FRE-FLO™ Percolation Test Results Almond Trees Vernalis, CA

A FRE-FLO water conditioning unit was installed on one block of irrigated almonds but not on the adjacent block, setting up a FRE-FLO TEST and CONTROL comparison opportunity for the evaluation of the FRE-FLO's ability to increase soil permeability and improve irrigation efficiency.

Pictured at right is the FRE-FLO test unit. Test unit is supplying water to a single row in the orchard. The remainder of the orchard is grower's standard practice.

C-PROBE Soil Moisture Sensors were installed at varying soil levels to record irrigation water percolation.

Two C-PROBE Data Recording Stations were installed, with one monitoring the FRE-FLO equipped (TEST) block and the other monitoring the NON-EQUIPPED (CONTROL) block.

Research by Crop Production Services, Inc.
Visalia, CA Branch. Bill Galli, CCA (559) 287-3980

FRE-FLO™ Percolation Test Results
Almond Trees Vernalis, CA. Harvest results!

Non FRE-FLO™ treated almond crop.

FRE-FLO™ Treated almonds showing 20% increase yield and quality greatly improved.

FRE-FLO™ Percolation Test Results Almond Trees Vernalis, CA

- The C-PROBE data recorded 3 irrigation cycles, with deeper water percolation in the FRE-FLO equipped block.
- Irrigation water applied to the CONTROL block exhibited ponding and produced run-off and irrigation had to be discontinued. This irrigation water ran off or would puddle on top of the soil, only to evaporate, leaving the minerals behind to further reduce the soil quality. No leaching was taking place.
- By contrast, irrigation water in the FRE-FLO equipped block absorbed into the soil during the observation period.

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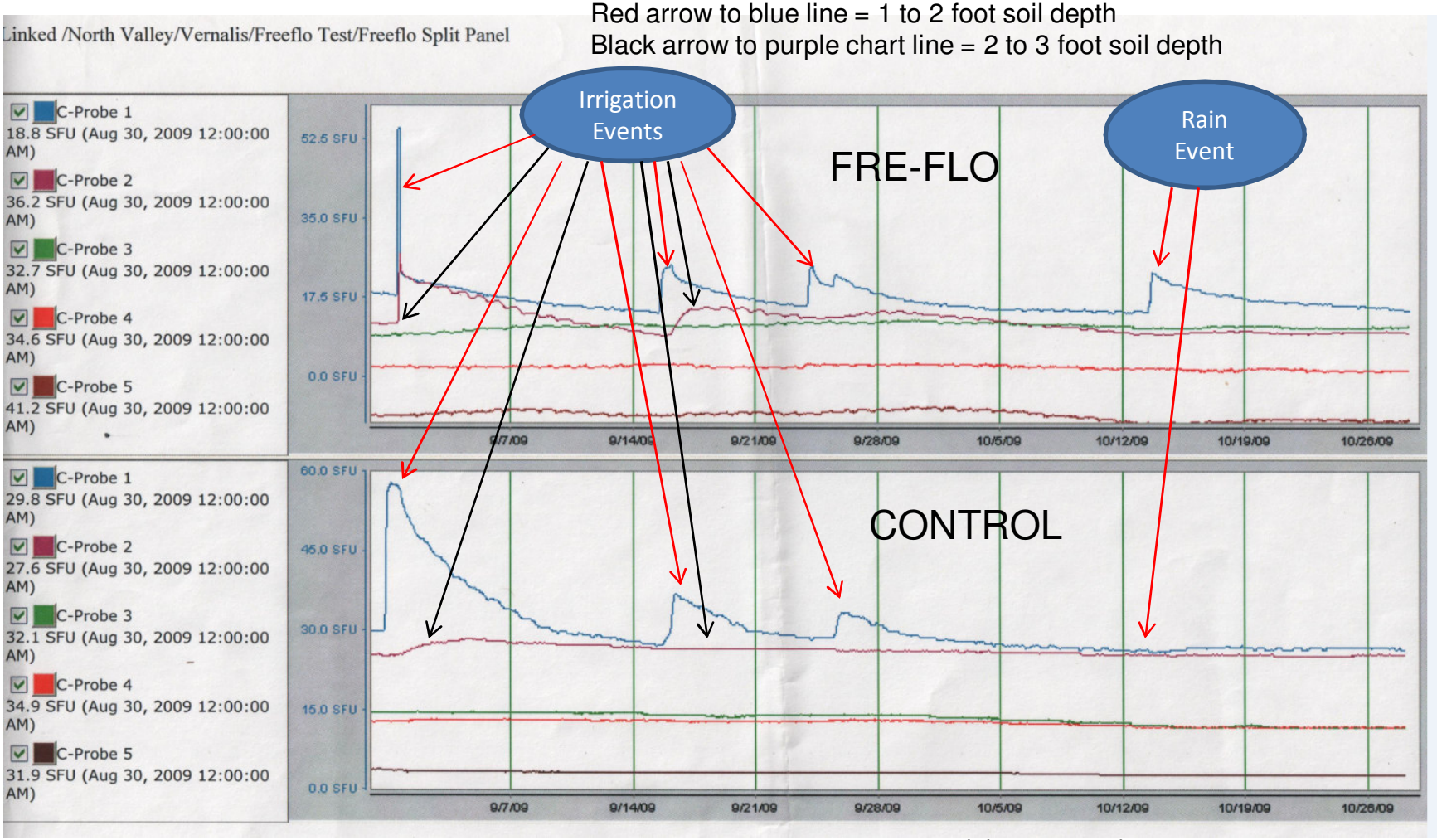
FRE-FLO™ Percolation Test Results Almond Trees Vernalis, CA

- In mid-October, a 2-inch rainfall event occurred. The rainfall was absorbed into the FRE-FLO equipped block to a depth of 2 feet, but was not absorbed by the CONTROL block. The failure to absorb rainfall, which has low EC, is indicative of soil conditions impacted by sodium and diminished CEC and elevated SAR.

FRE-FLO™ Percolation Test Results
Almond Trees Vernalis, CA



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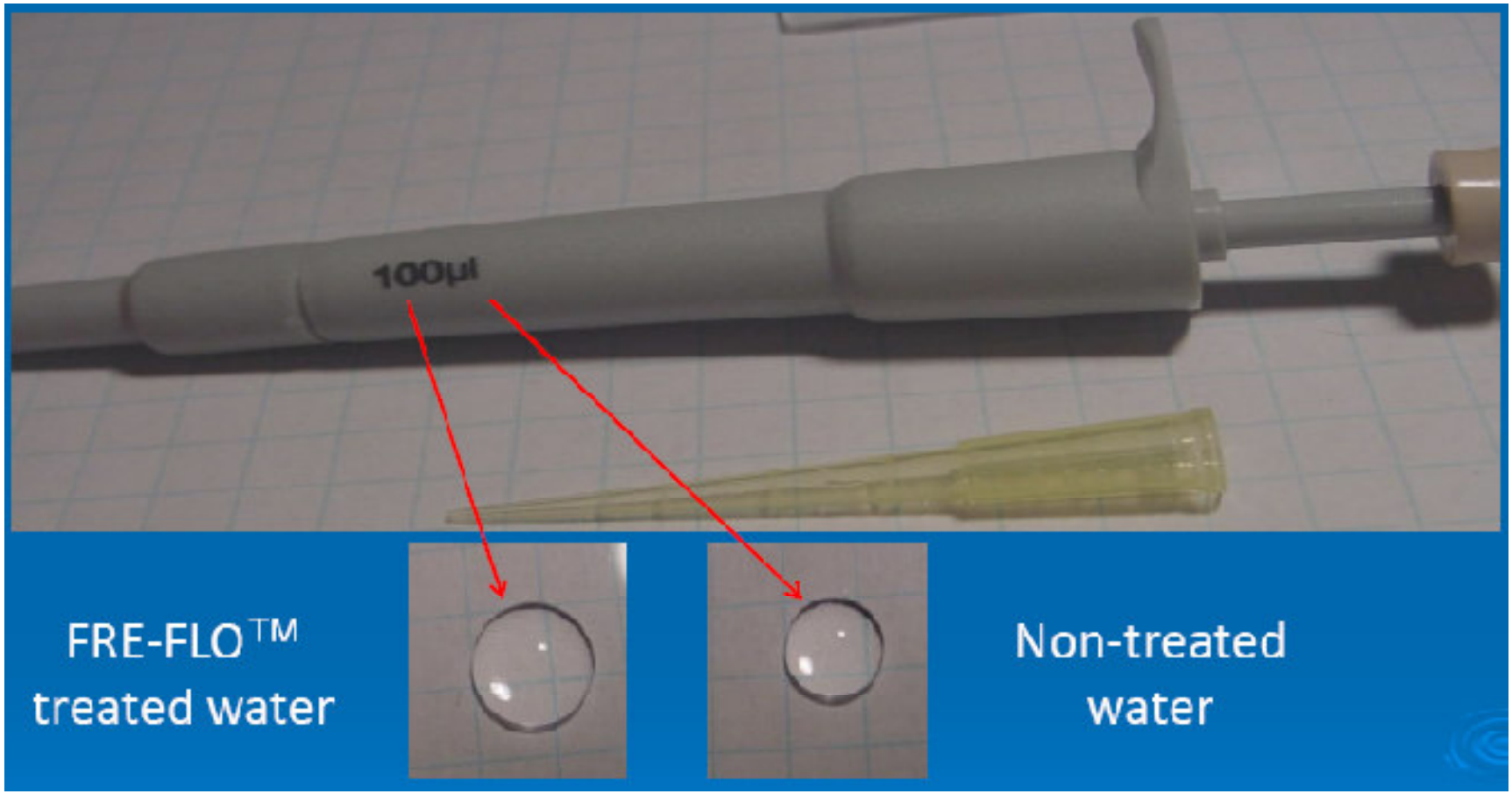
Conclusions and Summary by Bill Wilson, Associate, Carlile Macy, Environmental Engineering & Sustainability:

"The affect of the FRE-FLO water conditioning is two-fold: One, as shown by the surface tension comparisons and the water drop diameter observation, the ability of the water to hydrate calcium ions is improved by the decrease in bond strength between water molecules."



FRE-FLO™ Percolation Test Results Almond Trees Vernalis, CA

- "Secondly, calcium hardness in the water is mobilized to increase the efficacy of soluble calcium cations to balance SAR, increase CEC, and to displace Sodium, resulting in favorable flocculation of clay particles in the soil, resulting in increased infiltration rates and better uptake by plants."

- "The data plot from the C-PROBES for the rainfall event document rejection of rainfall with its characteristic low EC on the CONTROL block, a classic symptom of an alkaline dispersed soil with high SAR. The high infiltration rate on the FRE-FLO irrigated block indicates that this condition has been corrected."

- "This result has important implications for both increased irrigation efficiency and water conservation, and for reduction of agricultural run-off and Non-Point Source water quality impacts."

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FRE-FLO™ Percolation Test Results Almond Trees Vernalis, CA

SUMMARY:

- "Several synergistic things are taking place: Less surface tension in the water (weaker water-to-water bonds); better hydration of calcium cations; increased calcium solubility; repair of dispersed and/or sodic soils."
- "One way of characterizing this observation is that the FRE-FLO conditioned water is acting as an ion exchange water softener in reverse in impacted soils that have become 'dispersed' and lost their structure. The sodium is being displaced, leached out, and replaced with calcium, re-flocculating the soil."

FRE-FLO WATER SYSTEMS, INC
909.841.8083
www.freflowater.com

REFERENCE:

For a clear and comprehensive tutorial on these affects, please refer to the following link: J.L. Walworth. 2006. Soil Structure: The Roles of Sodium and Salts. University of Arizona Cooperative Extension Publication AZ1414, University of Arizona, Tucson, AZ. http://cals.arizona.edu/pubs/crops/az1414.ppt

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