Reclaimer and User shall establish a responsible party to comply with this Order and the monitoring and reporting program. This information shall be provided to the Board at least 30 days of receiving this Order.

    Thereafter, the responsible party must notify the Board, in writing, at least 30 days in advance of any proposed transfer of this Order's responsibility and coverage to a new Reclaimer and/or User. The notice must include a written agreement between the existing and new Reclaimer containing a specific date for the transfer of responsibility under this Order and compliance between the current and new Reclaimer and/or User.

19. This Order includes "Standard Provisions Applicable to Waste Discharge Requirements". If there is any conflict between provisions stated herein and the "Standard Provisions Applicable to Waste Discharge Requirements", these provisions stated herein will prevail.

E. RESCISSION

Order No. 86-97, adopted by this Board on November 24, 1986, is hereby rescinded.

I, Robert P. Ghirelli, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of a revised Order adopted by the California Regional Water Quality Control Board, Los Angeles Region, on June 13, 1994.

Robert P. Ghirelli

ROBERT P. GHIRELLI, D.Env.
Executive Officer

/MB

Attachment B

October 8, 2009

Rhiannon Bailard
Assistant Vice President, Governmental & Regulatory Affairs
Director, Center for Sustainability
Pepperdine University
24255 Pacific Coast Highway
Malibu, California 90263

Re: Response to RWQCB Resolution R4-2009-XX;
Proposed Amendment to the Water Quality Control Plan for the Coastal Watersheds of Ventura and Los Angeles Counties to Prohibit On-Site Wastewater Disposal Systems in the Malibu Civic Center Area

Dear Ms. Bailard:

Daniel B. Stephens & Associates, Inc. (DBS&A) has reviewed the Regional Water Quality Control Board (RWQCB) proposed amendment to the *Water Quality Control Plan for the Coastal Watersheds of Ventura and Los Angeles Counties* to prohibit on-site wastewater disposal systems in the Malibu Civic Center area. We have also reviewed the supporting technical memoranda, and the *Risk Assessment of Decentralized Wastewater Treatment Systems in High Priority Areas in the City of Malibu, California* by Stone Environmental, Inc (SEI) (2004), which serves as the technical basis for much of the proposed amendment.

Personal and Company Background

I am a Principal Hydrogeologist and Senior Vice President with DBS&A in Goleta, California (see attached résumé for in-depth professional and technical background). DBS&A has conducted technical aspects of the University's Hydrogeologic Monitoring Program (HMP) since the year 2000. The HMP was initiated in late 1987 with the objective of guiding and ensuring responsible and efficient water use that has no adverse effect on Pepperdine University's Malibu campus or the surrounding environment. With the goal of monitoring and documenting water use on campus, the HMP prescribes monitoring of precipitation, irrigation, runoff, evapotranspiration, soil moisture content, and shallow and deep groundwater elevations. Data on individual parameters that effect campus irrigation are regularly collected on hourly to monthly intervals (depending on the parameter). The data are synthesized and reported on a semiannual basis to the Los Angeles RWQCB.

Comments to RWQCB Resolution R4-2009-XX

Based on the findings of SEI (2004) and the results of Pepperdine's HMP, we find it unlikely that the University is contributing to the water quality degradation found in the Civic Center area. The basis for this opinion is provided below.

Daniel B. Stephens & Associates, Inc.

5951 Encina Rd., Suite 208 805 683-2409

Goleta, CA 93117 FAX 805 683-2419

Reason 1

The University irrigates with tertiary-treated effluent ("recycled water" under Title 22, California Code of Regulations) that is received from either Malibu Mesa or Tapia Treatment Plants. Recycled water does not pose the water quality threat of septic systems or other raw-sewage disposal systems. For example, recycled water discharged from Malibu Mesa to Pepperdine is required by RWQCB Order No. RS-2007-0002 to contain less than 10 milligrams per liter (mg/L) of nitrogen (nitrate + nitrite).

Reason 2

Recycled water is applied to vegetated portions of campus only. Travel through the root zone is known to decrease levels of nutrients by plant uptake.

Reason 3

Recycled water is applied to areas that lie between approximately 28 and 100 feet above the closest water table. Percolation through a thick vadose zone is known to decrease levels of pathogens.

Reason 4

Groundwater beneath the Pepperdine Campus flows either south through Winter Mesa toward the Pacific Ocean, or southeast, through Alluvium in Winter Canyon. SEI found that travel times from Pepperdine to the Pacific Ocean through Winter Canyon Alluvium are on the order of 10 to 30 years. Groundwater travel times across Winter Mesa are unknown, but they are likely to be similar because the distance, hydraulic gradient, and geologic materials are all similar to those found in the Winter Canyon flow path. It is very unlikely that pathogens and nutrients found at the low levels that exist in recycled water would remain after 10 to 30 years.

Reason 5

The Pepperdine HMP performs campus-wide monitoring of recycled water use through a combination of water metering, climate monitoring, soil moisture measurements, groundwater level measurements, and water balance modeling. The intention of the HMP is to ensure that irrigation is conducted in a manner that avoids, to the maximum extent possible, any contribution of irrigation water to the groundwater system underlying the University. Pepperdine Irrigation Services Staff use HMP data to guide irrigation practices and to help ensure that no more water is added to the vegetation than is required for their health and to meet water consumptive use requirements driven by vegetation evapotranspiration.

Reason 6

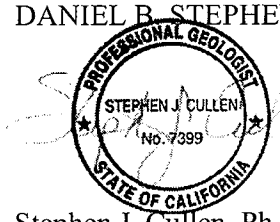
Historical groundwater elevation data from the HMP indicate that groundwater elevations are inversely related to irrigation and directly related to precipitation; water levels generally decrease during the high irrigation summer months and increase during the low irrigation (and high precipitation) winter months.

In summary, due to the relatively high quality of water used for irrigation, plant nutrient uptake, thick vadose zone, long groundwater travel times, and lack of groundwater level response to

irrigation, we find it unlikely that Pepperdine is adversely impacting water quality in the Civic Center area.

Sincerely,

DANIEL B. STEPHENS & ASSOCIATES, INC.



Stephen J. Cullen, Ph.D., PG (CA)
Senior Vice President

SJC/rpf
Attachment

Stephen J. Cullen, PhD, PG (CA), REA II, CPSS, CEM (NV)

Specialization

Dr. Cullen is a Principal Hydrogeologist with the firm with over 30 years experience. Areas of expertise include hydrocarbon and halocarbon site investigations, contaminant source identification, hazardous and solid waste landfill investigations and monitoring systems, metals and radionuclide investigations, land disposal of biosolids and sewage effluent, vadose zone and groundwater flow and transport modeling, land treatment facilities, intrinsic bioremediation as well as active approaches to soil and groundwater remediation. Expert opinions and testimony: resolution of a wide range of groundwater and vadose zone characterization, monitoring, and remediation problems.

Academic Degrees

Ph.D., Geography, University of California at Santa Barbara, 1996
Dissertation title: Field and Laboratory Investigations of Contaminant Natural Attenuation and Intrinsic Remediation in Soils and the Vadose Zone

M.Sc., Soil Physics, Montana State University, 1981

B.Sc., Soil Science and Hydrology, University of California at Davis, 1977

Professional Registration

California Professional Geologist, No. 7399

California Registered Environmental Assessor – Level II, REA II- No. 20107

Certified Environmental Manager, State of Nevada, No. 1839

Certified Professional Soil Scientist, Reg. No. 03169, ARCPACS

Registered Nuclear Soil Water and Density Gauges, CPN No.19336

Representative Professional Assignments

- ***Expert Panel Member, Single-Shell Tank Integrity Program (SSTIP), U.S. Department of Energy Facility at Hanford, Washington.*** Sits on panel of experts tasked with providing leak integrity and structural integrity recommendations to guide implementation of an enhanced SSTIP for the River Protection Project. The SSTs at Hanford have been used to store up to 56 million gallons of high-level radioactive waste until future site closure is implemented. Dr. Cullen provides expertise on soils and the vadose zone.

- ***Principal Hydrogeologist, Investigation of Historic Sources of Arsenic, Basic Remediation, Inc., Henderson, Nevada:*** Reviewed and assessed the site data, along with historical and current site conditions, to determine if the presence of arsenic is anthropogenic or naturally occurring. Evaluated site geology (including pedogenic, hydrogeologic and geochemical site conditions), summarized and evaluated site use history (including potential anthropogenic sources and potential arsenic mobilization and/or accumulation mechanisms), and conducted supplemental sampling and lab analyses.

- ***Principal Hydrogeologist, Investigation of Sulfometuron methyl pesticide (SM) movement in rangeland soils, farm plaintiff group, Southeastern Idaho.*** Evaluated the subsurface environmental fate of SM after aerial application to rangeland. Conducted vadose zone flow and transport modeling using Hydrus-1D to simulate the movement of water and contaminant in the subsurface. Evaluated effect of farm tillage and irrigation on SM leaching. Wrote expert rebuttal reports, gave expert deposition testimony, and provided expert testimony in federal court.

Stephen J. Cullen, PhD, PG (CA), REA II, CPSS, CEM (NV)

Representative Professional Assignments Continued

- ***Principal Hydrogeologist, Investigation of Historic Sources of Solvent Releases, Crown City Plating Company, El Monte, California.*** Provided historical review and evaluation of soil, soil vapor, and groundwater data to determine the location and timing of solvent releases relative to insurance coverage in place during the period of operational activity. Provided consultation and expert trial testimony.

- ***Principal Hydrogeologist, Wastewater Holding Pond Evaluation, Confidential Wastewater Agency, CA.*** Evaluated the integrity of wastewater pond liners; evaluate potential impacts of pond effluent on vicinity water production wells; development of monitoring program to evaluate groundwater quality over time; reporting and consultation with staff and Board of Directors.

- ***Principal Hydrogeologist, CERCLA-compliant Hydrogeologic Characterization, Magnesium Processing and Chemical Production and Distribution Effluent Disposal Facility, Basic Management, Inc., Henderson, Nevada***: Lead hydrogeologist for program to characterize impacted soil and groundwater on a 2,332-acre redevelopment site including: Interpretation of geologic, soil, groundwater, hydrologic, chemical, and geotechnical data to support the description of the conceptual site model; design and oversight of intrusive field investigation utilizing multiple drilling techniques; characterization of multiple aquifers; development of site-specific soil background concentrations for metals (including arsenic) and radiochemicals; design and oversight of an aquifer testing and soil hydraulic testing program; manage development and QA of analytic and numerical groundwater flow and contaminant fate and transport models; participation in public accountability meetings with technical, legal, and public representatives of State, County, and City governments, other potentially responsible parties, and the local citizen Remediation Advisory Board; database and GIS development and support. Site Closure Plan approved by NDEP.

- ***Principal Hydrogeologist, CERCLA-compliant Hydrogeologic Characterization, Corrective Action Management Unit (CAMU), Basic Management, Inc., Henderson, Nevada***: Lead hydrogeologist for program to characterize impacted soil and groundwater in support of permitting of a 114-acre CAMU proposed to receive waste soils resulting from remediation of a nearby redevelopment site. Work included: Interpretation of geologic, soil, groundwater, hydrologic, chemical, and geotechnical data to support the description and reporting of the hydrogeologic conceptual site model; design and oversight of intrusive field investigation utilizing multiple drilling techniques; characterization of multiple aquifers; development of site-specific soil background concentrations for metals (including arsenic) and radiochemicals; fate and transport analysis of Site and Off-Site impacts; review and analysis of Groundwater Treatment system performance; participation in public accountability meetings with technical, legal, and public representatives of State, County, and City governments, other potentially responsible parties, and the local citizen Remediation Advisory Board; database and GIS development and support.

- ***Principal Hydrogeologist, remediation of lead-impacted soils, Havlik Group, Santa Barbara, CA:*** Site investigation, regulatory negotiations, risk assessment, statistical analysis, groundwater monitoring, fate and transport analysis, remedial action plan developed to conduct hot spot excavation beneath existing structure.

- ***Principal Hydrogeologist, remedial alternatives evaluation of VOC-impacted soils, Confidential Client, Richmond, CA.*** Evaluation of the technical and financial feasibility of conducting 1) In-Situ Thermal Desorption (ISTD) and 2) Excavation with Off-Site Disposal to remediate chlorinated hydrocarbons at a site adjacent to the San Francisco Bay ("bay muds") and slated for redevelopment. Tasks included: current and historical geologic/hydrogeologic data evaluation; calculation of seepage velocity; evaluation of the presence of DNAPL; evaluate compliance with CERCLA and the National Contingency Plan (NCP); remedial cost estimation and evaluation; estimation of remedial volumes and removed

Stephen J. Cullen, PhD, PG (CA), REA II, CPSS, CEM (NV)

Representative Professional Assignments Continued

groundwater; evaluate remedial performance monitoring alternatives; evaluate compliance with Regional Water Quality Control Board orders. Settlement achieved, and the Site is undergoing redevelopment.

- ***Principal Hydrogeologist, RI/FS Remedial Alternatives, Operable Unit No. 2, Confidential Client, Brown & Bryant Superfund Site, Arvin, California.*** Evaluation and comment as to the technical and financial feasibility of conducting Pump and Treat in a shallow aquifer, Monitored Natural Attenuation (MNA) in a deeper aquifer, and removal of a deep municipal supply well as a mean of remediation and prevention of exposure to chloroform, 1,2-DBCP, 1,2-DCP, 1,3-DCP, Dinoseb, EDB, and 1,2,3-TCP. Task included: remedial cost evaluation; historic geologic/hydrogeologic data evaluation; municipal well abandonment protocols evaluation and recommendation; surface cap effectiveness evaluation; surface runoff evaluation; fate and transport analysis. Comments submitted to EPA on behalf of client.
- ***Chlorinated Hydrocarbon Site Characterization, Remediation, and cost evaluation, Confidential Client Aerospace Manufacturer, Santa Ana, California.*** Evaluated historical environmental sampling data and interpreted fate and transport of site constituents at a former electronics and aerospace manufacturing facility operational since 1959; researched historical regulatory & commercial documents to interpret use of chemicals at site; evaluated site characterization data to adequacy as the basis for remedial cost estimation; prepared remedial action plan that proposed enhanced bioremediation of PCE, TCE, Freon-113 and related breakdown products; provided an federal court expert opinion report and deposition testimony; directed groundwater flow (MODFLOW96) and PCE transport (MT3DMS) modeling (GWVISTAS pre/post processor) to quantify PCE travel time to the supply well perforations under various assumed hydraulic conditions; client achieve favorable settlement.
- ***Principal Hydrogeologist, basin-scale perchlorate groundwater investigation, Confidential Client***: Basin-scale groundwater investigation, vadose zone source identification, forensic data analysis, flow and transport analysis, source identification, remediation alternatives study, regulatory negotiation, client consultation.
- ***Principal Hydrogeologist, former illegal methamphetamine lab, Solvang, CA***: Forensic data analysis, regulatory negotiation, assisted client with closeout of regulatory case file. Residential redevelopment proceeded.
- ***Technical Specialist, CERCLA remedial investigation, Pantex Plant, Carson County, Texas, Department of Energy***: Feasibility study and implementation, conceptual site model development, design, test and implement soil vapor extraction system for chlorinated hydrocarbon soil impacts. Remediation O&M ongoing.
- ***Technical Specialist, design and implementation of innovative in-situ TCE remediation, Garden Plaza, Santa Barbara, California***: In-situ remediation of tetrachloroethene via electron donor injection in a guaranteed-price remediation program in support of Site redevelopment. Site closure granted by Regional Water Quality Control Board and site is redeveloped as retail shopping center.
- ***Technical Specialist, innovative reduction of ammonia IDLH health and safety hazard, Equilon Lube Plant, Carson, California***: Designed in-situ vadose zone remediation via hydrolysis used to induce transformation of the ammonia gas to the nongaseous ammonium at an industrial redevelopment site. Ammonium was oxidized to nitrate that subsequently served as electron acceptor for biodegradation of benzene in underlying groundwater. IDLH conditions removed such that Level D excavation and redevelopment activities proceeded.
- ***Principal Hydrogeologist, Texaco Exploration and Production, Inc., Santa Maria California***: Site Characterization, Feasibility Study, Remedial Action Plan, Statistical Sampling Design and Analysis,

Stephen J. Cullen, PhD, PG (CA), REA II, CPSS, CEM (NV)

Representative Professional Assignments Continued

Modeling, Expert Testimony, Oilfield Restoration. Site closure and redevelopment achieved. Jury verdict rendered. Trial defense named one of the Top 20 Defense Cases in 2002 by the National Law Journal.

- ***Principal Project Hydrogeologist, Chlorinated Hydrocarbons, Aerospace and Electronics manufacturing, Litton Industries, Santa Clara, California***: Forensic Data Evaluation, Fate and Transport Analysis, expert testimony. Settlement achieved.
- ***Principal Hydrogeologist, Chlorinated Hydrocarbons, Norvell Bass Dry Cleaner, Santa Barbara, California***: Site Characterization, Remedial Design Development, Cost Allocation, Expert Testimony. Settlement achieved. Site is currently undergoing redevelopment.
- ***Principal Hydrogeologist, Chlorinated Hydrocarbons, Aerospace Manufacturing Facility, Rockwell Collins, Santa Ana, California***: Site Characterization, Forensic Data Evaluation, Remedial Design Development, Remedial Action Plan, Remedial Cost Estimation, Expert Testimony at redeveloped industrial site. Settlement achieved.
- ***Principal Project Hydrogeologist, Hydrogeologic Site Characterization, Confidential Client, Santa Barbara, California***: Evaluation of conditions conducive to Mold Invasion in a coastal multi-unit dwelling, hydrogeologic assessment, aerial photo evaluation, calculation of water vapor flux through concrete, Expert Testimony. Judgment verdict rendered.
- ***Principal Project Hydrogeologist, Chlorinated Hydrocarbons, Law Office of DeLoreto and DeLoreto, Dutch Maid Dry Cleaners, Santa Barbara, California***: RCRA remedial investigation, DNAPL sampling, limited access indoor soil matrix and soil vapor sampling, development of site conceptual model, aquifer testing, groundwater monitoring well network design, geologic fault investigation, feasibility study, remedial design, treatability study, soil vapor pilot testing, soil excavation, indoor air sampling, forensic data evaluation, fate and transport analysis, expert testimony, regulatory negotiation. Settlement achieved.
- ***Principal Project Hydrogeologist, Gasoline Service Stations, Petroleum Hydrocarbons, UNOCAL, Stockton, California***: RCRA remedial investigation, remedial alternatives evaluation for petroleum hydrocarbons, Corrective Action Plan development, Intrinsic Bioremediation Study, regional hydrogeologic characterization, evaluation of saltwater intrusion, client consultation, expert testimony to California State Water Resources Control Board. Site granted MNA status.
- ***Principal Project Hydrogeologist, chlorinated hydrocarbons, aerospace manufacturing site, Hawker Pacific, Inc., Sun Valley, California***: RCRA remedial investigation, remedial alternatives study, regional hydrogeologic and contaminant plume investigation, 3-D vadose zone modeling, litigation support, presentation to Special Master. Site closure achieved; settlement achieved.
- ***Principal Project Hydrogeologist, petroleum hydrocarbon, Kern County School District, Bakersfield, California***: RCRA remedial investigation, feasibility study, soil vapor/air sparging extraction pilot test, in-situ bioremediation.
- ***Principal Project Scientist, Irvine Bus Base Closure, Orange County Transit Authority, Irvine, California***: Groundwater monitoring, geochemical analyses and evaluation for bioattenuation activity, free product removal evaluation, MTBE evaluation, dissolved phase diesel plume remediation, regulatory negotiations. Site closure achieved.
- ***Principal Hydrogeologist, former aerospace manufacturing facility, AlliedSignal, Los Angeles, California***: RCRA remedial investigation, feasibility study, fate and transport analysis (including assessment of the effects of the West Coast Basin saltwater intrusion barrier wells), and conceptual remedial action plan of soils and multiple aquifers impacted by chlorinated hydrocarbons, petroleum hydrocarbons, 1,4-dioxane adjacent to LAX. Evaluation of historic aquifer testing data. Evaluation of

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Representative Professional Assignments Continued

offsite impacts; evaluation of potential downgradient liabilities. Pilot and treatability testing included soil vapor extraction, dual phase extraction, groundwater circulation wells, and enhanced in-situ bioremediation followed by polishing with monitored natural attenuation. Remedial action objectives successfully negotiated with LA Regional Water Quality Control Board.

- ***Principal Hydrogeologist, former aerospace facility, AlliedSignal Aerospace Equipment Systems, Rancho Dominguez, California***: RCRA remedial investigation to delineate the extent of chlorinated VOC impacts to groundwater and the feasibility of remediation by monitored natural attenuation (MNA). Site closure achieved.
- ***Principal Hydrogeologist, perchlorate treatability study, Edwards Air Force Base, California***: Environmental tracer study of long-term recharge rates in the Mojave Desert using chloride balance method, bomb tritium, CFC profile analysis, unsaturated flux calculation. Results submitted to Army Corp of Engineers; presentation to California Groundwater Association.
- ***Project Hydrogeologist, DBCP Impacts to Groundwater; FMC Corp., multiple locations, USA***: Forensic data analysis, vadose zone fate and transport modeling, insurance cost recovery evaluation.
- ***Principal Hydrogeologist, Sulfometuron methyl (SM) pesticide migration and crop damage, multiple farm corporations, Southern Idaho.*** Designed and conducted vadose zone numerical modeling study of a rangeland applied post-fire pesticide application using Hydrus-2D. Evaluated V2DT modeling work, wrote two expert opinion reports, deposition testimony. Site reconnaissance and court testimony are scheduled.
- ***Principal Project Hydrogeologist and Team Leader, multiple locations in Arizona, California, Nevada, New Mexico; New York Orion Power Holdings, LLP.*** Power generation asset acquisition due diligence, manage air emissions control evaluation, hydrogeologic environmental site assessment, remedial cost estimation, assess NPDES requirements, evaluate seller EIRs, participate in asset auction bid preparation, manufactured gas plant, steam and combustion turbines, ,.
- ***Principal Project Hydrogeologist, chlorinated hydrocarbons, historic manufacturing activities, Confidential Regional Medical Center, Los Angeles Metro Area***: Real estate development due diligence and acquisition consultation, property historical research, environmental compliance assessment, streamlined feasibility study and remedial cost estimation; developed 3-secenario remedial economic/risk analysis. Property purchased.
- ***Principal Hydrogeologist, Intrinsic Remediation Sites, Texaco, Victorville, California; Roadway, Fresno, California***: Demonstrated viability of intrinsic natural attenuation mechanisms at two operating service stations (Texaco) and an operating trucking terminal (Roadway) to remediate petroleum hydrocarbons. Utilized innovative monitoring networks including soil vapor monitoring, barometric and thermal monitoring, neutron monitoring, and numerical fate and transport modeling that coupled vadose zone and groundwater transport. Site closures achieved.
- ***Technical Specialist, Refinery Remediation, Bakersfield Refinery, Bakersfield, California.*** Designed a pilot soil vapor extraction test along with vapor recovery by condensation and return to refinery operations; developed final design of a remediation recovery system for petroleum reformate impacting the vadose zone and groundwater (annual fluctuations up to 100 feet). Final extraction system design addressed impacted soils 90 feet deep over an area 25 acres in size. Enhanced by air sparging, the system has recovered over 1.5 million gallons of petroleum reformate from the well field.
- ***Principal Hydrogeologist, waste soil pile remedial investigation, Bakersfield, California.*** Directed CERCLA-based remedial investigation at a former waste recycling/treatment facility for soils impacted by

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metals, VOCs chlorinated hydrocarbons, petroleum hydrocarbons, fuel oxygenates, semivolatile organic compounds (SVOC), polynuclear aromatic hydrocarbons (PAH), PCBs, pesticides, and herbicides. Developed an innovative field-sampling plan using a custom-made hybrid between a direct push rig and an extending fork lift to extract samples. Conducted a statistical analysis of the sampling data used to identify the appropriate method of waste disposition. Remediation by excavation and off-site treatment. Communicated with PRP group and interacted with DTSC.

- ***Technical Specialist, EG&G, Rocky Flats Nuclear Manufacturing Facility, Colorado.*** Principal reviewer of performance evaluation modeling of vadose zone and groundwater modeling to assess viability of remediation by entombment of radionuclides and mixed wastes under alternative cap at low-level radioactive waste disposal site, Rocky Flats plant, Colorado.
- ***Principal Investigator, metals soil column study, Springfield Township Committee, Springfield, Michigan***. Managed controlled laboratory study to design, implement, and report on comparison of soil column leaching to the Synthetic Precipitation Leachate Procedure batch testing methodology (EPA Method 1312). Demonstrated attenuation of metals and PCB's within soil media through soil sorption.
- ***Technical Specialist, petroleum hydrocarbon fate and transport analysis, Farmland Industries, Coffeyville, Kansas.*** Modeled the potential impacts to groundwater of residual vadose zone concentrations of petroleum hydrocarbons at an 85-year old refinery operated by Farmland Industries in Coffeyville, Kansas.
- ***Technical Specialist and Reviewer, DTSC California school siting, William S. Hart Union School District, Santa Clarita, California.*** Preliminary Endangerment Assessment (PEA). Project challenges included: rugged inaccessible terrain; oil drilling and production, and explosives manufacture and testing on adjacent properties; active community participation in the siting process; and an aggressive overall construction schedule. Ambient air monitoring systems were deployed at strategic site locations. Over 100 soil and 150 soil-gas samples collected from over 50 borings within and around the 50-acre school site. Based on the project findings, the school district funded the final construction of the school.
- ***Technical Specialist, low-level radioactive waste disposal, EG&G, Rocky Flats Nuclear Manufacturing Plant, Golden, Colorado.*** Designed a vadose zone characterization and monitoring program. Identified contaminant release sources, developed conceptual model of the subsurface geology, mechanisms and pathways for contaminant migration, candidate remedial approaches, and viable monitoring approaches during closure and post closure. Contaminants of concern included nitrates and a variety of actinides.
- ***Principal Hydrogeologist, biosolids land application, City of Santa Barbara, Santa Ynez, California.*** Evaluated suitability of the land application of dewatered anaerobically digested sewage sludge. Developed model to calculate, assess, and forecast nitrogen balance for the site. Made recommendations for site-specific agronomic loading rate, Determined maximum annual and cumulative biosolids application rates. Designed and implemented a surface-water, groundwater, soils, and soil pore liquids monitoring system.
- ***Principal Project Hydrogeologist, TCE Joplin, Missouri***: Ball bearing manufacturing site, fate and transport analysis in area of karst hydrogeology, litigation support.
- ***Principal Project Hydrogeologist, pesticide formulation and distribution site, Great Lakes Chemical, Irvine, California***: Fate and transport analysis, forensic data evaluation. Allocation of liability.
- ***Collaborating Principal Investigator and Co-Author, Lawrence Livermore Reports, State of California***: State Water Resources Control Board, University of California and Lawrence Livermore National Laboratory Study, State-wide Investigation of Leaking Underground Fuel Tanks Impact on Groundwater.

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Conducted study that determined that passive bioremediation of petroleum hydrocarbons leaked from underground fuel tanks is an effective alternative to active engineered remediation approaches. As a result of the study, the State Water Resources Control Board recommended to its nine regional water boards that passive remediation should be considered the primary remediation tool in most cases once the fuel leak source has been removed.

- ***Collaborating Principal Investigator for Multi-Agency Petroleum Hydrocarbon Remediation Demonstration Project, Department of Defense (DOD) sites throughout the state of California:*** Conducted site inspections and met with base civilian and military personnel. Participated in expert panel demonstration of innovative and alternative risk-based cleanup strategies and recommended alternative innovative remediation approaches to cleanup petroleum hydrocarbons that contaminated soils and groundwater at the respective base sites.
- ***Technical Specialist, petroleum hydrocarbon fate and transport, Western States Petroleum Association, California.*** Initiated study to determine fate and transport of heavy crude oil products and byproducts and coordinated exchange of data with the American Petroleum Institute in Washington, DC.
- ***Technical Specialist, vadose zone monitoring, US EPA, Alton, Missouri.*** Demonstrated and installed a vadose zone monitoring system at a Superfund hazardous waste land treatment site for polychlorinated biphenyls (PCB).
- ***Technical Consultant, national lab site characterization, Lawrence Livermore National Laboratory, Livermore, California.*** Served as reviewer and consultant to LLNL, designed infiltration experiment to determine the influence of precipitation on the migration of chemicals, including radionuclides, through the vadose zone. Developed laboratory protocols for hydrologic testing of soil core samples
- ***Principal Investigator, tritiated water vapor diffusion, University of California, Santa Barbara.*** Designed an experiment to measure diffusion coefficients of tritiated water vapor in undisturbed soil cores.
- ***Principal Hydrogeologist, heap leach mining, confidential client, Kingman, Arizona.*** Managed installation, testing, and reporting of vadose zone monitoring systems including suction lysimeters and gypsum block arrays for a heap leach mining facility in Kingman, Arizona.
- ***Principal Investigator, vadose zone monitoring, Santa Barbara County, Santa Ynez, California.*** Provided neutron moderation logs to document background soil moisture conditions in the vadose zone below a leaking underground storage tank contaminating groundwater at Santa Ynez Airport.
- ***Technical Specialist, tritium migration modeling, Brookhaven National Laboratory, Upton, New York.*** Modeled and provided opinion of the significant factors affecting tritium migration beneath the High Flux Beam Reactor at Brookhaven National Laboratories.
- ***Principal Investigator, USEPA, Santa Barbara, California.*** Supervised a comparison of three functional forms for representing soil moisture characteristic curves.
- ***Technical Specialist, vadose zone transport modeling, Spokane Regional Solid Waste Disposal Project, Spokane, Washington.*** Developed and wrote a predictive scenario model to approximate the time-dependent travel distance of a wetting front below a breach in an earthen liner at three potential solid waste landfill disposal sites.
- ***Principal Investigator, Geographic Information System, Multiple Agencies, Santa Barbara County, California:*** Developed an interagency cooperative agreement between UCSB, USEPA, the US Bureau of Reclamation, and the US Air Force Space Command to develop GIS suitable for use in decision-making in ground water and vadose zone characterization and remedial investigations.

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Representative Professional Assignments Continued

- ***Principal Investigator, Geographic Information System (GIS), Vandenberg Air Force Base.*** Conducted a one-day GIS workshop at VAFB on developing groundwater and vadose zone remedial action plans. Subsequently managed development of GIS suitable for use in decision-making in ground water and vadose zone characterization and remedial investigations. Designed a GIS to facilitate remediation of approximately 1,000 underground storage tanks (USTs) at VAFB. Reviewed USBR field investigation strategies and protocols and served in a training capacity with respect to vadose zone hydrogeology.
- ***Principal Investigator, Vadose Zone Research Laboratory, University of California, Santa Barbara.*** Conducted research under USEPA cooperative agreement funding and lectured in Engineering Geology, Hydrogeology, Geography, and Environmental Engineering courses on the subject of vadose zone hydrologic processes. Conducted course instruction for upper division course on soil processes.
- ***Principal Author, EPA Guidance Document, USEPA, Washington, D.C.*** Wrote guidance document under RCRA Subtitle C entitled "Vadose Zone Monitoring at Hazardous Waste Sites". The work was a compilation of research efforts conducted at the Vadose Zone Monitoring Lab at the University of California at Santa Barbara.
- ***Principal Author, Vadose Zone Monitoring Case Studies, USEPA.*** Provided vadose zone monitoring case histories for the purpose of developing an agency position and rationale upon which national vadose zone monitoring regulatory requirements have been developed and promulgated under the RCRA.
- ***Principal Author, Environmental Standards Development, ASTM.*** Developed national standards for vadose zone monitoring through ASTM (formerly the American Society of Testing and Materials) and served as task force leader for D-18.04 Hydrologic Properties of Soil - Laboratory Techniques. Authored or co-authored four national standards:
  - Standard Test Method for the Determination of a Soil Water Retention Curve by Pressure Plate Extraction, ASTM D2325
  - Standard Test Method for the Determination of Soil Water Retention Curve by Pressure Membrane Extraction, ASTM D3152
  - Standard Guide to Soil Pore-Liquid Sampling in the Vadose Zone
  - Standard Guide to Soil Core Sampling in the Vadose Zone, and reviewed numerous others
- ***Principal Investigator, lysimeter evaluation, USEPA.*** Evaluated use of pressure-vacuum lysimeters for obtaining representative vadose zone water samples containing volatile organic compounds.
- ***Principal Investigator, reclaimed water irrigation, Facilities Management, University of California, Santa Barbara.*** Studied feasibility of using reclaimed wastewater for landscape irrigation.
- ***Project Scientist, solid waste assessment tests, Kern County, Bakersfield, California.*** Participated in Solid SWAT Investigations, monitoring programs, and closure plans for landfills. Assisted with the preparation of a Report of Waste Discharge, Report of Disposal Site Information, CEQA Documents (Negative Declaration), Auto-Shredder Feasibility Study, and Infectious Waste Feasibility Study. Assisted in preparing detailed site expansion plans for both vertical and horizontal expansion of the landfill. Participated in the completion of a Final Closure Plan, Post-Closure Maintenance Plan, Vadose Zone Monitoring Program Report, Gas Monitoring Program Report, Buffer Zone Evaluation Report, Special Impact Studies, and Supplemental Groundwater Monitoring Report.
- ***Principal Investigator, solid waste landfill monitoring, Calaveras County, Angels Camp, California.*** Supervised installation of an innovative, automated vadose zone monitoring system at a Calaveras County solid waste landfill used remote-deployed neutron probe.

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- ***Principal Investigator, landfill monitoring system design, Johnson Canyon Road Landfill, Monterey County.*** Designed, constructed and installed a unique vadose zone monitoring system that combined direct pore-liquid, indirect pore-liquid, and soil-gas monitoring techniques with retrofit installations of these monitoring devices completed to depths of over 300 feet below grade.
- ***Technical Specialist, landfill monitoring system design, Woodward Clyde, Flagstaff, Arizona.*** Technical Advisor and Lead Designer for the design and installation of a vadose zone monitoring system at a landfill in Arizona. The design was notable in that it was implemented as a preventative plan and used in lieu of a groundwater monitoring system.
- ***Technical Advisor, vadose zone landfill monitoring system design, Santa Barbara County, Santa Barbara County, California.*** Advised Santa Barbara County Solid Waste Disposal Unit regarding application of vadose zone monitoring techniques to the groundwater monitoring strategy being developed for use at Foxen Canyon Landfill.
- ***Technical Specialist, instrumentation development, Soilmoisture Equipment Corp., Santa Barbara, California.*** Managed research and monitoring instrumentation product and market development for applications including hydrogeology, environmental engineering, research, well drilling, oil exploration, and natural resource management in over 50 countries.
- ***Technical Specialist, landfarm monitoring system design, wood treatment facility, Alton, Missouri.*** Developed instructional videotape for the USEPA Region VII Laboratory that demonstrated vadose zone monitoring techniques and methodologies.
- ***Principal Laboratory Investigator, laboratory soil hydrologic studies, Oklahoma, Michigan.*** Developed the conductivity-pressure head relationship for mine spoils in Oklahoma and a compacted clay liner in Michigan.
- ***Principal Investigator, instrumentation design and development, USEPA.*** Conceived an innovative air permeameter in which the soil-water matric potential can be precisely controlled, permitting quantification of soil air permeability under changing pore liquid content conditions. Patent pending.
- ***Principal Hydrogeologist, Water Master Plan Update 2007-2008, Big Bear Community Services District, Big Bear City, CA.*** Principal in charge of team that conducted work that evaluated: water system service area review; population projections ad future water use, source of water supply; storage requirement reviews; water distribution systems review, analyses, and projection; update of drought contingency plan; new water systems facilities and construction costs; systems operations evaluation; improvement review; fee review; and, financing alternative review. Dr. Cullen also headed up the evaluation of long term recharge for the Big Bear Valley using the Distributed Parameters Watershed Model, a water balance approach that uses fine level of spatial discretization.
- ***Principal Hydrogeologist, strategic long-term groundwater management plan, Owens Valley, Los Angeles Department of Water and Power (LADWP), Los Angeles, California.*** Conducted a study of a technical groundwater management guidance protocol for the management of Owens Valley groundwater resources. Performed detailed analysis of hydrologic instrumentation used in Owens Valley, conducted mathematical analysis of the algorithms used to make groundwater pumping decisions, and evaluated the scenarios that would result from following the management protocols. Evaluated the state-of-the-art methodologies for measuring and estimating evapotranspiration. Proposed approach to the strategic management of groundwater in the Owens Valley subsequently recommended for adaptation.
- ***Principal Hydrogeologist, Quantification of Nitrogen Removal, Eastern Municipal Water District (EMWD), Perris, CA.*** Performed subsurface evaluation associated with recycled water storage ponds.

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Representative Professional Assignments Continued

Project involved data collection and review, conceptual modeling, pressure/vacuum lysimeter and monitoring well installation, sampling, analysis and reporting. Data evaluation demonstrated total inorganic nitrogen removal from recycled water during recharge on the order of three times the default reduction values used in Regional Water Quality Control Board (RWQCB) models. Tasks included: project design; drilling and lysimeter installation oversight; weekly and monthly monitoring and sample collection; data evaluation using comparison of boron to chloride ratios and stiff water quality diagrams comparisons to native water; control duplicate sampling; presentations of project findings to stakeholders from the RWQCB, Technical Oversight Committee, and EMWD Board and Staff personnel.

- ***Principal Hydrogeologist, Watershed Management and Hydrologic Monitoring, Confidential Client, Southern California.*** Oversee hydrologic monitoring program and water balance modeling effort to document and ensure that irrigation of reclaimed wastewater does not result in downslope geotechnical instability. Task included: development of a water balance model; monitoring of irrigation, ET, surface runoff, soil storage, and deep percolation; monitoring of perched and regional groundwater elevations; water quality sampling and reporting; support NPDES permit requirements; semiannual and annual reporting to regulatory agencies and community groups; general hydrologic advice regarding recycled water demand, water conservation, water quality enhancement, and operational efficiency measures aimed at saving money.
- ***Principal Hydrogeologist, Installation and Testing of the Vadose Zone Monitoring System, Los Angeles County Sanitation District, Water Reclamation Facility (WRF) , Effluent Management Site, Palmdale, California.*** Installed and tested vadose zone monitoring instrumentation in soils receiving treated water from the Palmdale PWRP. Tasks included: project management, monitoring system design and instrumentation selection review; monitoring instrumentation testing, calibration, and installation; soil sampling and analysis; field data collection; reporting. Instrumentation included: percolation samplers; pressure/vacuum lysimeters; ECHO soil moisture sensing probes; data loggers.
- ***Principal, natural resource inventory, Santa Cruz, Inc., Cazadero, California.*** Performed investigation of the geologic, hydrologic, soils, and biological resources on a 3,000 acre ranch in northern California and wrote a plan to develop the water resources and a profitable agricultural enterprise.
- ***Lead Scientist, agricultural and irrigation management, Various Private and Corporate Farms, Montana and South Dakota.*** Supervised an interdisciplinary team that studied and consulted in the areas of dryland soil water management, irrigation management, and the use and management of pesticides.
- ***Assistant Research Scientist, Hydrologic, soil and geotechnical research, U.S. Forest Service, Libby, Montana; Darby, Montana; Bozeman, Montana.*** Designed, conducted, and wrote research on the effect of heavy machine traffic on the hydrologic, chemical, physical, and engineering properties of compacted soils. Lectured to introductory soil science classes and soil physics laboratory sessions.
- ***Project Scientist, geologic, hydrologic, and soil resource inventory, Tongass National Forest, U.S. Forest Service, Sitka, Alaska.*** Surveyed watershed resources and conducted project level planning. Wrote technical manuals on slope stability, floodplain logging, and soil and hydrologic survey work. Co-authored the first detailed soils maps of northeast Chichagof and Admiralty Islands, southeast Alaska.
- ***Assistant Project Scientist, hydrologic and soil resource inventory, U.S. Bureau of Land Management, Salem, Oregon.*** Conducted watershed surveys and wrote a soils handbook and map of the Mollala area and watershed in the Western Cascades with associated management guidelines. Developed a detailed map of road engineering feature the resulted in stream sediment loading.

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Additional Professional Training

OSHA 40-hour Health and Safety Training

OSHA Hazardous Waste Supervisor Training

National Groundwater Association Webinar, A Practitioner's Guide to Isotope Hydrology; NGWA Webinar No. 825, Instructor Ian Clark, PhD.

Professional Affiliations

American Society of Agronomy (ARCPACS)
American Society of Testing and Materials, 1985 - 2000
- Soil and Rock Committee (full voting member)
- Hydrologic Properties of Soils Subcommittee
- Chairman of Task Group on Hydrologic Properties of Unsaturated Soils
- Vadose Zone Monitoring Subcommittee
- Waste Disposal Committee (full voting member)
- Environmental Assessment of Commercial Real Estate Transactions Committee (full voting member)

Association of Groundwater Scientists and Engineers (National Groundwater Association), No. 121697
Coast Geologic Society
Groundwater Resources Association of California
Soil Science Society of America
Southern California Water Utilities Association

Professional Experience

Daniel B. Stephens & Associates, Inc., Santa Barbara Co., California, September 2004 to present
Hydrogeologist, Senior Vice President, California Operations

MWH Americas, Inc., Santa Barbara Co., California
Principal Hydrogeologist, Vice President, Domestic Energy & Infrastructure, June 2002 - September 2004
Director, National Experts Group, June 2002 to September 2004

IT /Shaw Group, Santa Barbara, California, May 2000 to August 2002
Principal Hydrogeologist, Vice President, Environment and Infrastructure

Arcadis Geraghty & Miller, Inc., Santa Barbara, California
Principal Hydrogeologist, Associate Vice President, February 1998 to May 2000
Principal Hydrogeologist, Area Operations Manager, June 1997 to February 1998
Principal Scientist, Office Manager, November 1992 to February 1998

University of California, Santa Barbara, Vadose Zone Monitoring and Research Laboratory, Institute for Crustal Studies, Faculty, Assistant and Associate Research Hydrologist, August 1989 to 1996

Metcalf & Eddy, Santa Barbara, California, November 1990 to November 1992
Senior Environmental Scientist

Kaman Sciences Corporation, Santa Barbara, California, August 1989 to November 1990
Senior Environmental Scientist

Soilmoisture Equipment Corp., Santa Barbara, California, June 1985 to August 1989
Director of Technical Marketing and Product Development

Private Environmental Consultant, Santa Rosa, California, June 1984 to August 1985

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Professional Publications and Presentations Continued

Steffen Robertson Kirsten, Lake County, California, March to June 1984
Geotechnical Laboratory Support, Heap Leach Mining

Centrol, Inc., Webster, South Dakota, September 1981 to February 1984
Lead Soil Scientist, Consultant, and Operations Manager

Montana State Cooperative Extension, Fairfield, Montana, May to August 1981
Extension Specialist, Irrigation Management and Nitrate Groundwater Pollution

Montana State University, Bozeman, Montana, September 1979 to April 1981
Faculty, Assistant Research Soil Scientist

United States Forest Service, Tongass National Forest, Sitka, Alaska, January 1978 to September 1979
Forest Soil Scientist

United States Bureau of Land Management, Salem, Oregon, July to September, 1977
Soil Scientist

United States Forest Service, Klamath National Forest, Seiad Valley, California, June to August, 1976
Soil, Geologic, Hydrologic, and Timber Survey Intern

Professional Publications and Presentation

Schnaar, Gregory, and S. Cullen, 2009. *The Hydrology of Geologic Sequestration.* Southwest Hydrology, Vol. 8, No. 5, September/October 2009.

Stephens, D.B., S. Moore, and S. Cullen, 2009. *Artificial Recharge Using Water Harvesting and Dug Wells.* Presentation to Ground Water for the Americas Conference, National Groundwater Association, Panama City, Panama, June 8 to 10, 2009.

Kear, J., F. Manghi, S.J. Cullen, P.M. Kaiser, 2009. *Quantification of Nitrogen Removal under Recycled Water Recharge Ponds.* Invited presentation to California 09 Section Conference of the WaterReuse Association, March 22-24, 2009, Intercontinental Mark Hopkins Hotel, San Francisco, California.

Cullen, S. J., Todd G. Umstot, and Daniel B. Stephens, 2009. *Parameter Estimation or Measurement for Vapor Transport Modeling?* Invited presentation to The 19th Annual AEHS Meeting and West Coast Conference on Soils, Sediments, and Water, March 9-12, 2009 Mission Valley Marriott, San Diego, California.

Cullen, S.J., J. Kelsey, N. Blandford, D. Reaber, 2007. Principal Workshop Developer and Instructor, *Vadose Zone Hydrology: Principles and Practices*, two day workshop co-sponsored by Wyoming Department of Environmental Quality, Sheridan, Wyoming, October 25-26, 2007.

Sahu, R., Cullen, S.J., M. Jones, D. Reaber, 2007. Development of a Conceptual Site Model of Chemical Migration in Groundwater Adjacent to the Las Vegas Wash, *Bringing Water To The Desert, Spring Conference, American Water Works Association*, April 19, 2007, Las Vegas, Nevada.

Cullen, S.J., R. Sahu, M. Jones, D. Reaber, 2006. Invited speaker, Investigating Paleochannel Occurrence Near The Las Vegas Wash, *High Resolution Site Characterization & Monitoring,* California Groundwater Resources Association, November 14, 2006, Long Beach, CA

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Professional Publications and Presentations Continued

Cullen, S.J., R. Sahu, M. Jones, D. Reaber, 2006. Invited speaker, An Investigation of Perchlorate Impacts to Groundwater in the Las Vegas Vicinity, *2006 Water Quality / Regulatory Conference*, East Valley Water District, October 26, 2006, Ontario, California.

Cullen, S.J. 2005. Invited speaker, The Driving Force to Perchlorate Leaching: Application of Methods To Date Historic Meteoric Recharge Travel Time to Groundwater, "*Environmental Forensics: Focus on Perchlorate*", Workshop sponsored by the International Society of Environmental Forensics, La Fonda on the Plaza, Santa Fe, New Mexico, September 21- 22, 2005

Sahu, R., S. Cullen, and M. Jones. 2005. An Update on Remedial Investigations of the BMI Site Common Areas Properties, Henderson, Nevada, presented to the BMI and Vicinity - All Companies Meeting, May 24, 2005, Henderson, Nevada.

Cullen, S.J. 2005. Invited speaker, Theory and Application of Vadose Zone Instrumentation, *The Santa Barbara Groundwater and Vadose Zone Instrumentation Workshop*, Soilmoisture Equipment Corp., May 17, 2005, Goleta, California.

Cullen, S.J. 2005. Invited speaker, Commercial Applications of Laboratory and Field Groundwater and Vadose Zone Instrumentation, *The Santa Barbara Groundwater and Vadose Zone Instrumentation Workshop*, Soilmoisture Equipment Corp., May 17, 2005, Goleta, California.

Cullen, S.J. 2005. Invited speaker, Theory and Application of the Guelph Permeameter, *The Santa Barbara Groundwater and Vadose Zone Instrumentation Workshop*, Soilmoisture Equipment Corp., May 17, 2005, Goleta, California.

Cullen, S.J. 2005. Invited speaker, The Importance of Environmental Protection of Soil and Groundwater Worldwide, *The Santa Barbara Groundwater and Vadose Zone Instrumentation Workshop*, Soilmoisture Equipment Corp., May 16, 2005, Goleta, California.

Cullen, S.J., W. Allmon, and T. Battey. 2005. An Evaluation of Baseline Recharge Conditions at a Perchlorate-Impacted Site in an Arid Environment, a technical poster presentation to the California Groundwater Resources Association meeting, "Artificial Recharge: Nexus of Quantity and Quality in California", March 16-17, 2005, Sacramento, California.

Cullen, S.J. 2004. Fate and Transport of Perchlorate in the Subsurface. Invited presentation to the American Chemical Society, Annual Meeting, March 31, 2004, Anaheim, California.

Cullen, S.J. 2002. Dry Cleaners: Characterizing and Remediating Multiple Sources of PCE in a Complex Hydrogeologic and Legal Environment. Invited presentation to Entech West 2002, November 12, 2002, Long Beach, California.

Cullen, S.J. and M. Lupo, 2001. Soil Bioventilation and Modeling of Air Flow. *In* American Microbiological Society (eds.), Manual of Environmental Microbiology, 2nd Edition, American Microbiological Society Press, Washington, D.C.

McNab, W.W., Jr., B.P. Dooher, D.W. Rice, S.J. Cullen, L.G. Everett, M.C. Kavanaugh, W.E. Kastenburg, M.C. Small, and P.C. Johnson. 1998. Risk-Based Assessment of Appropriate Fuel Hydrocarbon Cleanup Strategies for the Base Exchange Service Station at Vandenberg Air Force Base, California. Report submitted to the Air Force Center for Environmental Excellence, Environmental Restoration Directorate, Technology Transfer Division, Brooks Air Force Base, Texas. Lawrence Livermore National Laboratory, Livermore, CA.

Everett, L.G., S.J. Cullen, D.W. Rice, W.W. McNab, Jr., B.P. Dooher, M.C. Kavanaugh, P.C. Johnson, W.E. Kastenberg, and M.C. Small. 1998. Risk-Based Assessment of Appropriate Fuel Hydrocarbon Cleanup

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Publications and Presentations Continued

Strategies for the Naval Exchange Gasoline Station, Naval Construction Battalion Center, Port Hueneme, California. Submitted to the Naval Facilities Engineering Services Center, Port Hueneme, CA. Lawrence Livermore National Laboratory, Livermore, CA.

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