



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

Name(s) Anika Danh; Amber Jennings	Project Number S0603
Project Title Nitrates in Ground Water: A Silent Threat	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective is to determine whether nitrate contamination in ground water is more prevalent in an agricultural area versus a rural residential area.</p> <p>Methods/Materials A comparison scenario was created in order to align the experiment with the objective. A total of twenty-five residential and agricultural test sites were determined using the following guidelines established in order to ensure the integrity of the experiment. Each residential test site was defined by its ratio of one house for every two and a half acres that was not presently surrounded or inclusive of any active agricultural operation within a one mile radius. Conversely, the agricultural test sites were defined by the establishment of an active agricultural operation such as those relating to botany or livestock. All water purifiers or softeners were removed for the samples collected from within residential dwellings.</p> <p>Results All of the ground water samples were determined to contain at least one hundred percent of the nonenforceable Environmental Protection Agency's Maximum Contaminant Level guideline of ten parts per million for nitrates. An increase in nitrate levels was noted in two of the rural residential test sites. Since these sites were labeled using a linear pattern of east to west, it is likely that there is an outside variable such as unreported fertilizer usage or a poorly placed septic tank. These results illustrate the objective which was to analyze ground water for the presence of nitrates.</p> <p>Conclusions/Discussion The latter results are of significance since all of the ground water analyzed is used in human consumption. Currently, private residential wells are not governed by any county, state, or federal guideline insofar as testing for water contamination is concerned. Nitrates are of human interest due to their ability to cause Methemoglobinemia or "Blue Baby Syndrome" in infants under the age of six months. Also, the effects of long term exposure to high levels nitrates in adults is largely unknown. However, nitrates are thought to be responsible for hemorrhaging of the spleen, diuresis, and cancer.</p>	
Summary Statement Our project analyzed ground water for the presence of nitrates.	
Help Received This experiment would not have been possible without the assistance of families who generously allowed us access to their well water.	