

USGS / U.S. EPA Pacific Northwest (Region 10)

Fractured Rock Workshop Agenda

September 11 and 12, 2019

DAY 1: FRACTURED ROCK 101: FOCUS ON CHARACTERIZATION

Introduction

8:30 – 8:45 Welcome and Overview of Workshop (Cindy Frickle, EPA and Claire Tiedeman, USGS)

8:45 – 9:00 Welcome, Geology of Pacific Northwest. Map, Importance and Special Challenges Presented by Fractured Rock Sites to Superfund Program in Region 10 (Ted Repasky, EPA R10)

Groundwater Flow, Contaminant Transport Processes, and Remediation in Fractured Rock– Overview

9:00 – 9:30 Characterizing the Fate, Transport, and Remediation of Contaminants in Fractured Rock Aquifers (Allen Shapiro, USGS)

Characterization of Fractured Bedrock: Hydrogeology, Contaminant Distribution, Flow, and Transport

9:30 – 10:00 Basalt and Other Hard-Rock Types in Region 10 (Terry Tolan, INTERA)

10:00 – 10:15 BREAK

10:15 – 10:45 Introduction to Geophysical Methods for Fractured Rock (Fred Day-Lewis, USGS)

10:45 – 11:15 Overview of Fractured Rock Drilling Methods – Advantages, Disadvantages, and Anecdotes (Terry Tolan, INTERA)

11:15 – 11:45 Borehole Geophysics for Fractured Rock (Fred Day-Lewis, USGS)

11:45 – 12:00 Questions and discussion with the presenters (All Presenters)

12:00 – 1:00 LUNCH

1:00 – 1:30 Profiling Transmissivity and Contamination in Fractures Intersecting Boreholes (Claire Tiedeman, USGS)

1:30 – 2:00 Selection, Design and Construction of Multilevel Groundwater Monitoring Systems in Bedrock (Tim Maley, EPA R10)

2:00 – 2:30 Overview of Sampling Methods for Bedrock Monitoring Wells (Allen Shapiro, USGS)

2:30 – 2:45 BREAK

2:45 – 3:15 Characterizing Contaminant Mass in the Rock Matrix (Dan Goode, USGS)

3:15 – 3:45 Early-stage Conceptual Site Model – Formosa Mine (Don Clabaugh, EPA R10)

3:45 – 4:15 Groundwater Flow Paths over Larger Volumes of Rock – Cross-Hole Hydraulic Testing (Claire Tiedeman, USGS)

WRAP-UP

4:15 – 4:30 Questions and discussion with the presenters (All Presenters)

4:30 – ADJOURN

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DAY 2: FRACTURED ROCK 102: FOCUS ON REMEDIATION

Introduction

8:30 – 8:45 Overview of Day 2 of the Workshop: Continued Characterization and the Remediation Practice at Superfund Fractured Rock Sites; (Cindy Frickle, EPA and Claire Tiedeman, USGS)

Characterization of Fractured Bedrock: Hydrogeology, Contaminant Distribution, Flow, and Transport (continued)

8:45 – 9:15 Designing Tracer Tests for Site Characterization and Decision Support at Sites of Groundwater Contamination (Allen Shapiro, USGS)

9:15 – 9:45: Characterization of a fractured system – Red Devil Mine (Mark Longtine, ENE)

Remediation of Contamination in Fractured Rock Systems

9:45 – 10:15 Role of Numerical Modeling in Remedy Selection and remedial performance evaluation (Dan Goode, USGS)

10:15 – 10:30 BREAK

10:30 – 11:00 Characterization and Treatment of DNAPL Sources in Fractured Rock (Charles Schaefer, CDM Smith)

11:00 – 11:30 Bioaugmentation in Fractured Rocks — Application at Naval Air Warfare Center, NJ (Claire Tiedeman, USGS)

11:30 – 12:00 Assessing Abiotic Dechlorination in Rock Matrices (Charles Schaefer, CDM Smith)

12:00 – 1:00 LUNCH

1:00 – 1:30 Thermal Remediation in Fractured Rock – A Case Study and What to Look for in a Work Plan (Lauren Soos, TRS Group, Inc.)

1:30 – 2:00 Natural Attenuation in Fractured Rock Aquifers (Allen Shapiro, USGS)

2:00 – 2:30 Chemical Attenuation in a Fractured Bedrock Aquifer Impacted by Landfill Leachate (Tamzen Macbeth, CDM Smith)

2:30 – 2:45 BREAK

2:45 – 3:15 GEF Viewmaster Site: TCE in Columbia River Basalts (Henning Larsen – Oregon DEQ)

3:15 – 3:45 Current Research on Fate, Transport, Remediation, and Management of Contaminated Fractured Rocks (Day-Lewis, Goode, Shapiro, Tiedeman – USGS)

WRAP-UP

3:45 – 4:30 Important Takeaways and Open Discussion (All Presenters and Audience)

4:30 – ADJOURN