To the Expert Panel,

Please find attached a refined version of an example and point that I made during my presentation in San Luis Obispo. I believe that in order to solve the existing Nitrate loading problem associated with Agriculture, it is most important to establish an understanding of how government policies impact growing practices. In my opinion, the practice of “Pump and Fertilize” needs to be promoted in order to see improvement in the Nitrate Loading Problem in the production of shallow rooted crops. The attached document illustrates this point and I would like to submit the document as part of my testimony.

I feel that the second most important to factor is to focus on the importance of managing irrigation water such that its application does not leach applied fertilizer out of the root zone.

I feel that the third most important factor in the management of nitrate leaching in shallow rooted crops is the management of Soil Organic matter concentrations in the root zone.

I feel that all factors need to be ranked not only according to effectiveness in solving the problem, but also factor in the economic return on investment of dollars spent to increased productivity of crops. Many of the practices may more then pay for the expense of implementation in economic return to the ranch. If this can be pointed out to the grower then the implementation will be a much easier sell. I believe that analyzing these three practices will show more than pay back then cost to each individual operator with improved production and quality. I believe that it is vital to focus on the most important factors because it is so important in this day and age to make every dollar spent provide a return on investment in the eyes of a grower.

Thank you for your consideration,

George Adam
Grower
Comparison of different Methods of Mass Balance Nitrate Impact Analysis
Using Conventional 100% Applied Method vs "Pump and Fertilize" Method

Example 1 using a well with 20 Lbs NO3-/ Acre Ft

Example 1 using Low NO3- Well Water
Irrigation Water NO3- = 20 Lbs/Acre foot

Soil NO3- + Applied NO3- + Irr Water NO3- = Total NO3-Applied vs Crop = Total Residual Need

Conventional 100% Applied Method of Analysis
10 Lbs/Acre + 80 Lbs/Acre + 20 Lbs/Acre = 110 Lbs/Acre vs 80 Lbs = 40 Lbs/Acre
Less: Residual soil NO3- = 10 Lbs/Acre
Net change in Groundwater NO3- from growing Broccoli Crop = 30 Lbs/Acre

"Pump and Fertilize" Method of Analysis
35% available
10 Lbs/Acre + 80 Lbs/Acre + 7 Lbs/Acre = 97 Lbs/Acre vs 80 Lbs = 17 Lbs/Acre
Less: Residual soil NO3- = 10 Lbs/Acre
Less: Lbs of NO3- Available in applied groundwater = 7 Lbs/Acre
Net change in Groundwater NO3- from growing Broccoli Crop = 0 Lbs/Acre

Example 2 using High NO3- Well
Irrigation Water NO3- = 200 Lbs/Acre foot

Soil NO3- + Applied NO3- + Irr Water NO3- = Total NO3-Applied vs Crop = Total Residual Need

Conventional 100% Applied Method of Analysis
10 Lbs/Acre + 20 Lbs/Acre + 200 Lbs/Acre = 230 Lbs/Acre vs 80 Lbs = 150 Lbs/Acre
Less: Residual soil NO3- = 10 Lbs/Acre
Net change in Groundwater NO3- from growing Broccoli Crop = 140 Lbs/Acre

"Pump and Fertilize" Method of Analysis
35% Available
10 Lbs/Acre + 20 Lbs/Acre + 70 Lbs/Acre = 100 Lbs/Acre vs 80 Lbs = 20 Lbs/Acre
Less: Residual soil NO3- = 10 Lbs/Acre
Less: Lbs of NO3- Available in applied groundwater = 70 Lbs/Acre
Net change in Groundwater NO3- from growing Broccoli Crop = <60 Lbs/Acre

Well Options under each Method of analysis:
The best option under Region 3 Method would be to use the low nitrate well because of the 30 Lb increase in Groundwater NO3- per acre grown is better than the 140 Lb increase per acre grown using the high nitrate well. The best option under "Pump and Fert" Method would be to use the high nitrate well because the 60 Lb decrease in Groundwater NO3- per acre grown is better then the "no change" shown using the low nitrate well.