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Technical Impracticability/ Containment Zone

Environmental Restoration Program
Edwards AFB, CA

Patrice Hallman
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Technical Impracticability Waiver



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- **Background on Technical Impracticability (TI) waiver**
- **Sites being considered for TI waiver**
- **Case study: South Air Force Research Laboratory (AFRL)**



ARAR Definition



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- **ARAR: Federal and state Applicable or Relevant and Appropriate Requirements under the *Comprehensive Environmental Response, Compensation, and Liability Act of 1990 (CERCLA)***



ARAR Waivers



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- **ARAR Waivers (CERCLA Section 121(d)(4))**
 - Interim measures
 - Equivalent Standard of Performance
 - Greater risk to human health and the environment
 - Technical Impracticability
 - Inconsistent application of a state standard
 - Fund balancing
- **The remedy must be protective of human health and the environment**



TI Waiver



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- **CERCLA Section 121 (d)(4)**
- **40 CFR 300.430(f)(1)(ii)(c)(3)**
- **“Compliance with such requirements is technically impracticable from an engineering perspective”**
- **Cost may be considered, but should play a subordinate role**
- **Should not be invoked in the Record of Decision (ROD) if ability to attain an ARAR in doubt**



Containment Zone Designation



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- **State Water Resource Control Board Resolution 92-49 “Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304,” Article III**
 - “Defined non-attainment zone with respect to water quality objectives”
 - Should be limited in lateral and vertical extent



Containment Zone Designation



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- **Criteria**

- Containment zone equivalent to TI waiver of ARARs under CERCLA
 - Technological infeasibility
 - Economic infeasibility
 - Determination can be made by Regional Water Quality Control Board



Sites Being Considered



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- **Arroyos Sites 36, 162, and 461**
- **Site 25, Operable Unit 8**
- **Northeast AFRL/Mars Blvd Sites**



Case Study



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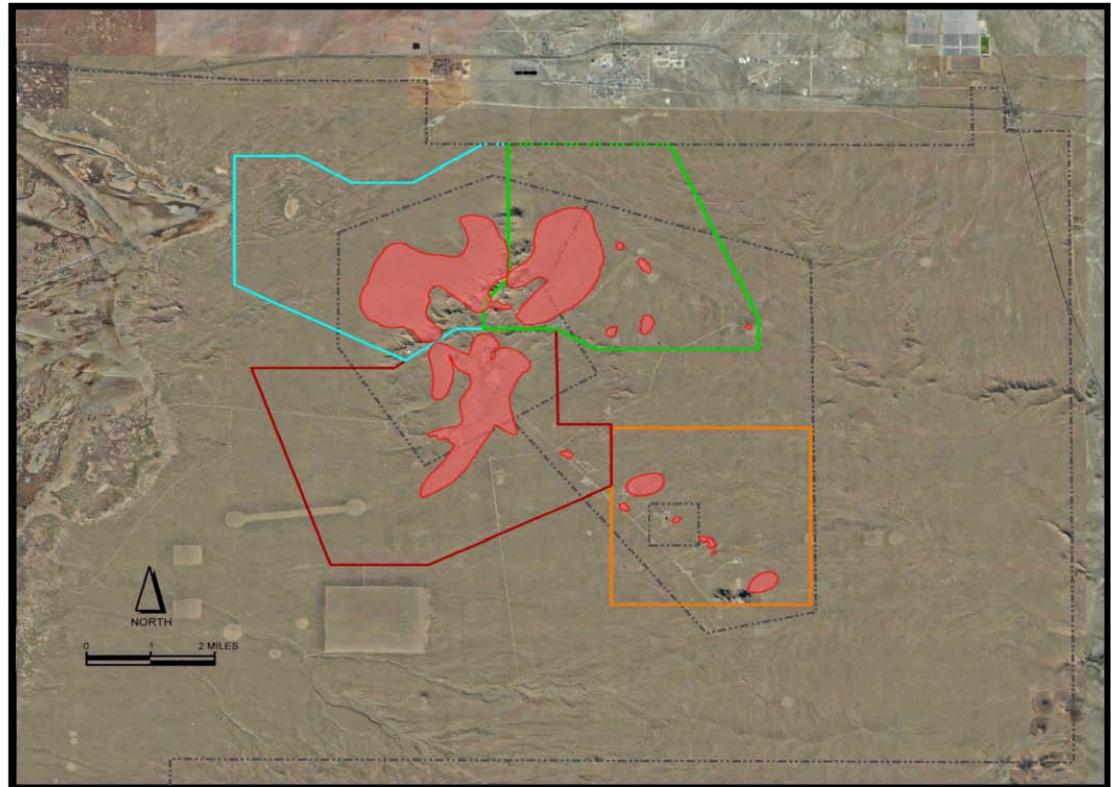


South AFRL Record of Decision 2007



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1. **TI waiver of federal and state drinking water standards within a 16.4-square mile area (designated as a Containment Zone in California)**
2. **Long-term monitoring**
3. **Land Use Controls and Contingency Plan**
4. **Five-year review**



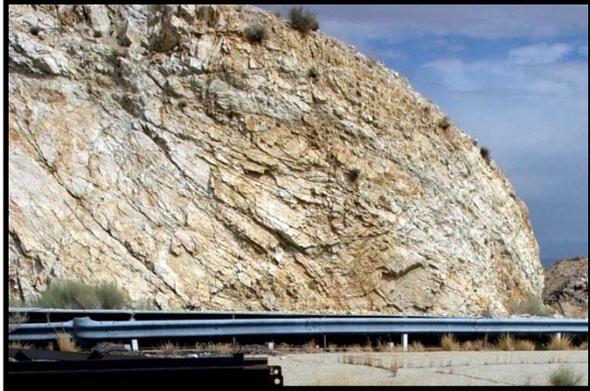


- **Remediation Constraints**
 - Hydrogeologic Constraints
 - Low hydraulic conductivity, difficulty in locating productive water-bearing zones
 - Fracture flow is complex
 - Primary constraint is effective extraction of or injection into groundwater
 - Contaminant Constraints
 - Dense, Nonaqueous Phase Liquid (DNAPL) in source areas
 - Dissolved plumes widespread
 - Intrinsic biodegradation is minimal



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Complex Geology/Hydrology at AFRL



- **Thin zone of unconsolidated soil (silty sand) overlying fractured granitic bedrock**
- **Groundwater flows through a network of fractured granitic bedrock under hydrostatic pressure**
- **Depth to first groundwater ranges from 20 to more than 200 feet, averaging 120 feet**
- **Fracture flow is complex – not all fractures are water-bearing nor interconnected**
- **Hydraulic conductivity ranges from 0.1 to 1.0 feet/day**
- **Wells pump at less than 0.5 gallons per minute (gpm) on average**



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- **Components of TI Evaluation**
 - Specific ARARs to be waived – drinking water maximum contaminant levels (MCLs)
 - Spatial area under TI waiver
 - Surface area is 16.4 square miles
 - Vertical depth is 500 feet
 - Conceptual Site Model



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- **Evaluation of Restoration Potential**
 - Sources identified and removed (except DNAPL)
 - Performance of existing systems evaluated
 - Estimated cost to achieve groundwater restoration to the MCL: more than \$194 million
 - Demonstration that no other remedy could attain MCLs within a reasonable timeframe – innovative technologies may reduce mass; however, none likely to achieve MCLs in fractured granitic aquifer



References



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- **Guidance for Evaluating the Technical Impracticability of Groundwater Restoration, Interim Final, OSWER Directive 9234.2-25, U.S. EPA, September 1993**
<http://www.epa.gov/superfund/health/conmedia/gwdocs/techimp.htm>
- **Consistent Implementation of the FY1993 Guidance on Technical Impracticability of Groundwater Restoration at Superfund Sites, OSWER Directive 9200.4-14, U.S. EPA, January 1995**



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Questions?