

# OZONE GAS AS A SOIL FUMIGANT

TR-113751

## SUMMARY

### Background

To meet the challenge to develop environmentally friendly alternatives to the scheduled phase out of methyl bromide (to be banned starting in 2001) for soil fumigation, SoilZone, Inc. in 1998, conducted ten field trials utilizing injection of on-site generated ozone gas into the soil. In 1997, SoilZone, Inc, began field trials in California as an attempt to develop this new technology for agricultural and horticultural markets.

### Objectives

Initial success in carrot and tomato trials prompted SoilZone, Inc. to request and receive matching assistance contracts from EPRI and Edison Technology Solutions to more widely test this technology to:

- Control soilborne pathogens
- Increase yields in a range of crops in different geographical locations.

### Approach

Ozone injection trials using buried drip tubes and injection probes were conducted in plots using randomized complete block techniques. Upon harvest crop yields were measured, final soil samples collected and statistical analyses completed.

### Results

The results of these field trials generally demonstrate the broad effectiveness of ozone treatment in soils to increase plant yield and reduce the detrimental effects of soil pathogens on a variety of crops and soils under a range of climatic conditions.

When the ozone preplant application was compared to untreated controls, improvements in crop yield and plant vigor were seen in all except the peach trials. The results indicate that soil treatment with ozone results in decreased soil pathogen pressures (due to its biocidal effects) and increased nutrient availability (due to oxidation of organic compounds). Applied as a preplant treatment, these two benefits promote increased plant "growth and yield without detrimental environmental effects. Much additional work is necessary to be able to accurately predict the specific growth response achieved by ozonation in different crops, soils and climatic conditions.