

Forensic Approaches to Address Background Perchlorate Source Identification and Characterization at Navy Facilities and Ranges

Technology Description

Perchlorate is a naturally occurring substance. However, perchlorate is also manufactured for use in a variety of military/industrial applications such as fireworks, pharmaceuticals, fertilizers, explosives, rocket propellants, and munitions. Because both of these types of perchlorate can contribute to groundwater contamination, SPAWARSYSCEN PACIFIC developed an environmental forensics approach to simply and efficiently determine if a perchlorate signature is attributable to a naturally occurring source.

SPAWARSYSCEN PACIFIC has prepared a technical guidance document for background perchlorate source identification (BPSID) with appropriate validated forensic approaches, tools, and methods to quantify and distinguish naturally occurring perchlorate from manufactured perchlorate. The technical guidance is particularly useful in cases where there is no current and historical use of perchlorate by Navy and defense contractors but perchlorate is observed in site groundwater and/or surface water.



Value to the Warfighter

Perchlorate evaluation is part of range condition assessments and monitoring strategies per current DOD policy, which have a direct impact on continued range use for training, testing, and operational readiness. Identifying natural sources of perchlorate will provide an appropriate baseline (background levels) for mitigating any potential cleanup efforts and costs. Without an understanding of the extent to which background perchlorate sources may be potentially impacting the site, inaccurate assessments and poor management decisions will result, ultimately leading to unnecessary cleanup actions at greater expense to the Navy.

Economics of the Technology: ROI or Payback

This is a Technology Transition Category 4 by providing technology improvements for internal use by the Navy. This study will result in cost avoidance. With potentially high costs related to perchlorate remediation, the ability to confirm the existence of a background perchlorate signature of natural origin would free site managers from having to perform a complete perchlorate background evaluation resulting in a significant cost savings for the Navy.

Technology Transition Documentation

The results of this effort will be disseminated in the form of guidance documents which will be available January 2014.

For a copy of the draft guidance contact Dr. Robert George (Space and Naval Warfare Systems Command) at robert.george@navy.mil or (619) 553-2776.

Site Implementation

The environmental forensics approach of determining if a perchlorate signature is attributable to a naturally occurring source was put to the test during SPAWARSYSCEN PACIFIC's validation and demonstration of the BPSID approach at Pinecastle Range, Florida. A persistent low-level perchlorate signature had been observed in the groundwater with no known identifiable anthropogenic source. The BPSID results indicated that perchlorate strongly correlated with nitrate levels, commensurate with similar correlations between perchlorate and nitrate across the region, which is consistent with perchlorate of natural origin.

Specific Applications

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This project was executed by Space and Naval Warfare Systems Command, Pacific under the Navy Environmental Sustainability Development to Integration (NESDI) Program.