

NITROGEN AS A TESTING MEDIUM
FOR PROVING THE
MECHANICAL INTEGRITY OF WELLS

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ABSTRACT

The Safe Drinking Water Act (Public Law 93-523) specifies that an Underground Injection Control (UIC) Program be promulgated by States desiring primacy and by the EPA for States that decline to do so under the law. The goal of UIC programs is to assure that usable water aquifers are not contaminated by materials being pumped down cased boreholes passing through them. The premise of all UIC regulations is that such contamination will not occur if the two basic elements (i.e., the casing and its cementation) of a borehole have "Mechanical Integrity". Proof of "Mechanical Integrity" must be demonstrated on all boreholes subject to the provisions of Public Law 93-523. Such proof must be submitted on or before April 1, 1987 and at five year intervals thereafter. All brine producing wells, underground storage wells and brine disposal wells are subject to the Law as are a variety of other type boreholes. Most State agencies responsible for UIC program enforcement, and hopefully the EPA District section as well, accept that neither the present nor future state of the art in borehole testing will have the capability to positively prove there is zero leakage in a borehole system. Irrespective of this fact it is the duty and obligation of the enforcement agency to assure itself, as a servant of the public, that the usable waters they are required to protect will not be contaminated by industry's lawful operations. They therefore, out of necessity, will require industry to certify the degree of precision (i.e., the minimum rate of leakage which can be detected) of the test it uses.

This paper describes a method, developed and perfected by personnel of Texas Brine Corporation, which is the first one proven to have the capability of detecting and quantifying low order of magnitude leaks in the wellhead, suspended strings, final cemented casing string and its cementation. The test can be applied without removing suspended strings from the well. Pressure equal to or greater than the maximum operating pressure can be exerted at all points in the well. The method can be used under certain conditions, without removing the pad from a brine well or emptying a storage well of product. Tests can be run within a short time period in some instances in as little as 48 hours.