



# Mine Sites Inspections & Water Quality Concerns

John Tinger

Inspector, Clean Water Act

EPA Region 9 Enforcement

# Mining Overview

- Permitting
- Types of Mines in R9
  - Hard rock/ metal
  - Coal
  - Sand & Gravel
  - Abandoned / inactive
  - Suction Dredging
- Mining Processes
- Typical pollutants of concern
- Inspecting under Clean Water Act



# Permitting

- NEPA for new Mines
- NPDES – Discharge to Surface Waters
  - Individual Permit
  - Stormwater General permit
  - Dewatering
- Groundwater Protection
  - WDR (California)
  - NEV (Nevada)
  - APP (Arizona)
- Abandoned

# Hard Rock Mines

- Gold, Copper, Lead, Zinc, Silver, Molybdenum, Lithium
- Rg Tribal - Tohono O'odham

## Open Pit Mineral Extraction

Permitting

Zero Discharge

Concerns:

Acid mine drainage

Groundwater / Pit interface

GW Permits

- Ore → Processed
- Waste Rock → disposed



# Hard Rock / Ore Processing



- Ore Crushing
  - Mineral Extraction Process
- Tailings waste product

## Permitting

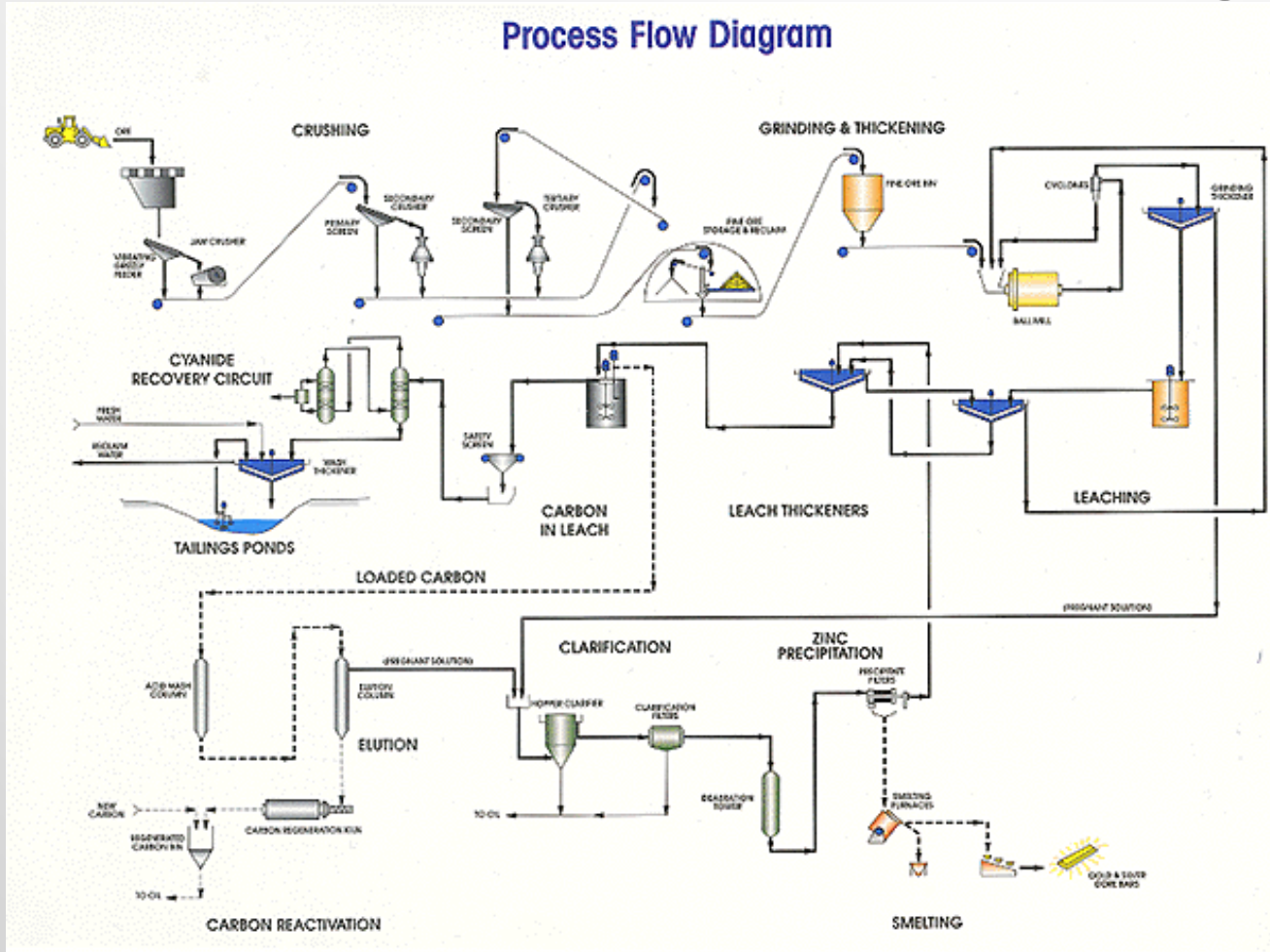
- Zero Discharge requirement
- Process Water Recycling / Tailings

## Inspection Concerns:

- Spills, Process controls, (cyanide, acids)

# Hard Rock / Ore Processing

Process Flow Diagram



# Hard Rock Ore Processing / Tailings



## Permitting

- Zero discharge requirement
- Groundwater Permit

## Inspection Concerns

- Spills, process controls

# Waste Rock / Overburden



## Inspection Concerns

- Stormwater Controls
- Spills
- Outfall Sampling
- Seeps



# Ore Processing / Heap Leach

- Cyanide
- Acid (sulfuric)
- Metals leaching

## Permitting

- Zero discharge
- Groundwater Permit
- Closure

## Inspection Concerns

- Spills, process controls



# Abandoned Mines

- Adits
- Tailings

## Water Quality Concerns

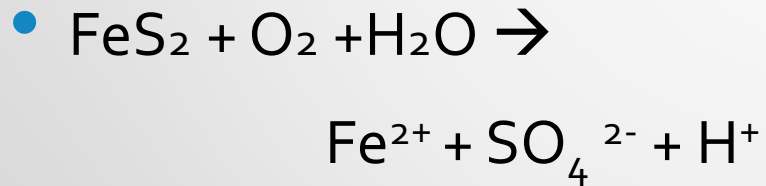
- Acid Mine Drainage
- Low pH
- Suspended solids
- Dissolved Metals
- Sulfates

## Permitting / Inspection



# Acid Mine Drainage

Simplified Equation for Pyrite Oxidation



# Coal Mines

- R9 Tribal – Navajo, Hopi
- Permitting:
  - Individual NPDES
  - SMCRA
- Concerns
  - Sediment
  - Alkaline conditions
  - Reclamation



# Coal Mine Reclamation

- Inspection Concerns
  - Sediment
  - Erosion / SEDCAD
  - Seeps
  - Reclamation
  - Monitoring



# Sand and Gravel Mines



- R9 Tribal: White Mountain Apache, Pyramid Lake Paiute, Salt River Pima-Maricopa

Permitting: Individual or Stormwater NPDES

Inspection Concerns

- Sediment, spills
- Dewatering - impacts
- Metals - arsenic, selenium

# Suction Dredging/Placer Mining

## Water Quality Concerns

- Turbidity
- Mercury suspension



Permitting:

Suction Dredging suspended in CA (Aug 6, 2009) – ongoing litigation

CA Fish and Wildlife Per

Inspection Concerns

# Questions

- John Tinger

[Tinger.John@EPA.gov](mailto:Tinger.John@EPA.gov)

415-972-3518

Resource:

- EPA and Hardrock Mining: A Source Book for Industry in the Northwest and Alaska, EPA 2003