

Responses to Technical Evidence and Comments Submitted in Regards to Cease and Desist Orders, Los Osos

**Submitted by Central Coast Water Board Prosecution Staff
April 19, 2006**

This document rebuts technical arguments submitted to the Water Board by Designated Parties and Interested Persons regarding the 45 proposed Cease and Desist Orders (CDOs) that will be considered by the Water Board on April 28, 2006. This document is complementary to, and should be considered with, the memorandum from Lori Okun, Prosecution Team counsel, regarding legal issues. Prosecution Team staff has not attempted to quote and respond to every argument brought forward by Designated Parties and Interested Persons, but this document summarizes and responds to major arguments and themes found in many of the submittals, including those of the Los Osos Community Services District (LOCSO).

1.

Prohibition Zone Boundaries are Based on Solid Scientific Evidence and Supported by a Wealth of Monitoring Data

This issue is not before the Board in this matter. However, here is a brief summary. The Central Coast Water Board adopted the Basin Plan Prohibition Zone for Los Osos based on existing wastewater related problems and expected increased wastewater problems. The Basin Plan requires septic tanks to be sited on at least one-acre lots where there are less favorable conditions such as in Los Osos. However, lot sizes (on the average) are closer to one sixth of that size in Los Osos. Soil permeabilities are very high, which is especially problematic when coupled with areas of high groundwater in Los Osos. The Central Coast Water Board also cited findings by others of conditions of contamination and pollution in the Prohibition Zone. Over a third of the monitoring wells exceeded nitrate standards at the time the Board adopted the Prohibition Zone. The Board also had evidence of bacterial contamination (wells and surface waters). The County Health agency recommended adoption of the Prohibition Zone. The adopted Zone boundaries coincide predominantly with areas of highest allowed housing density.

More than two decades of groundwater monitoring data verify that the Prohibition Zone boundary is appropriate. LOCSO's groundwater monitoring program consistently demonstrates that the areas of greatest nitrate contamination correlate to areas of greatest septic system density in the Prohibition Zone. Many years after the Central Coast Water Board adopted the Zone, new testing techniques (DNA) indicate high quantities of fecal coliform bacteria from humans are seeping into the Morro Bay Estuary. During wet weather cycles, high groundwater causes surfacing septic tank effluent in some low-lying areas. Surfacing effluent presents a public health hazard. The LOCSO operates pump systems to alleviate problems in the most severe areas (with potential flooding of homes) by pumping shallow groundwater into the estuary.

2.

All Septic System Discharges in the Prohibition Zone are Contributing to Water Quality Degradation

In Section III.D of its submittal, LOCSO argues that the Water Board did not inspect each septic system or determine the "depth of aquifer, proximity of leach field to streams, proximity to leach field to other leach fields, etc." to determine whether the septic systems are working "as designed and operated." Several other Designated Parties make this argument as well.

First, this information is not necessary in this case because the proposed Cease and Desist Orders are for violations of a complete prohibition of discharges from septic systems. There is no dispute that the subject properties' owners or tenants are discharging from their septic tanks and violating this prohibition. Septic system discharges are illegal in the Prohibition Zone, whether or not the systems are working as designed and operated.

Secondly, Water Board staff could inspect every septic system and provide site-specific information (separation to groundwater, septic system density, etc.) for each property to demonstrate that every property in the Prohibition Zone does not meet Basin Plan criteria. However, such information is really only important in that it is used for siting and design of individual septic systems to determine if that system is acceptable for areas where septic systems are appropriate, i.e., areas *without* a septic system prohibition. Due to septic system density and hydrogeology, septic tanks are not appropriate throughout the Prohibition Zone, with minor exceptions for the Bayview Heights and Martin Tract areas (but only if a sewer system is in place to reduce total waste loading to the basin).

Further, site-specific information clearly is not required in this case because there is a wealth of monitoring data and other information that demonstrates existing septic systems have actually degraded water quality and that continuing discharges are preventing restoration of groundwater quality.

LOCSD's groundwater monitoring program consistently demonstrates that groundwater nitrate concentrations exceed the drinking water standard all over town, including higher ground areas of town where there is significant separation to groundwater (greater than 50 feet). Contour maps provided by LOCSD illustrate that the areas of highest nitrate concentration correlate to areas with greatest septic system density. Nitrate concentrations in groundwater immediately beneath 41 of the 45 properties that received Cease and Desist Orders exceed the drinking water standard. Those properties that are outside of the area where nitrate exceeds the drinking water standard still contribute to water quality degradation. Those properties are either immediately upgradient of and contributing nitrogen to these highly contaminated areas, or are located close to the Bay where shallow groundwater is flushed into the Bay by tidal action. Well 7N1, which is also called the 3rd Street Well, exemplifies this flushing effect. Well 7N1 is less than 200 feet from the Bay, has very shallow groundwater (which suggests that groundwater is hydraulically connected with the Bay and is seeping or spilling into the Bay), and is consistently less than the drinking water standard for nitrate. LOCSD's hydrogeologist affirms this flushing effect in his statement that "NO₃-N concentrations are inferred to decrease at the bay front."¹ One septic system contractor recently reported that he once had to wait until low tide for groundwater to subside to install a replacement leach bed on 2nd Street in Los Osos².

Water quality degradation by septic systems is not limited to nitrate in groundwater. Shallow groundwater seeps into Morro Bay Estuary along the approximately 2.5-mile shoreline within the Prohibition Zone. Analyses of these seeps indicate fecal coliform bacteria greatly exceed standards, and DNA testing indicates the greatest source of these bacteria is humans. During wet weather cycles, high groundwater causes septic tank effluent to surface in some areas and drain into Morro Bay Estuary. There is no question that septic systems in the Prohibition Zone are degrading water quality.

¹ *Los Osos Nitrate Monitoring Program, October 2005 Ground Water Monitoring*, December 2005, Cleath & Associates, page 6 (Document No. 4 of Prosecution Staff's Master Documents List).

² Personal communication with Frank Merrill, April 14, 2006.

In testimony to the State Water Resources Control Board on November 16, 2005, LOCSD Vice-President John Fouche stated, "We know we need the sewer. Water quality is of the utmost importance. That is not even a question."

3.

A Septic Tank Maintenance District Will Not Adequately Reduce Pollutant Loading

Some Designated Parties promote establishment of an On-Site Septic Tank Maintenance District (OSMD) in lieu of the septic tank pumping requirement. An OSMD's duties typically include maintenance of existing systems – replacing deteriorated tanks, turning valves for rotation between leachfields, checking sludge and scum levels, and periodically pumping out septic tanks. However, the problems with Los Osos are mostly related to high density of discharges, with small lots that frequently have deep seepage pits, some areas with shallow groundwater, which in some areas inundates seepage pits and leachfields, providing no vadose zone treatment. The OSMD duties do not alleviate these problems. There are common elements between the two, including periodic pumping and tank maintenance or replacement. However, a typical OSMD pumping schedule is once every three years, while the CDOs require pumping every two months. An OSMD could operate a pumping service that matches with the CDO schedule or perform the tank repairs that the CDOs require. Having a community-wide OSMD perform this service could conceivably reduce costs (economy of scale, group rates). An important consideration is that the Board does not have enforcement authority over an OSMD unless it discharges or causes or contributes to a condition of pollution or nuisance (CWC §13304).

Since the CDOs and an OSMD are not mutually exclusive, and the OSMD could provide additional water quality benefits or cost savings, Prosecution Staff does not oppose an OSMD complementary to the CDOs, as long as developing the OSMD does not deflect resources from developing a community sewer system or other means to terminate all septic system discharges.

Note that several years ago, LOCSD worked with then Assemblyman Maldonado to obtain legislation required for LOCSD to act as an OSMD, as a part of LOCSD's overall wastewater management plan. LOCSD reportedly approved that action on a 3-2 vote, but the legislation did not proceed to law.

4.

Frequent Pumping Will Not Disrupt Proper Septic Tank Function

The primary function of a septic tank is to remove floating and settleable solids from wastewater prior to it overflowing into the disposal field. Nitrogen is highly soluble and is not removed in significant amounts in the septic tank³. Although the solids are decomposed within the tank, there is always a net accumulation of sludge, which decreases the tank's capacity and function. Frequent pumping will maximize the tank's volume and will not disrupt this primary function.

The secondary function of septic tanks is to break down solids through anaerobic decomposition. Some argue that frequent pumping will disrupt this decomposition process. The rate of solids decomposition is very slow compared to the required frequency of pumping, and

³ In: Costa, J.E, G. Heufelder, S. Foss, N.P. Millham, and B. Howes. 2002, Nitrogen removal efficiencies of three alternative septic technologies and a conventional septic system, Environment Cape Cod 5(1):15-24, nitrogen removal in a conventional septic tank ranged from 1% to 3% (Document No. 20b of Prosecution Staff's Master Documents List).

frequent pumping will not completely eliminate the microbiology that causes anaerobic decomposition (when tanks are pumped, they are not sterilized, so substantial residual and microorganisms remain in the tank after pumping), so this is a moot point.

The proposed septic tank pumping requirement is akin to a holding tank and hauling system, which is recognized by U.S. Environmental Protection Agency (USEPA) as an appropriate application in some problematic or environmentally sensitive areas. USEPA's Fact Sheet on holding tanks and hauling systems⁴ states, "[p]ump and haul collection is best used when soil absorption fields do not work (for example, where bedrock or ground water levels are near the ground surface) and there is no sewer system. Typical applications are...where a nuisance or public health hazard must be abated...or where nutrients must be excluded from ground water to protect environmentally sensitive areas."

5.

Septic Tank Pumping Will Not Exacerbate Seawater Intrusion

LOCSO and some CDO recipients have suggested that the proposed schedule of septic tank pumping will dewater the community's groundwater basin and exacerbate seawater intrusion. Staff's analysis is that frequent septic tank pumping will not exacerbate Los Osos' seawater intrusion problem.

Groundwater beneath Los Osos is generally divided into upper, middle, and lower zones by defined clay layers ('aquifers'). Los Osos' primary water supply used to be the upper zone, but has shifted to the deeper zones in recent years since nitrates now contaminate the upper zone.

Over-pumping of the middle and lower zones is decreasing fresh water pressure head in those zones and causing salt water to actively intrude eastward from the Pacific Ocean. The average rate of intrusion from 1985 to 2005 in the middle and lower zones is estimated to be 50 to 60 feet per year⁵.

The community returns water pumped from the deeper zones to the upper zone through septic system discharges and irrigation. The upper zone is underlain with a competent aquifer that prevents significant recharge to the deeper zones. Consequently, groundwater levels in the upper zone have risen significantly since the community was rapidly developed in the late 1970s⁶. In fact, groundwater is so shallow in some of the lower parts of town near the Bay that LOCSO has installed an underdrain system and must pump shallow groundwater into Morro Bay Estuary to prevent localized flooding.

There is clearly a surplus of water in the upper zone. Pumping out septic tanks and dewatering of the upper zone will not exacerbate seawater intrusion. On the contrary, pumping out septic tanks, and eventual restoration of upper zone water quality through installation of a community sewer system, may allow the community to use more of the upper zone, reduce its reliance on the deeper zones, and combat seawater intrusion. Prior to a community sewer system being

⁴ Onsite Wastewater Treatment Systems Special Issues Fact Sheet 4, Holding Tanks and Hauling Systems, Onsite Wastewater Treatment Systems Manual, February 2002, Page SIFS-9 (Document No. 15a of Prosecution Staff's Master Documents List).

⁵ *Sea Water Intrusion Assessment and Lower Aquifer Source Investigation of the Los Osos Groundwater Basin*, July 2005, Cleath & Associates, page 41 (Document No. 5 of Prosecution Staff's Master Documents List).

⁶ Personal communication with Los Osos Community Services District's Hydrogeologist, Spencer Harris of Cleath & Associates, March 29, 2006.

functional, interim pumping will provide some relief from localized flooding and surfacing effluent, and will provide an increased vadose zone for better treatment of discharges from some septic systems. Also, septic tank pumping may lessen the need for LOCSD to pump shallow groundwater into Morro Bay Estuary.

6.

Frequent Septic Tank Pumping Will Not Hinder Agricultural Exchange

The proposed septic tank pumping schedule will not interfere with the potential ability to exchange water with irrigated agriculture operations. First, the agricultural exchange concept is not something that is currently happening, and the concept has not been developed to any appreciable degree. There has been no feasibility study, no detailed analysis of whether water quality will be adequate for the intended use, and no analysis of demand, commitment of use by farmers, areas where water would be pumped, routes for pipelines, pump station locations, or financing means. Second, since the agricultural exchange program is intended to be part of the community sewer system project, the concern about septic tank pumping interference is moot because the community sewer system will end septic system pumping. Lastly, agricultural use requires clean treated water;⁷ septage is not useable.

If LOCSD is suggesting that it plans to start pumping and selling water from the upper aquifer for agriculture use before building a treatment plant, the same concerns apply. No infrastructure exists. The pumping requirements are intended to be temporary, since the CDOs require full compliance with the prohibition by January 2010. Any impact this may have on interim agricultural exchange is entirely speculative.

Finally, discharging waste is a privilege, not a right. LOCSD is essentially claiming it has a vested right to the continued illegal discharges by homeowners. As discussed in the memorandum from Counsel Lori Okun regarding legal issues raised in Designated Parties' responses, this is not the law.

7.

Appropriate Design for a Community-wide Treatment Plant is Not Relevant

In Section III.F of its submittal, LOCSD states, "studies – including studies authorized by the Federal EPA and the SWRCB – conclude that the RWQCB's preferred sewage system is not the best or only method for ameliorating the groundwater in Los Osos," and asserts that Water Board staff is "relying on outdated science in this process." This argument fails for two reasons. First, this entire line of argument is irrelevant because the CDOs are not based on the availability of a project that staff "supports." The Water Board did not design the approved project or select it. Once LOCSD selected its project, the Water Board supported the LOCSD's effort to proceed with its approved project. The community's representatives designed it, and the Water Board approved it because it met all applicable standards. The community has now stopped the project and there is no other project in sight. The CDOs are necessary to ensure that interim measures are taken to protect the environment until any approved wastewater treatment plant is available or until the community implements some other means to comply with the prohibition if no plant is on-line by 2010. Even if staff agreed that the Tri-W project was flawed, which it does not, staff would support interim environmental protection and a deadline for complying with the prohibition.

⁷ See, 22 Cal. Code of Regs. §60304.

Second, LOCSD's irrelevant arguments regarding outdated science are not correct anyway. Water Board staff has considered all of the studies that LOCSD suggests staff has disregarded and none of them are relevant to this case. The first study LOCSD refers to is the *Review of Technologies for the Onsite Treatment of Wastewater in California*, prepared by UC Davis Department of Civil and Environmental Engineering for the State Water Resources Control Board in August 2002. That study rated the performance of dozens of various onsite wastewater technologies. In summary, only 14 of the 37 technologies for which performance data were available are rated to treat domestic wastewater to less than 10 mg/L total nitrogen—the minimum performance necessary to eventually restore Los Osos's groundwater to drinking water standards. And of those 14 technologies (e.g., sequencing batch reactors, membrane bioreactors, and wetlands), all are complex treatment systems that require significant operation and maintenance. None are commonly applied to individual properties for these reasons. Indeed, one of the most highly rated technologies in the study is membrane bioreactors—the central technology of the community wastewater project that LOCSD stopped.

Another commenter, Interested Party Ann Calhoun, said that Dr. John Alexander has an effective on-site nitrogen removal system that has been proven to this "RB staff's satisfaction." Staff met with Dr. Alexander a few years ago and he indicated that his system would not be applicable to residential use. Staff understands that the system is not commercially available. Approximately 15 years ago, Dr. Alexander pilot tested his galvanic agglutinator at the Morro Bay/Cayucos Wastewater Treatment Plant. The system did not function properly. Dr. Alexander claimed that that particular failure was due to the limited size of the project (pilot test was conducted with a 55 gal drum). Contrary to Ms. Calhoun's claim, the system has not been proven to "staff's satisfaction."

8.

Atmospheric Deposition of Nitrogen by the Morro Bay Power Plant is Not a Significant Contributor of Nitrogen to Los Osos Groundwater

LOCSD also argues that frequently asked questions regarding atmospheric deposition in USEPA's Handbook for Watershed Managers somehow "reveals that the RWQCB is proceeding pursuant to antiquated scientific theories." Later, LOCSD argues "the RWQCB's failure to perform any studies in preparation of these prosecutions – in particular, studies of the effect of the Morro Bay power plant's emissions on the Los Osos area – render these prosecutions indefensible." These arguments are thinly disguised attempts to convolute the matter before you and do not necessitate a response. However, it must be clarified that atmospheric deposition of nitrate is not a significant contributor to Los Osos groundwater pollution.

In 2002, Tetra Tech estimated nitrogen loading to Morro Bay resulting from atmospheric deposition of air discharges from the Morro Bay Power Plant and compared that loading to estimates from other sources of nitrogen loading to Morro Bay, such as agriculture and urban stormwater runoff from the Chorro Creek and Los Osos Creek watersheds⁸. The study states, "It appears that the current contribution of nitrogen from the power plant is less than 1 percent of the total nitrogen load to the [Morro Bay] estuary." The Morro Bay watershed is 48,000 acres and only a small fraction of its runoff could recharge Los Osos groundwater, so it is reasonable to assume that atmospheric deposition contributes an insignificant amount (much less than 1% of total nitrogen loading) to groundwater beneath Los Osos. The Tetra Tech study concluded, "it appears unlikely that nitrogen deposition from the power plant to the watershed will result in

⁸ Butcher and Rimelman, Tetra Tech, Scoping Air Deposition of Nitrogen to Morro Bay, June 2002 (Document No. 12a of Prosecution Staff's Master Documents List).

significant loading to Morro Bay. Elevated nitrate loads observed in tributaries entering Morro Bay are most likely attributable to loading from agricultural and residential land uses, particularly septic systems.”

The absence of a link between atmospheric deposition and Los Osos groundwater is further verified by the fact that the Morro Bay Power Plant has not operated for any significant length of time since 2002, yet there is no discernible decrease in nitrate concentrations of Los Osos groundwater. Groundwater nitrate concentrations are generally greatest in areas of highest septic system density in Los Osos, with concentrations decreasing at the Prohibition Zone boundaries and beyond. To blame the power plant, one must assume that nitrogen from the stacks somehow selectively travels through the air, deposits, and concentrates in this same area of extremely high septic system density. LOCSO exhibits a severe misunderstanding of air and water pollution principles, and the matter before you, with its suggestion that atmospheric deposition must be considered in this matter.

9.

Groundwater Nitrate Concentrations Have Not Decreased Since 1983

Some CDO recipients submitted comparisons of groundwater nitrate data from 1983 to data from April 2005 in an attempt to demonstrate that nitrate levels have decreased since 1983⁹. Upon closer inspection, the apparent decrease in values is attributed to the way the data is reported, not actual decreases. The nitrate data from 1983 is reported as nitrate. The nitrate data from 2005 is reported as nitrogen. The difference in values is a result of the difference in molecular weight of nitrate and nitrogen (nitrate is 4.45 times heavier than nitrogen). Correction of the 1983 values demonstrates that nitrate concentrations in groundwater have clearly increased since 1983. Correction of the limited data set provided by the CDO recipients demonstrates that average nitrate concentrations were 30% higher in April 2005 than in 1983. Also, the number of wells that exceed the drinking water standard of 10 mg/L nitrate as nitrogen increased from 9 out of 26 wells in 1983 to 13 out of 26 wells in 2005. This is consistent with the long-term groundwater data set, which demonstrates discernible upward trends in nitrate concentrations in nearly all wells since 1983.

10.

Conclusion

None of the arguments put forth by the Designated Parties or Interested Persons are able to refute the basis of the proposed Cease and Desist Orders, which is that every person who disposes of sewage within the Prohibition Zone does so in violation of the Water Board's Basin Plan. Since local government has failed for nearly 20 years to implement a project that would allow residents to comply with the prohibition, compliance now falls to the individuals who are ultimately responsible for the waste discharges. The requirements of the proposed Cease and Desist Orders are reasonable interim measures to reduce the effects of the ongoing, illegal, septic system discharges.

Attachments:

1. Legal Memo by Prosecution Staff Counsel Lori Okun dated April 19, 2006
2. Master Documents List, Revised April 19, 2006

⁹ See submittals by Bishop and DerG...