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

Submitted by Central Coast Water Board Los Osos Prosecution Team
November 30, 2006

This document responds to technical and scientific arguments submitted to the Central Coast Water Board by Designated Parties in response to the proposed individual Cease and Desist Orders (CDOs) that will be considered by the Water Board on December 14-15, 2006. This document is complementary to, and should be considered with, the December 1, 2006, memorandum responding to legal issues prepared by Prosecution Team legal counsel. This document does not quote and respond to every technical or scientific argument brought forward by Designated Parties, but summarizes and responds to major arguments and themes found in many of the submittals, including those of the Los Osos Community Services District (LOCSD).

1.
All Septic System Discharges in the Prohibition Zone Cause or Contribute to Water Quality Degradation

Several Designated Parties point out that their septic systems are functioning as designed or as approved and permitted by the County of San Luis Obispo. Also, several Designated Parties, including LOCSD, argue that the Prosecution Team offers no site-specific evidence that individual properties are polluting groundwater. The Prosecution Team already addressed these points at length in its report prepared August 29, 2006, but includes its response here again for convenience.

First, site-specific evidence such as depth to groundwater or septic system density 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. The studies and monitoring data supporting this prohibition are detailed in the Prosecution Team's August 29, 2006, report. There is no dispute that the subject properties' owners or tenants are within the Prohibition Zone and are discharging from their septic tanks in violation of this prohibition. Septic system discharges are illegal in the Prohibition Zone, regardless of whether the systems are operated properly or working as designed.

Second, Water Board staff could inspect every septic system and provide site-specific information for each property to demonstrate that no property in the Prohibition Zone meets 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 a system is acceptable for areas where septic systems may be appropriate, i.e., areas ***without*** a septic system prohibition. Due to high housing density and unfavorable 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 evidence such as groundwater samples from immediately beneath each property is not required in this case because there is already a wealth of monitoring data and other information that is representative of the entire Prohibition Zone, and which demonstrates that existing septic systems have degraded or contribute to degradation of water quality, and that continuing discharges are preventing restoration of groundwater quality.

Some Designated Parties seem to misunderstand the relevance of LOCSD's groundwater monitoring program to their property. The monitoring program includes a network of 26 wells throughout the Los Osos area. Groundwater samples are collected, analyzed, and then interpolated by a certified hydrogeologist according to widely accepted scientific principles. The nitrate contour maps generated by LOCSD's hydrogeologist represent shallow groundwater throughout the area bounded by the monitoring well network. To suggest that the Prosecution Team should offer site-specific groundwater data is to suggest that the Prosecution Team require Designated Parties to install groundwater monitoring wells on their properties and regularly monitor groundwater depth and quality. The California Water Code provides authority to require such monitoring. However, the Prosecution Team believes such a requirement is not necessary at this time since LOCSD already has a monitoring program that represents groundwater beneath all of the Designated Parties' properties.

LOCSD's groundwater monitoring program consistently demonstrates that groundwater nitrate concentrations exceed the drinking water standard throughout 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. Only one of the six monitoring wells (or 17%) where density is one dwelling unit per acre or less exceeds nitrate drinking water standards. On the other hand, nitrate exceeds the drinking water standard in 15 of the 21 wells (or 71%) where density is greater than one dwelling unit per acre. This suggests that septic system density and groundwater nitrate concentrations are directly related. It also highlights the inappropriateness of the Prohibition Zone's septic system density of 6 to 10 systems per acre.

According to LOCSD data, nitrate concentrations in groundwater immediately beneath 41 of the 45 properties that received proposed 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 nitrate to these highly contaminated areas, or are located close to the Bay where shallow groundwater is flushed to the Bay.

Also, 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 known 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 system discharges in the Prohibition Zone are degrading water quality.

A few Designated Parties argue that certain environmental conditions at their property (e.g., separation to groundwater, housing density, sandy soils) should exempt them from the proposed CDOs. Again, all septic system discharges in the Prohibition Zone are prohibited, regardless of particular environmental conditions at each property. All properties in the Prohibition Zone are causing or contributing to degradation of water quality and are subject to CDOs.

2.
Groundwater Nitrate Concentrations Have Not Decreased Since 1983

One Designated Party argues that groundwater nitrate levels have actually decreased in the last 20 years. The Prosecution Team already addressed this at length in its report prepared August 29, 2006, but includes its response again here for convenience. Groundwater nitrate concentrations have not decreased in the last twenty years. Upon closer inspection, the apparent decrease in values that this Designated Party reports 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 due to the difference in molecular weight of nitrate and nitrogen (nitrate is 4.45 times heavier than nitrogen). Correction of the 1983 values (normalization to being reported as nitrogen) proves that nitrate concentrations in groundwater have clearly increased since 1983. Correction of the limited data set previously provided by this Designated Party 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.

3.
LOCSD Monitoring Wells Appropriately Represent Groundwater Conditions

A few Designated Parties submitted excerpts of an August 2001 written declaration by petroleum engineer Glenn Stillman, claiming that ten groundwater monitoring wells installed by Brown & Caldwell in 1982 were not properly sealed and should be abandoned and replaced. Another Designated Party refers to Stillman's declaration as well as one by retired civil engineer and Los Osos resident Wade Brim, and argues that LOCSD's groundwater monitoring wells "amount to nothing more than ordinary funnels to funnel surface pollutants into the upper aquifer." First, even though the old monitoring wells may not have had 20 feet of sealant, they did have a seal of grout at the surface and bentonite clay from 8 to 12 feet below ground surface. So it is unlikely that the wells served as conduits of surface runoff to groundwater. Second, when these complaints originally surfaced, LOCSD reevaluated all monitoring wells in its network. LOCSD destroyed two wells and replaced 12 wells in May 2002. The new wells all have at least 20 feet of sealant (bentonite, cement-bentonite grout, and concrete), a

locked watertight plug on the well casing, and a sealed well vault. There is very little difference between nitrate monitoring results taken before and after the wells were replaced, demonstrating these claims of groundwater contamination by surface runoff are unfounded. There is a stable or upward trend in nitrate results from these new wells, consistent with the longer-term trend.

4.
Irrigation of Los Osos Soils is Not a Significant Source of Groundwater Nitrate Contamination

One Designated Party submitted a report from the November 2003 edition of Science magazine entitled, ***A Reservoir of Nitrate Beneath Desert Soils***, and suggests that simply irrigating Los Osos soils could be leaching nitrates from the soil into groundwater.

The gist of the study is that nitrate behaves as a solute (i.e., salt). In desert conditions, where there is very little precipitation, high evaporation rates, and soils low in organic matter and microbes, nitrate can accumulate in the soil just beneath the root zone of plants. Nitrate accumulates at this "hydraulic sink" due to the "sustained absence of downward water movement" in the soil caused by low precipitation and high evaporation, similar to how salt would accumulate in a pan of salty water left out in warm weather. The study estimates that a significant reservoir of nitrate could accumulate in these desert conditions over the course of several thousand years. This Designated Party suggests that such a reservoir may exist in Los Osos, and that irrigating the soil could be leaching these nitrates to groundwater.

The desert conditions necessary for this phenomenon to occur do not exist in Los Osos. Los Osos does have sandy soil that is low in organic matter and microbes. However, Los Osos has high precipitation rates and low evaporation rates relative to the desert study sites described in this report. Groundwater levels fluctuate according to wet weather cycles in Los Osos, indicating there is significant downward movement of water in the soil, and inferring that the soil column is regularly flushed by precipitation. There is not a hydraulic sink beneath the root zone of plants where nitrate could accumulate, so there is not likely a natural reservoir of nitrate that could be mobilized by irrigating the soils.

Even if we did assume there was a significant reservoir of naturally occurring nitrate in Los Osos soils, then such nitrates would be mobilized as much by septic tank discharges, which are controllable, as it would be by irrigation of the soils. This would further support elimination of septic system discharges.

And again, there is a wealth of studies and monitoring data specific to Los Osos that point to septic systems as the primary source of groundwater nitrate contamination. These studies and data are discussed in the Prosecution Team's August 29, 2006 report.

As an aside, the referenced report supports the Prosecution Team's position that very little denitrification (i.e. nitrate removal) occurs in Los Osos' sandy soils. It states, "Desert subsoils are persistently low in organic matter, low in microbial populations, low in water content, aerobic, and neutral to basic in pH, all of which promote nitrate stability and inhibit denitrification."

5.
Comparisons to the Proposed Morro Bay/Cayucos Wastewater Treatment Plant Upgrade are Inappropriate

A few Designated Parties point to a proposed timeline for upgrade of the Morro Bay/Cayucos Wastewater Treatment Plant, apparently to argue against the compliance dates of the proposed CDOs. LOCSD's argument is labeled "Morro Bay has been given almost a decade to complete a mere upgrade in an existing plant, while the RWQCB attempts to force Los Osos to site and build an environmentally-unfriendly plant in just four years." This statement is inaccurate and this comparison is inappropriate. Basin Plan Resolution No. 83-13 has required elimination of septic system discharges since 1983. Los Osos has not been given four years to solve the Prohibition Zone, it has been given 23 years. There is an abundance of studies and monitoring data proving that ongoing Los Osos septic system discharges continue to degrade water quality. On the other hand, there is very little or no evidence that the Morro Bay/Cayucos wastewater system has degraded water quality. Morro Bay/Cayucos have volunteered to upgrade their wastewater treatment plant, to eventually forgo their unpopular Clean Water Act Section 301(h)-Modified NPDES permit, and possibly produce recycled water. Morro Bay/Cayucos's wastewater infrastructure is decades ahead of Los Osos, and far more protective of water quality. If studies or monitoring data in Morro Bay/Cayucos pointed to the same or similar conclusions as Los Osos, and it had the same history of non-compliance and delay as Los Osos, then Morro Bay/Cayucos would likely find itself in the same position as Los Osos does now. Different treatment of Los Osos and Morro Bay/Cayucos is well justified.

6.
Conclusion

None of the responses or evidence submitted by the Designated Parties refutes 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 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 appropriate remedies for ongoing violations of the Basin Plan prohibition.