



# California Regional Water Quality Control Board

## Central Coast Region



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July 1, 2008

Mr. Richard Sadowski and Ms. Marla Jo Bruton  
490 Java Street  
Morro bay, CA 93442

### **RESPONSE LETTER ADDRESSING THE MORRO BASIN NITRATE STUDY ISSUES AND CONCERNS COMPLAINT, MORRO BAY, SAN LUIS OBISPO COUNTY**

Dear Mr. Sadowski and Ms. Bruton:

Central Coast Water Board staff has reviewed your April 2008 *Morro Basin Nitrate Study; Issues and Concerns* complaint letter (complaint) submitted on April 9, 2008. The complaint mainly discusses concerns with the December 7, 2007 *Morro Basin Nitrate Study* by Cleath and Associates (Cleath Report) for the City of Morro Bay. This letter provides our response to your complaint.

Your complaint alleges that sewer line exfiltration is the significant contributing source of nitrate contamination to the City of Morro Bay's (City) supply wells. Several Water Board staff members, with extensive background and expertise in isotope fractionation principles, groundwater geochemistry, groundwater flow and transport, and sewer collection systems, reviewed the Cleath Report and your complaint. It is our opinion that the conclusions of the Cleath Report are well founded and supported by several lines of evidence, resulting in a logical explanation. Water Board staff agrees with the conclusion that the primary source of nitrate contamination in the City's wells is from agricultural practices. This letter discusses specific findings of the Cleath Report that demonstrate justification for the report's conclusions.

The Cleath Report examines several chemical and physical processes to assess the possible sources of nitrate in the City's wells. One process evaluates stable isotope fractionation in groundwater. The Cleath Report thoroughly examines associated literature on nitrate isotopic signatures for various sources of nitrate, and compares isotopic data from groundwater collected from each of the four City wells at the Highway 1 well field to literature values (e.g., Figure 14 of the Cleath Report). The Cleath report concludes that nitrate contamination found in the city's well field is not exclusively a result of nitrate fertilizer applications or exclusively from sewer exfiltration. Although the isotopic study by itself may not be conclusive, it demonstrates Cleath and Associate's diligence in investigating any potential sources of nitrate.

The Cleath Report's analysis of the general chemical signature of local groundwater and wastewater suggests that produced supply well water does not have a significant component of wastewater. The Piper diagrams illustrated in the report (e.g., Figure 12 of the Cleath Report) demonstrate a clear separation in cation composition between groundwater and wastewater, even though there is less separation with the anions. Even with cation exchange, any appreciable mixing of exfiltrating wastewater with native groundwater produced by the supply wells would result in the supply well data plotting between wastewater and groundwater fields in the cation Piper diagram, (e.g., Figure 12 of the Cleath Report), which is not the case. Therefore, the chemical signature of the supply well water indicates that wastewater is not a significant component of the water produced and therefore exfiltration is not likely a source of nitrogen/nitrate.

The Cleath Report provides another more direct line of evidence that agricultural sources are the primary source of nitrate by demonstrating the change in nitrate concentrations through time in the lower Morro Valley groundwater and groundwater produced from the supply wells. Knowledge of groundwater extraction dynamics, and the geometry of the Morro Valley alluvium, groundwater gradient, and well field placement, indicate that the well field produces nearly all of its groundwater from the Morro Valley. There is a direct and measurable correlation between nitrate increases in the Morro Valley and nitrate in water produced from the supply wells. For example, average nitrate concentrations in supply well MB-3 were approximately 15 milligrams per liter (mg/L) (Figure 4 and Appendix F of the Cleath Report) prior to 1992. Nitrate concentrations increased to an average of 60 mg/L after 2002 in that well. According to page 12 of the Cleath Report, nitrate concentrations from the lower Morro Valley monitoring wells (sampled in December 1980) averaged 34 mg/L. Lower Morro Valley groundwater samples collected in August 2007 (Figure 6 of the Cleath Report) averaged approximately 136 mg/L (Figure 6). Therefore, concentrations increased in both the City supply wells and the lower Morro Valley groundwater by a factor of four sometime between 1980 and 2007. Assuming no degradation of nitrate occurs, according to the above concentrations, nitrate from the lower Morro Valley is diluted by the creek and rainfall infiltration by a factor of approximately 2.3 before it is produced by well MB-3. These concentration changes through time demonstrate a direct correlation between the nitrate concentrations in the lower Morro Valley groundwater and concentrations found in groundwater produced from the supply wells.

Cleath and Associates made it apparent, in their discussion of "Sewer Exfiltration (page 16 of the Cleath Report)," that certain conditions (i.e., age of pipe, type of pipe, distance to groundwater levels, and pipe elevation) may provide an opportunity for sewer exfiltration to a minimal extent. Central Coast Water Board staff has reviewed the referenced documentation (*Exfiltration in Sewer Systems*, Amick and Burgess, December 2000) and believes that the Cleath Report accurately applies the information to the Morro Basin nitrate source contamination study. Page 17 of the Cleath Report concludes that exfiltration "is not likely a significant source of nitrate contamination to

the City well field." Upon review of your allegations, your report does not provide direct measurable evidence in support of sewer exfiltration being a significant source of nitrate contamination. Water Board staff concurs with Cleath Report's conclusion explaining the sewer exfiltration as less than a significant source of nitrate contamination in the supply well system.

In addition, the City of Morro Bay is required to comply with the Statewide *General Waste Discharger Requirements for Sanitary Sewer Systems, Order No. 2006-0003-DWQ (General WDR)*. The City of Morro Bay obtained enrollment status under this General WDR on January 8, 2007. The General WDR requires the city to develop a sanitary sewer management plan, which specifically includes an operation and maintenance program. The operations and maintenance program is required to include collection system mapping, a preventative maintenance program, a rehabilitation and replacement program, and staff training. Furthermore, the sanitary sewer management plan includes a sanitary sewer evaluation component. The sanitary sewer evaluation identifies and prioritizes deficient portions of the sanitary sewer systems that experience overflows, hydraulic deficiencies, and inflow/infiltration (including exfiltration) issues. Upon preliminary review of the city's sanitary sewer management plan, Central Coast Water Board staff concludes that the city is compliant with General WDR provisions. Additionally, we conclude that the city is proactively operating and maintaining its collections system to correct sanitary sewer system deficiencies. For example, the city's main sewer line was relined the summer of 2001 to prevent infiltration/exfiltration. If there are current deficiencies in the liner, the expected rate of infiltration/exfiltration would be minimal, thus yielding a minimal potential for nitrate contamination.

In summary, Water Board staff concurs with the Cleath Report conclusions based on legitimate lines of evidence. Your complaint letter does not provide sufficient evidence or references to support the suggestion that sewer exfiltration is the primary source of nitrate contamination in the City supply wells. We appreciate your concern regarding nitrate contamination in the Morro Basin. If you have further questions regarding our assessment of the subject reports, please call **David LaCaro at (805)-549-38592** or email at [dlacaro@waterboards.ca.gov](mailto:dlacaro@waterboards.ca.gov).

Sincerely,



Roger W. Briggs  
Executive Officer

CC:

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