



Monitored Natural Attenuation Technical Guidance

Instructors

Matt Turner, NJDEP

Steve Posten, AMEC

Rich Lake, Environmental Resolutions





Committee Members

- Matthew Turner, NJDEP
- Steve Posten, AMEC Environment & Infrastructure, Inc
- Rich Lake, Environmental Resolutions, Inc.
- Julian Davies, Sovereign Consulting, Inc
- Ann Charles, NJDEP
- B.V. Rao, EG&R Environmental Services
- Renee Bancroft, NJDEP
- David Bausmith, Whitman Co





Presentation Overview

Matt

- Section 1 - Intended Use of Document
- Section 2 - Purpose
- Section 3 - Document Overview
- Section 4 - Applicability of MNA

Steve

- Section 5 - Site Characterization
- Section 6 - Lines of evidence

Rich

- Section 7 - RA Permit for Ground Water with Long Term Monitoring
- Section 8 - Reporting





MNA Tech. Guidance Appendices

- A: Degradation/Stabilization Processes
- B: Compound Specific Isotope Analysis
- C: Contaminant Mass Example Calculations
- D: Aquifer Characteristics
- E: Trend Analysis and Statistical Tests
- F: Selected Reference Summaries
- G: Glossary
- H: Acronyms

During the presentation: Information contained in the
Appendices will appear in **RED** text





MNA Development Steps

- Conducted Literature review
 - Identified 36 reference documents
- Committee consensus
- 222 Comments / Response
- 15 reference summaries
 - **Appendix F**





Purpose - Section 2

Natural Attenuation – Definition

- Reliance on natural processes to achieve the applicable ground water remediation standard
- Processes include a variety of physical, chemical, or biological processes that, under favorable conditions, act without human intervention reduce the mass, toxicity, mobility, volume, or concentration of contaminants in ground water





Purpose - Section 2

- Monitored Natural Attenuation (MNA)
 - Evaluate and document the effectiveness of natural attenuation processes

Objective - Achieve the Ground Water Quality Standards

- MNA most effective when:
 - used in conjunction with other remedial measures
 - used as a follow up to active remedial action





Document Overview - Section 3

- **Conceptual Site Model (CSM)**
 - Focus on MNA as remedy
- **Site Characterization**
 - Distribution of contaminants
 - Site hydrogeological data
- **Lines of Evidence**
 - Primary – contaminant distribution & decreasing trend
 - Secondary – geochemical conditions
 - Tertiary – microbiologic and isotopic studies
- **Long Term Monitoring**
 - Requires RA permit for ground water and CEA





Applicability MNA - Section 4

- Source Control
 - Fundamental component of MNA
 - Inadequate source control complicate MNA
 - Compliance with the IGW pathway
- Technical Impracticability
 - MNA is not technical impracticability
 - MNA is not a default when active remediation is infeasible or technically impracticable





Conditions that Generally Preclude MNA

- **Expanding GW Plume**
- **Effective Monitoring Difficult**
 - Complex hydrogeologic systems
 - Fractured bedrock or karst formations
- **Receptor Impacts**
 - Impacts human and/or ecological receptors
 - Potable wells, surface water, vapor intrusion, utilities





Conditions that Generally Preclude MNA

- **Imminent threat to receptors**
 - Short travel time to receptor
 - Calculated through seepage velocity or solute transport model
- **Free and Residual Product**
 - Natural remediation of free and/or residual product will not be allowed
 - N.J.A.C. 7:26E-6.1(d)

