Boron Impacts in Soil a Produced Water Co-Contaminant

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Boron is an essential micro-nutrient for plant growth, it can be toxic at elevated levels. The total soil boron can go up to 100-300 mg/kg with most of this fixed in minerals and unavailable although a small portion is soluble and available to plants. The “Hot Water Soluble” boron test can reveal how soluble boron is mainly comprised of boric acid or salts: B(OH)3 + H20 B(OH)4- + H+.

The “Hot Water Soluble” (HWS) is the most common test used by labs. It requires soil and water to be mixed (1:2 ratio) and boiled. Though some technique variations between labs, they all measure a similar dissolved mixture with adsorbed boron which represents “plant available” boron. The HWS test is designed to diagnose deficiency, not toxicity with an AENV Tier I Guideline showing the standard is 2 mg/kg HWS boron. This result is consistent with CCME, 1999 and is a guideline mainly intended to protect plants.

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