

**INTERSTATE TECHNOLOGY AND REGULATORY
COOPERATION WORK GROUP (ITRC)
IN SITU
BIOREMEDIATION WORK TEAM, CLOSURE
CRITERIA FOCUS GROUP**

FY-97 REPORT

-FINAL-

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**Prepared by
The Interstate Technology and Regulatory Cooperation
Work Group
In Situ Bioremediation Work Team
Closure Criteria Focus Group**

EXECUTIVE SUMMARY

The Interstate Technology and Regulatory Cooperation Work Group (ITRC) was established in February, 1995 to encourage interaction among various regulatory and non-regulatory parties. This federal, state, industry, and stakeholder group aims to improve the deployment of innovative technologies or approaches for the environmental remediation of sites across the U.S. Participating state environmental agencies are using the network to verify the effectiveness of various technologies and methodologies in an attempt to reduce paperwork and expensive duplication of effort.

In FY-97, the ITRC established six technical task teams, including one charged with reviewing a number of technical and regulatory issues surrounding *In situ* Bioremediation technologies. The *In situ* Bioremediation Technical Task Group established smaller, more focused groups to study specific aspects of the field, including the Focus Group on Closure Criteria. This is the report of that Focus Group.

Three relatively common approaches to remediation of sites with volatile organic compounds (VOCs), soil vapor extraction, bioventing, and natural attenuation, were included in a survey to determine practices and trends in establishing closure criteria for such sites. Closure criteria essentially define the performance required for any remediation technology. Based on 24 responses to a survey (sent out in November 1996), these basic approaches were observed for establishing closure criteria: attaining soil cleanup criteria (either soil chemical analysis or soil gas), a technology limits, and risk assessment. In general, these three approaches are remarkably dissimilar in principle and practice, and only the risk assessment approach robustly addresses issues related to protection of public health and the environment. The soil cleanup criteria approach is typically conservative, even in meeting conservative remediation objectives (MCLs in ground water back calculated for soil cleanup values). The technology-based approach, often associated with soil vapor extraction (SVE) projects, does not quantify residual risk associated with a site. However, soil vapor extraction has been remarkably successful in removing tremendous amounts of VOCs from the subsurface and has been shown to meet extremely conservative cleanup requirements in many states.

The conclusions of the Focus Group may be summarized that:

- the wide range of contaminant specific closure criteria may be due to differences in current or future resource use, site specific considerations (soil type, lithology, etc.), or the method of calculating closure criteria or modeling contaminant fate and transport; and,
- a national consensus on the methodology used to establish closure criteria would bring some consistency to the field, which would prove particularly beneficial for SVE technologies.