



# Soil Moisture Sensor



## TECHNOLOGY SUMMARY

In the agriculture industry, it is critical to know the water content in the soil in order to maintain the viability and profitability of an agriculture business. With the high cost of water, it is essential to limit the amount of water used to only what is necessary for the health of the plant. Current technologies provide soil moisture information that is limited to areas near the surface of the soil. As the demand on water resources increases, there is a need for technology that provides subsurface measurements of water held in lower layers of soil. Sandia National Laboratories has invented a method and system for determining the soil moisture at depths of more than a few feet.

As cultivated land is irrigated or receives precipitation, water accumulates over time in the soil. This invention measures the amount of accumulated moisture in the soil to determine when and how much irrigation is needed. The amount of water needed for the cultivated field is determined by monitoring the decrease in secondary cosmic radiation intensity as the quantity of water in the soil increases. The sensor is placed five feet below the surface and a reference sensor is mounted above ground, which measures the total incoming cosmic radiation. The sensors measure moisture over a relatively wide area, measuring moisture from about a 10-foot-wide circle at the surface.

## BENEFITS

Enhances irrigation efficiency

Measurement apparatus is practical, inexpensive, easy to install, and requires little maintenance

Provides available data in “real time”

Measures relatively wide area of soil

## INTELLECTUAL PROPERTY

US PATENT #6,663,012  
SD# 8351

## POTENTIAL MARKET APPLICATIONS

Agriculture Industry

Wine Industry

Water Efficiency/ Conservation

## TECHNOLOGY READINESS LEVEL

Sandia estimates this technology at approximately TRL 4. Key elements have been demonstrated in a laboratory environment.

**Craig Smith | 925.294.3358 | casmith@sandia.gov**



**Sandia National Laboratories**

Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration. SAND # 2011-4642P