

## Water Quality Impacts from Onsite Waste Disposal Systems in the Cherry Valley Community of Interest

*By Kristal Davis Fadtko*

In the City of Beaumont and surrounding unincorporated areas, the only source of drinking water is groundwater, supplied by Beaumont-Cherry Valley Water District (BCVWD), from the Beaumont Management Zone. Rising nitrate levels have been observed in wells underlying the Cherry Valley Community of Interest (CVCOI) and, recently, nitrate-nitrogen (NO<sub>3</sub>-N) concentrations in a couple of groundwater production wells owned by BCVWD have approached the maximum contaminant level of 10 mg/L. NO<sub>3</sub>-N in drinking water in excess of 10 mg/L is of concern because, if ingested, it may cause methemoglobinemia, also known as blue-baby syndrome, in infants less than six months of age. The ingestion of nitrates in drinking water has also been associated with hypertension, diabetes, increased infant mortality, and several types of cancer, including non-Hodgkin's lymphoma.

Onsite Waste Disposal Systems (OSWDS) have been identified as a possible source of nitrate in the groundwater underlying the CVCOI because of the density of households that rely on such systems. Currently, there is no sewer service in the CVCOI; thus, residents rely exclusively on OSWDS for the treatment and disposal of their wastewater. OSWDS are the most frequently reported cause of nitrate contamination in groundwater and their density is one of the most important factors influencing groundwater contamination. The Santa Ana Regional Water Quality Control Board requires a minimum lot size of one half acre per OSWDS. In the CVCOI, about 800 of the approximate 1,900 developed lots with OSWDS are on less than half acre size parcels. At build-out, the total number of lots with OSWDS could reach about 8,800. Hence, there is ample reason for the City of Beaumont and the BCVWD to be concerned with OSWDS discharges to groundwater.

Field studies were conducted to determine the source of nitrate to groundwater. Nine production wells were sampled and groundwater samples were analyzed for  $\delta^{15}\text{N}$ , and selected pharmaceuticals and personal care products (PPCPs). All groundwater samples were within the range of  $\delta^{15}\text{N}$  values of nitrate from septic tank effluent. Six of the nine wells had detectable levels of PPCPs, which included acetaminophen, ibuprofen, sulfamethoxazole, estradiol, progesterone, and testosterone. The simultaneous occurrence of high NO<sub>3</sub>-N concentrations, PPCPs, and the nitrogen isotopes that are associated with OSWDS discharge indicates that OSWDS are the source of nitrate contamination in the Beaumont Management Zone.

The potential nitrate load to groundwater was estimated using literature values of nitrate concentrations in septic tank effluent and the average annual discharge volume for OSWDS in the CVCOI, which was based on an analysis of the water sales data for the period of 2000 to 2005. At build out, the future discharge from OSWDS is projected to be about 13 to 21 percent of the total recharge in the Beaumont Management Zone. This equates to about 185,000 to 500,000 pounds of nitrogen entering the groundwater from OSWDS per year. This means that if the only source of nitrate is OSWDS, they will contribute enough nitrate to groundwater that in the fullness of time, the entire Beaumont Management Zone will be rendered non-potable.

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