

NSZD – Moving Past the Perceptions

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The science supporting the effectiveness of natural processes to degrade and deplete petroleum non-aqueous phase liquid (NAPL) source zones (termed “natural source zone depletion [NSZD]”) is more than a decade old. As a synthesized remedial technology, it’s been referenced in peer-reviewed literature since 2006 and available in guidance since 2009 (U.S. Interstate Technology & Regulatory Council [ITRC]). One might think it would be fairly received since monitored natural attenuation (MNA), its predecessor, companion technology is one of the most commonly used remedial approaches for petroleum in groundwater. However, instead it has been met with a mixed response, demonstrating the on-going challenge with uptake of new science/technology and predisposition of natural processes as an inadequate approach. This presentation will directly address these issues and clearly explain that NSZD can be at least as effective, if not more than other remedial technology options.

This presentation will concisely cover the following key points:

- Current Perception of NSZD is Mixed - A poll summary to relate actual regulatory responses received from experience on >70 sites that have measured and included NSZD in remedy decision documents.
- NSZD is Significant- A database summary to demonstrate the effectiveness of NSZD as a knowledge-driven remedy as compared to other remedial technologies such as NAPL recovery and in situ aeration.
- There are Ample Precedents on Effective Use of NSZD as a Remedial Approach - Presentation of tangible examples where NSZD has been used as an effective risk management approach.

A poll of various practitioners was conducted to solicit real regulatory responses to help inform the current understanding of the practice and discern the cause for mixed responses. The information will be presented to initially establish the current state of the practice and regulatory receptiveness of using NSZD in North America.

Next, site-specific mass removal data can be used to directly compare NSZD to its peer technologies such as fluid recovery, aeration, and multiphase extraction. The Jacobs database shows that while some remedial technologies initially remove mass at a higher rate than NSZD, the mass removal efficiency of most declines relatively quickly to the point where the rate of NSZD outperforms them. This demonstrates that NSZD is significant.

Last, if the industry is to move forward with sustainable/resilient remediation and risk management, then NSZD must be considered at all petroleum sites. Through case study examples, this presentation will show exactly how NSZD can be used to satisfy regulatory requirements and cost-effectively manage risk at petroleum NAPL sites.

Tom Palaia

A multi-published author of industry standard guidance and guest speaker on remedial technologies, Tom is a globally recognized Subject Matter Expert in NSZD and petroleum NAPL remediation technologies. He is an active trainer for the ITRC LNAPL Team and authored the American Petroleum Institute's and CRC CARE's (Australia) guide on the NSZD topic. Tom serves as Jacobs' global technology leader for petroleum NAPL characterization and remediation and remedial process optimization (RPO) and co-leads the firm's Communities of Practice associated with each of these practice areas. He has specialized in remediation strategy and planning, pre-design investigation, design, construction, operation, and optimization of site remediation systems. Over his past 29 years at Jacobs (25 with CH2M), Tom has dedicated a large part of his career to facilitating application of best practice, technology transfer, and training of many practitioners.