



Global Science and Cleanup Levels

Elizabeth Southerland
U.S. Environmental Protection Agency
Office of Superfund Remediation
and Technology Innovation (OSRTI)

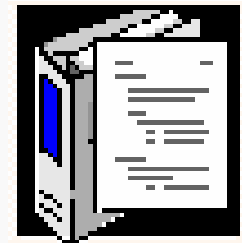
Presented to the
10th Biennial Meeting of the International Committee on
Contaminated Lands

10/25/2011

U.S. Environmental Protection Agency

EPA Addresses Site Cleanup

- Law: Comprehensive Environmental Response, Compensation & Liability Act (CERCLA or “Superfund”)
- Regulation: National Contingency Plan (NCP)
- National Priorities List (NPL) identifies which sites need further attention
 - 62 Proposed (1 radiation site)
 - 1,301 Final (56 radiation sites)
 - 351 Deleted



Site Cleanup Levels

- Federal or State standards often determine cleanup levels
- Where such standards are not available or protective, EPA sets site-specific cleanup levels that
 - For carcinogens, limit increased cancer risk to 1×10^{-6} to 1×10^{-4}
 - For non-carcinogens, result in no adverse effects to human health (hazard index (HI) <1)
- Address ecological concerns

Risk-Based Cleanup Levels

- Exposure scenarios are based on the Reasonable Maximum Exposure (RME)
 - Long-term / chronic exposures to contaminated media
 - Receptors include children, women of child – bearing age and adult males

Risk-Based Cleanup Levels

- Exposure scenarios include environmental media
 - Soil: ingestion, inhalation (particulates) & dermal contact
 - Surface water & Groundwater: ingestion, inhalation & dermal contact
 - Atmospheric & Indoor Air: inhalation

Exposure Pathways, Route, & Media

Gases, Vapor
Airborne Particles
(including soil)

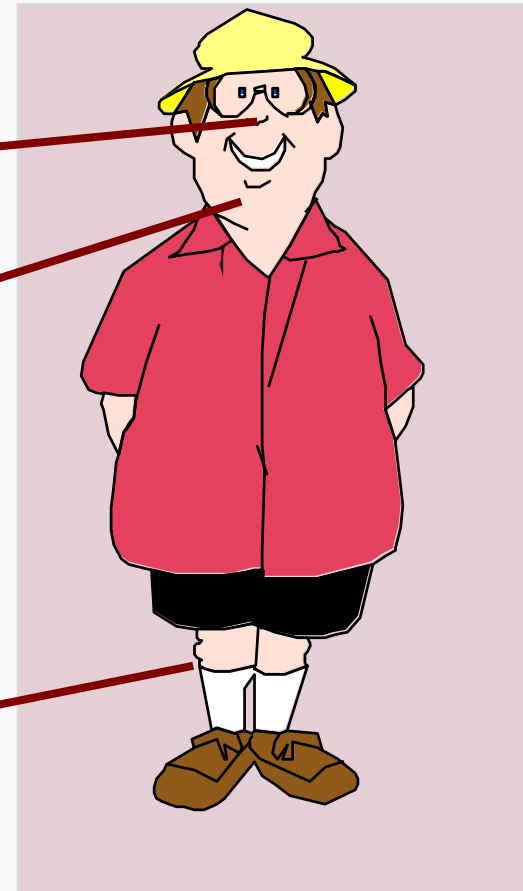
Inhalation

Soil
Water
Food

Ingestion

Soil
Water

Dermal Contact



- EPA Office of Research & Development
 - Integrated Risk Information System (IRIS)
 - Human health assessment program that develops toxicity values for EPA's regulatory activities
 - Currently, 550 chemicals
 - Comprehensive World-Wide Literature Search and Data Call – In
 - Completed literature searches are posted in the Federal Register Notice
 - Federal Register Notice requests information on new studies/ research
 - International and domestic studies are posted on www.epa.gov/hero

Superfund Hierarchy for Toxicity Values

IRIS

- Extensive internal and external peer review
- Agency consensus

Other sources

- International
- Federal
- State
- Tribal

- EPA Office of Radiation and Indoor Air
 - Federal Guidance Report 13 (FGR 13)
 - Guidance that contains cancer risk coefficient values for EPA's regulatory activities
 - Currently, 800 radionuclides
- FGR 13 developed mostly using Reports from Scientific Advisory Groups
 - U.S. National Academies of Science
 - International Commission on Radiological Protection
 - United Nations Scientific Committee on the Effects of Ionizing Radiation
 - National Council on Radiation Protection and Measurements

2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)

- Draft 2011 TCDD Reference Dose based on the following (final expected in 2012):
 - Epidemiological study of Italian residents
 - Baccarelli et. al. (2008)
 - Mocarelli et. al. (2008)
- Draft 2011 TCDD oral Cancer Slope Factor based on the following:
 - Epidemiological study of German workers
 - Becher et. al. (1998)
 - Ott and Zober (1996)

Trichloroethene (TCE)

- TCE is prevalent at many hazardous waste sites. To date, TCE has been detected in soil and groundwater at 761 sites
- EPA's approach for addressing the risks of TCE depends on the pathway of exposure.
- EPA ORD published new IRIS toxicity values September 2011

Trichloroethene (TCE)

- 2011 TCE Inhalation Cancer Slope factor based upon the following:
 - Epidemiological study of French workers
 - Charbotel et. al. (2006)
 - Epidemiological study of Danish workers
 - Raaschou-Nielsen et. al. (2003)

For More Copies or Information

- Guidance documents for chemical cleanup level issues are on Superfund Remedy Decisions Webpage:
 - <http://www.epa.gov/superfund/policy/remedy/sfremedy/index.htm>
- Guidance documents for radionuclide cleanup level issues are on Superfund Radiation Webpage:
 - <http://www.epa.gov/superfund/health/contaminants/radiation/index.htm>

EPA/ITRC training on Superfund radionuclide cleanup

- http://www.clu-in.org/conf/itrc/radscleanup_060507/

USEPA Collaboration on International Mining Efforts

- EPA's collaborative mining activities are focused on the following:
 - Providing technical assistance on a government to government basis to implement best practices
 - Share lessons learned on characterization and cleanup of mining sites
 - Share information on innovative and cost effective cleanup approaches

Development of Guidance on the #1 Mining Issue - Acid Mine Drainage:

- USEPA worked with International Network for Acid Prevention (INAP) members in the development of the “Global Acid Rock Drainage Guide (GARD)” addressing:
 - Characterization
 - Prediction
 - Prevention and Mitigation
 - Treatment
 - Monitoring
 - Management and Performance Assessment

Development of the International Cyanide Code

- ICC is a voluntary best practices guide for international gold mining companies and covers practices related to the transport, storage, use and treatment of sodium/potassium cyanide
- EPA worked with International Council on Mining and Metals (ICMM – composed of the 15 largest mining companies in the world), International Wildlife Fund (NGO), the World Bank, and representatives from Canada, Australia and the EU in scoping, reviewing and finalizing the Code

Development of the International Cyanide Code

- The Code has been incorporated into operations throughout the world and has been especially useful in Ghana, Indonesia, and the Dominican Republic. Central American countries have revised their mining regulations to incorporate portions of the Code
- EPA has learned from the Code about what are technically feasible and economically sound cyanide treatment options

World Bank's Social and Economic Guidance and Mining Guide

- EPA is currently reviewing the Draft Social and Economic Impact Guidance
- The Agency will soon begin review of the Mining Impact Guidance
- EPA also provides technical review of proposed mining projects seeking World Bank funding

UN Commission on Sustainable Development (CSD): Mining

- USEPA and US Department of Interior prepared the US Government position on sustainable mining issues for the UN Commission
- EPA and DOI technical staff participated in the two week negotiations at the UN in May 2011
- This effort led to a consensus position on sustainable mining by the member countries
- EPA and DOI are currently developing the US position on additional sustainable mining issues which will be presented at the Commission's meeting in June 2012

Central America Free Trade Agreement

CAFTA: Mining EIA Guidance

- As part of the CAFTA trade agreement, the Central American mining ministers requested that an Environmental Impact Assessment (EIA) Mining Guide be cooperatively developed
- Over the last three years, mining ministry technical staff and EPA have developed a mining guide covering hardrock and non hardrock mining
- This guide identifies mutually agreed upon best practices that should be used to reduce environmental impacts from proposed large scale mining projects
- In September 2011, in Nicaragua, the CAFTA conducted training on the use of the guide

Conclusions

- Large scale mining projects potentially cause environmental, social and economic impacts
- Need to continue working worldwide to develop cost-effective approaches to address long-term impacts of mining
- Need to continue working worldwide on identifying issues, sharing lessons learned and developing guidance