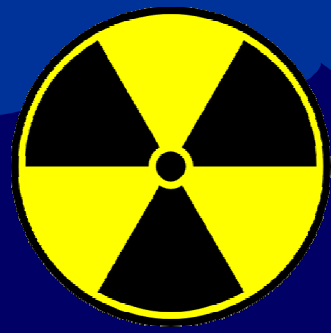
U.S. EPA Superfund Risk Harmonization when addressing Chemical and Radioactive Contamination

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



Presented to the
Panel on Worldwide Regulatory Oversight
of Radioactive Legacy Sites
WM 2012 Symposia
in Phoenix, AZ on 29 February, 2012

EPA

EPA Addresses Site Cleanup Under Several Laws, Programs

- Comprehensive Environmental Response, Compensation & Liability Act, CERCLA or "Superfund"
- National Contingency Plan (NCP) is regulation for CERCLA
- National Priorities List (NPL) guides EPA on which sites need further attention

EPA

Purpose

- Provide brief description of CERCLA process
- Provide overview and comparison of key EPA CERCLA guidance and tools that specifically address radionuclides and their chemical precursor
  - Radionuclides are also addressed with other hazardous substances under general EPA CERCLA guidelines

Superfund sites: Number and Progress

- 1,279 NPL sites
  - »56 are radiation sites
    - —55 of these 56 also have significant chemical contamination
- 61 mores sites proposed for NPL
  - »1 is a radiation site
- 1,084 NPL sites have progressed to "construction completion"
  - »37 are radiation sites

EPA

How to Address Radiation in a Chemical Program?

- With only 56 radioactively contaminated sites out of 1,279 total, the focus of the Superfund program has been on chemicals.
- **Question:** How best address radiation?
- **Answer:** Address radiation in a consistent manner with chemicals, except to account for the technical differences posed by radiation
  - » Radiation easily fits within Superfund framework
  - » Improves public confidence by taking mystery out of radiation

EPA

Why Does Radiation Easily Fit within the Superfund Framework?

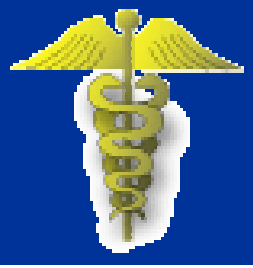
- Primary effect is cancer
- People ingest, inhale, eat, same amount of contaminated dust and food whether it is chemical or radioactive contamination,
- Dust gets resuspended the same whether it is chemically or radioactively contaminated
- Inorganic elements move through the subsurface whether they are radioactive or not

Part 1.
Technical Guidance & Tools

EPA

Nine CERCLA Remedy Selection Criteria – Two Threshold

- Two threshold criteria (both must be met)
  1. Protect human health and the environment
  2. Comply (attain or waive) with other federal and state laws: Applicable or Relevant and Appropriate Requirements (ARARs)
     - Protect current or future sources of drinking water (e.g., attain MCLs or more stringent state standards)



EPA

CERCLA Cleanup Levels

- ARARs often determine cleanup levels
- Where ARARs are not available or protective, EPA sets site-specific cleanup levels that
  - » For carcinogens, represent an increased cancer risk of 1×10^{-6} to 1×10^{-4}
    - —10^{-6} used as “point of departure”
    - —PRGs are established at 1×10^{-6}
  - » For non-carcinogens, will not result in adverse effects to human health (hazard index (HI) <1)
- Address ecological concerns
- To-be-considered (TBC) material may help determine cleanup level

CERCLA Cleanup Levels Are NOT Based On

- NRC decommissioning requirements (e.g., 25, 100 mrem/yr dose limits) 10 CFR 20 Subpart E
  - » If used as an ARAR, 10^{-6} still used as point of departure, and 10^{-4} to 10^{-6} risk range must be met
- Guidance outside risk range and/or if expressed as a dose (# mrem/year). This includes:
  - » DOE orders, NRC guidance (e.g., NUREGs), ICRP guidance, IAEA guidance, NCRP guidance, ANSI/HPS guidance, EPA/DHS PAGs, and Federal guidance

Risk-based Cleanup Levels for Radioactive Contamination

- Radiation cleanup levels expressed as risk levels, **not** mrem [mSv]
- Superfund uses "slope factors" in Health Effects Assessment Summary Tables (HEAST) instead of dose conversation tables to estimate cancer risk from radioactive contaminants
  - » HEAST has been updated with new information from Federal Guidance 13
    - —Based on information in ICRP 72

Site consistency

- To help facilitate compliance with NCP and cleanup sites, EPA Headquarters provides:
  - Guidance documents
  - Models (calculators)
  - Training (developed with State led ITRC)
  - 12 Annual Meetings with EPA Regions
- Guidance, models, training are available for free on the internet

Guidance: Risk Assessment Q&A

- *Radiation Risk Assessment at CERCLA Sites: Q&A* (12/99) OSWER Directive 9200.4-31P
- Provides overview of current EPA guidance for radiation risk assessment
- Written for users familiar with Superfund but not radiation
- Adds some new guidance
  - » Dose assessment only for ARAR compliance
  - » No dose-based TBCs (including ***No*** 15 mrem/yr [0.15 mSv/yr])
  - » Direct exposure rate may supplement sampling

Guidance: chemical SSG

- Soil Screening Guidance [SSG] documents (7 & 5/96) OSWER Directives 9355.4-23 and 9355.4-17A
  - » User Guide
  - » Technical Background Document
- Guidance to screen out areas, pathways, and/or chemicals early in the process
  - » 1 x 10^{-6} and MCLs (leaching from soil)
  - » Residential land use
  - » Survey procedures for site characterization
  - » Evaluates 9 soil to groundwater models

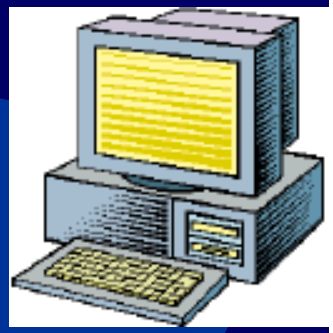
Guidance: Rad SSG

- Soil Screening Guidance for Radionuclides [rad SSG] documents (10/00) OSWER Directives 9355.4-16A and 9355.4-16
  - » User Guide
  - » Technical Background Document
- Guidance to screen out areas, pathways, and/or radionuclides early in the process
- Consistent with 1996 chemical SSG
  - » 1×10^{-6} and MCLs (leaching from soil)
  - » Residential land use
  - » Survey procedures for site characterization
  - » Evaluates 5 soil to groundwater models
  - » Accounts for technical differences of radiation

EPA

Guidance: Chemical RSL Calculator

- Calculator to establish Screening Levels/PRGs, when:
  - » ARAR is either not available or sufficiently protective
- Electronic equations (risk and leaching to groundwater) also are on Internet
  - » $1x10^{-6}$ and MCLs (leaching from soil)
  - » Includes dermal exposure

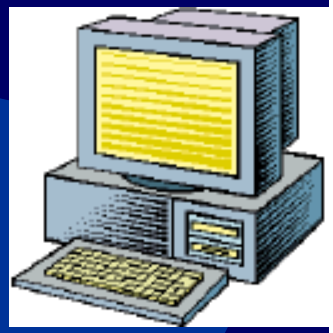


Guidance: Chemical RSL Calculator (continued)

- Eight scenarios/land uses available
  1. Residential
  2. Recreator
  3. Indoor workers
  4. Outdoor workers
  5. Fish ingestion
  6. Tap water
  7. Soil to groundwater
  8. Air
- Includes chemical toxicity of uranium

Guidance: Rad PRG Calculator

- Calculator to establish PRGs, when:
  - » ARAR is either not available or sufficiently protective (e.g., 25 mrem/yr [0.25 mSv/yr] or more)
- Electronic equations (risk and leaching to groundwater) also are on Internet
  - » $1x10^{-6}$ and MCLs (leaching from soil)
  - » Accounts for technical differences of radiation (e.g., gamma, plant uptake)



Guidance: Rad PRG Calculator (continued)

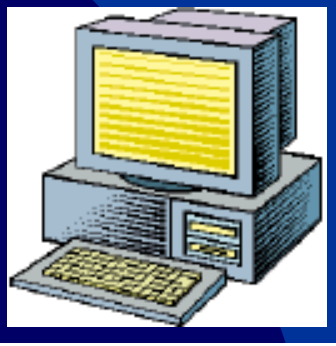
- Eight scenarios/land uses available

  1. Residential
  2. Agricultural
  3. Indoor workers
  4. Outdoor workers
  5. Fish ingestion
  6. Tap water
  7. Soil to groundwater
  8. Air

- Chemical SSL Internet equations should be used for chemical toxicity of uranium
- EPA developed Internet-based training with States (ITRC) on calculator and radiation risk assessment
  - » http://www.clu-in.org/conf/itrc/rads_051507/

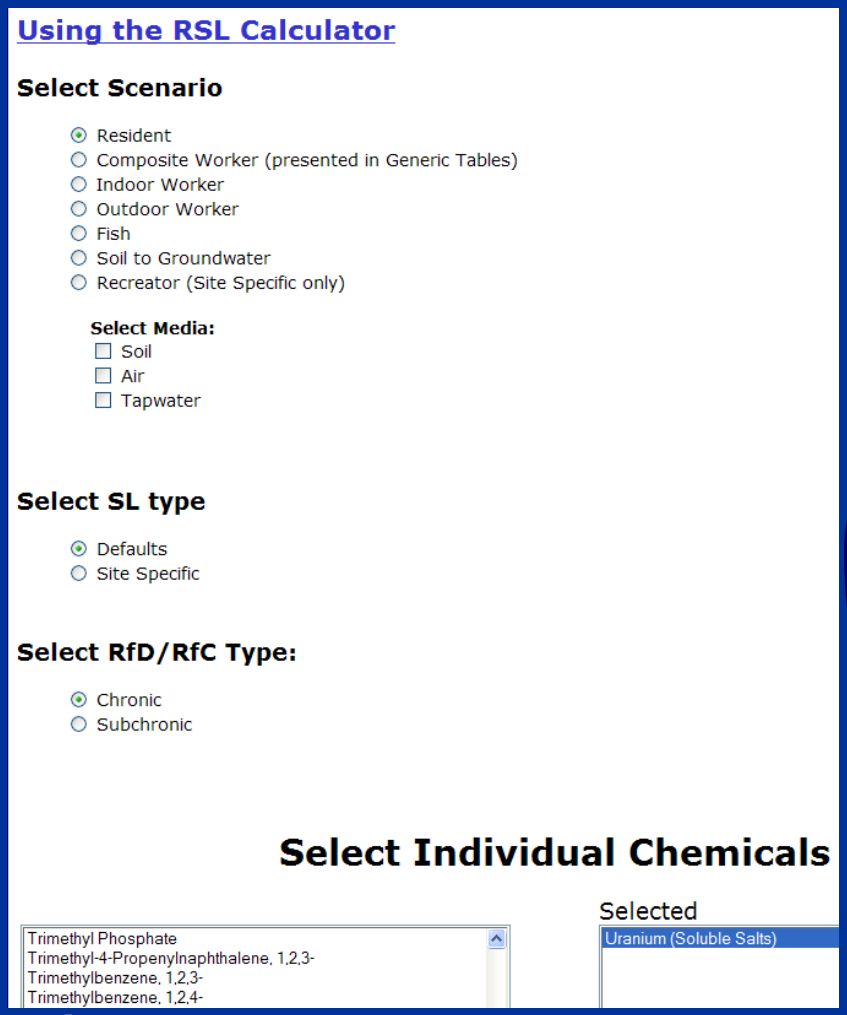
Guidance: ARAR Dose Calculator

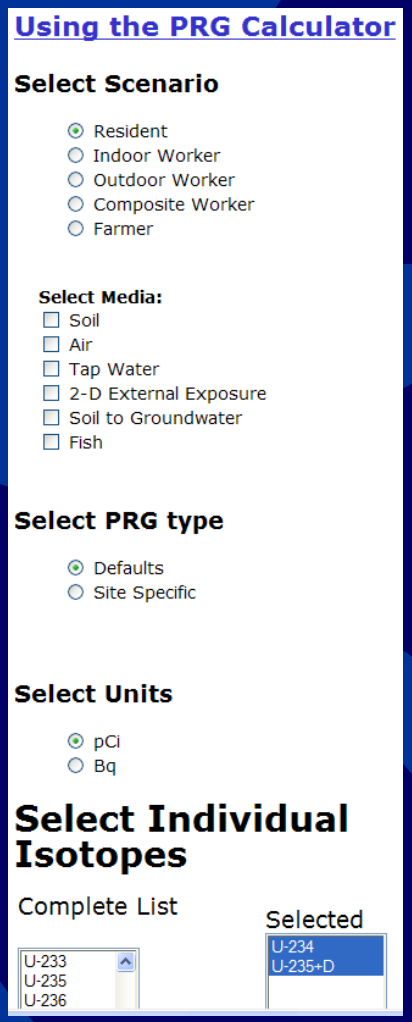
- Calculator to establish Dose Compliance Concentrations (DCC) for single dose limit ARARs requiring a dose assessment
- Eight scenarios/land uses available
  1. Residential
  2. Agricultural
  3. Indoor workers
  4. Outdoor workers
  5. Fish ingestion
  6. Tap water
  7. Soil to water
  8. Air
- Equations similar to those used for PRG calculator, except dose conversion factors used instead of slope factors

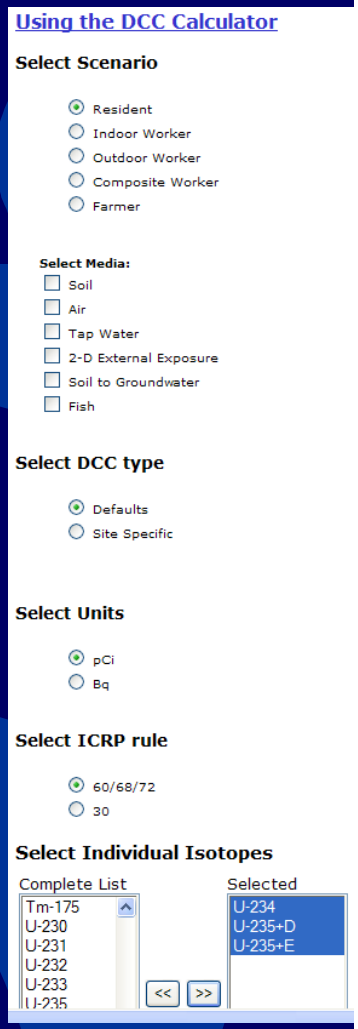


EPA

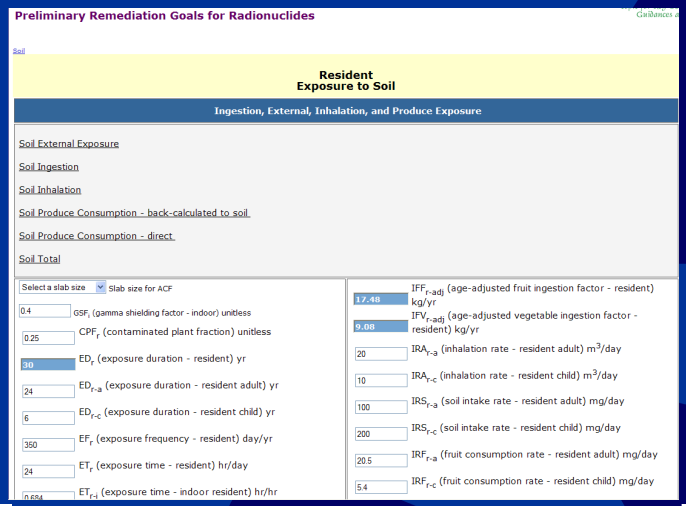
RSL, PRG, DCC, Similar Look and Feel







RSL, PRG, DCC, Consistent Exposure Assumptions



Preliminary Remediation Goals for Radionuclides

Soil

Resident
Exposure to Soil

Ingestion, External, Inhalation, and Produce Exposure

Soil External Exposure
Soil Ingestion
Soil Inhalation
Soil Produce Consumption - back-calculated to soil
Soil Produce Consumption - direct
Soil Total

Select a slab size — Slab size for ACF	17.48 IFF_{r-adj} (age-adjusted fruit ingestion factor - resident) kg/yr
0.4 GSF, (gamma shielding factor - indoor) unitless	9.08 IFV_{r-adj} (age-adjusted vegetable ingestion factor - resident) kg/yr
0.25 CPF_r (contaminated plant fraction) unitless	20 IRA_{r-a} (inhalation rate - resident adult) m^3/day
30 ED_r (exposure duration - resident) yr	10 IRA_{r-c} (inhalation rate - resident child) m^3/day
24 ED_{r-a} (exposure duration - resident adult) yr	100 IRS_{r-a} (soil intake rate - resident adult) mg/day
6 ED_{r-c} (exposure duration - resident child) yr	200 IRS_{r-c} (soil intake rate - resident child) mg/day
350 EF_r (exposure frequency - resident) day/yr	20.5 IRF_{r-a} (fruit consumption rate - resident adult) mg/day
24 ET_r (exposure time - resident) hr/day	5.4 IRF_{r-c} (fruit consumption rate - resident child) mg/day
0.684 $ET_{r,i}$ (exposure time - indoor resident) hr/hr	

Regional Screening Levels for Chemical Contaminants at Superfund Sites

Soil

Resident
Exposure to Soil

Ingestion, Dermal, and Inhalation Exposure

Soil Carcinogenic Dermal
Soil Carcinogenic Ingestion
Soil Carcinogenic Inhalation
Soil Carcinogenic Total
Soil Non-Carcinogenic Dermal
Soil Non-Carcinogenic Ingestion
Soil Non-Carcinogenic Inhalation
Soil Non-Carcinogenic Total

0.07 AF_a (skin adherence factor - adult) mg/cm^2	24 ET_r (exposure time - resident) hour
0.2 AF_c (skin adherence factor - child) mg/cm^2	1 THQ (target hazard quotient) unitless
70 BW_a (body weight - adult) kg	114 IFS_{adj} (age-adjusted soil ingestion factor) mg-year/kg-day
15 BW_c (body weight - child) kg	100 IRS_a (soil intake rate - adult) mg/day
361 DFS_{adj} (age-adjusted soil dermal factor) mg-year/kg-day	200 IRS_c (soil intake rate - child) mg/day
30 ED_r (exposure duration - resident) year	70 LT (lifetime - resident) year
24 ED_a (exposure duration - adult) year	5700 SA_a (skin surface area - adult) cm^2/day

Dose Compliance Concentrations for Radionuclides (DCC)

Soil

Resident
Exposure to Soil

Ingestion, External, Inhalation, and Produce Exposure

Soil External Exposure
Soil Ingestion
Soil Inhalation
Soil Produce Exposure
Soil Total

Select a slab size — Slab size for ACF	18 IFA_{r-adj} (age-adjusted soil inhalation factor) m^3/day
0.8 AAF_{r-a} (annual age fraction - adult resident)	120 IFS_{r-adj} (age-adjusted soil ingestion factor) mg/day
0.2 AAF_{r-c} (annual age fraction - child resident)	17.48 IFF_{r-adj} (age-adjusted fruit ingestion factor) mg-yr/kg-day
0.25 CPF_r (contaminated plant fraction)	9.08 IFV_{r-adj} (age-adjusted vegetable ingestion factor) mg-yr/kg-day
1 DL (dose limit) mrem	20 IRA_{r-a} (inhalation rate - adult) m^3/day
1 ED_r (exposure duration - resident) yr	10 IRA_{r-c} (inhalation rate - child) m^3/day
1 ED_{r-a} (exposure duration - adult) yr	100 IRS_{r-a} (soil intake rate - adult) mg/day
1 ED_{r-c} (exposure duration - child) yr	200 IRS_{r-c} (soil intake rate - child) mg/day
350 EF_r (exposure frequency) day/yr	20.5 IRF_{r-a} (fruit consumption rate - adult) mg/day
24 ET_r (exposure time - resident) hr/day	5.4 IRF_{r-c} (fruit consumption rate - child) mg/day
0.684 $ET_{r,i}$ (indoor exposure time fraction - resident) hr/hr	10.4 IRV... (vegetable consumption rate - adult)
0.073 $ET_{r,o}$ (outdoor exposure time fraction - resident) hr/hr	
0.4 GSF_i (gamma shielding factor - indoor)	

EPA

RSL, PRG, DCC
Consistent treatment of inorganics

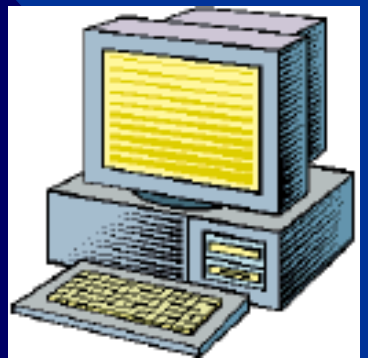
- Resuspension – same
- Soil to groundwater – same
- All 3 steady state models. Not depleting source (transfer/dynamic) models

EPA/ITRC Radiation Risk Training

- Four modules provide:
  1. Background and Regulatory Case Studies
  2. Existing Practices in Radiation Risk Assessment
  3. **Use of Radiation PRG Calculator *(tutorial on using PRG and ARAR dose calculator)***
  4. **Case Study Application for PRG Calculator**

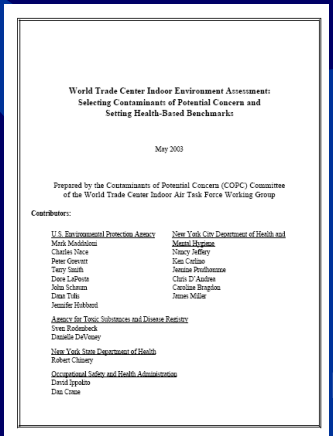
EPA/ITRC Radiation Risk Training, cont.

- Eight Live Internet rad CERCLA Policy Training sessions have been conducted
  - » 1,047 total participants, including 165 EPA employees
- An archived version of a live training session is available at:
  - » http://www.clu-in.org/conf/itrc/rads_051507/
- Archived version was accessed by users 1,710 times between January 1, 2008 and August 26, 2009.



Guidance: World Trade Center (WTC) Benchmark

- Document used to establish $1x10^{-4}$ risk based cleanup levels for the reuse of chemically contaminated buildings after the 9/11 attacks.
- Equations and parameters were the latest EPA chemical methodology
- Ingestion, inhalation, and dermal
  - » http://www.epa.gov/wtc/reports/contaminants_of_concern_benchmark_study.pdf



World Trade Center Indoor Environment Assessment:
Selecting Contaminants of Potential Concern and
Setting Health-Based Benchmarks

May 2003

Prepared by the Contaminants of Potential Concern (COPC) Committee
of the World Trade Center Indoor Air Task Force Working Group

Contributors:

U.S. Environmental Protection Agency
Mark Maddaloni
Charles Nace
Peter Grevatt
Terry Smith
Dave LaPierre
John Schaum
Dana Tulis
Jennifer Hubbard

Agency for Toxic Substances and Disease Registry
Sven Rodenbeck
Danielle DeVinney

New York State Department of Health
Robert Chinery

Occupational Safety and Health Administration
David Ippolito
Dan Coss

New York City Department of Health and Mental Hygiene
Nancy Jeffery
Ken Cerlino
Jessica Posthumus
Chris D'Andrea
Caroline Brogdon
James Miller

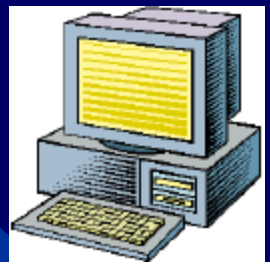
Guidance: World Trade Center (WTC) Benchmark (continued)

- WTC benchmark document includes 1 land use scenario
  - Residential
- This land use includes 2 exposure routes
  - Settled dust
  - Ambient air

EPA

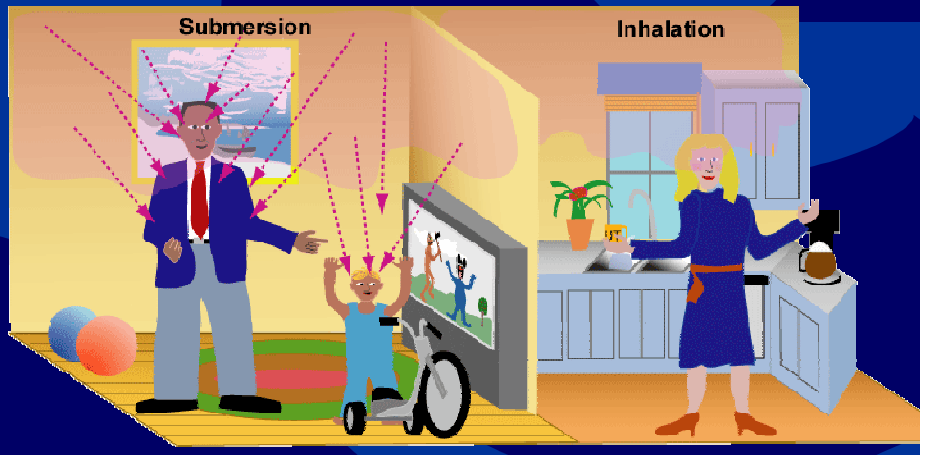
Guidance: Building PRG (BPRG) Calculator

- Calculator to establish $1x10^{-6}$ risk based PRGs for the reuse of radioactively contaminated buildings.
- Equations and parameters are derived from latest EPA chemical methodology (e.g., assessment at WTC)
  - » Adjusted to account for technical differences posed by radiation
- EPA and ITRC Internet-based training on BPRG calculator and D&D
  - » http://www.clu-in.org/conf/itrc/radsdd_040308/



Guidance: Building PRG (BPRG) Calculator (continued)

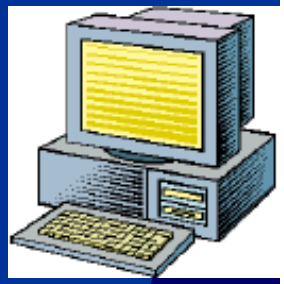
- BPRG calculator includes 2 land use scenarios
  - » Residential
  - » Indoor worker
- Both land uses include 3 exposure routes
  - » Settled dust
  - » Ambient air
  - » Direct external exposure
    - —5 Room sizes and 4 receptor locations, both
      - –Surface
      - –Volumetric



EPA

Building Dose Cleanup Concentrations (BDCC) ARAR Dose Calculator

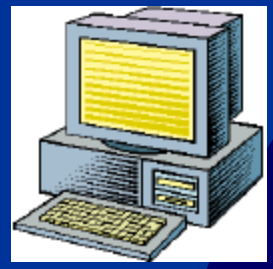
- BDCC Purpose: to establish BCCs for Inside Buildings for single dose limit ARARs (# mrem/yr)
- BDCC includes 2 land use scenarios (Residential, Indoor Worker)
- 2 land uses include 3 exposure routes (Settled dust, Fixed Direct External 3-D, Ambient Air)
- Equations similar to those used for BPRG calculator, except dose conversion factors used instead of slope factors



EPA

Surfaces PRG (SPRG) Calculator

- Establish 1 x 10^{-6} risk based PRGs for radioactively contaminated ***outside*** hard surfaces (e.g., slabs, pavement, sidewalks, sides of buildings)
- Derived from rad PRG and BPRG calculators



EPA

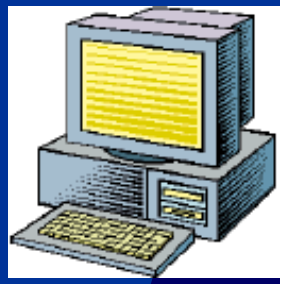
SPRG Exposure Scenarios

- SPRG includes 3 land use scenarios
  - » Residential
  - » Indoor Worker
  - » Outdoor Worker
- 3 land uses include 3 exposure routes
  - » Settled dust (pave and unpaved street level)
  - » Fixed Direct External 3-D (street level)
    - —Surface and Volumetric
  - » Fixed Direct External 2-D (slabs)
    - —Surface and Volumetric

EPA

Surface Dose Cleanup Concentrations (SDCC) ARAR Dose Calculator

- SDCC Purpose: to establish DCCs for Outside Hard Surfaces for single dose limit ARARs (# mrem/yr)
- SDCC includes 3 land use scenarios (Residential, Indoor Worker, Outdoor Worker)
- 3 land uses include 3 exposure routes (Settled dust, Fixed Direct External 3-D, Fixed Direct External 2-D (slabs))
- Equations similar to those used for SPRG calculator, except dose conversion factors used instead of slope factors



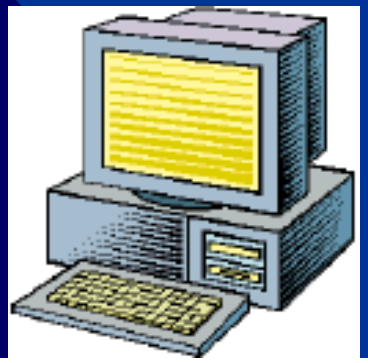
EPA

EPA/ITRC Radiation D&D Training

- Four modules provide:
  1. Introduction and Regulatory Basis for D&D
  2. Factors for Implementing D&D
  3. **Preliminary Remediation Goal (PRG) Calculators *(tutorial on using BPRG, SPRG, BDCC, and SDCC calculators)***
  4. Case Studies and Lessons Learned

Radiation D&D Training, cont.

- Five Live Internet rad CERCLA Policy Training sessions have been conducted
  - » 731 total participants, including 101 EPA employees
- An archived version of a live training session is available at:
  - » http://www.clu-in.org/conf/itrc/radsdd_040308/
- Archived version was accessed by users 2,046 times between January 1, 2008 and August 26, 2009.



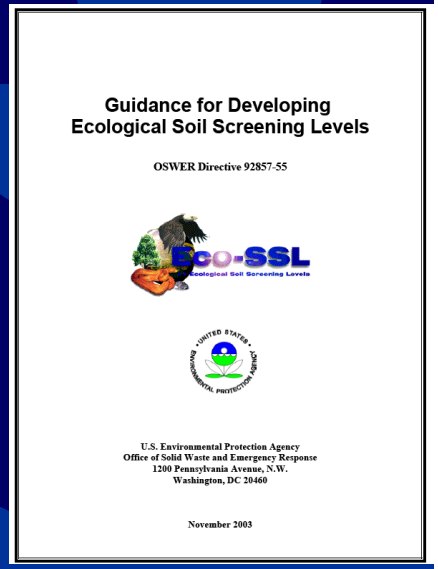
Tools and Guidance under Development

1. Radionuclide Ecological Benchmark calculator
2. MNA for inorganics (metals and radionuclides)
3. Counts per minute calculator

EPA

Radionuclide Ecological Benchmark (REB) Calculator

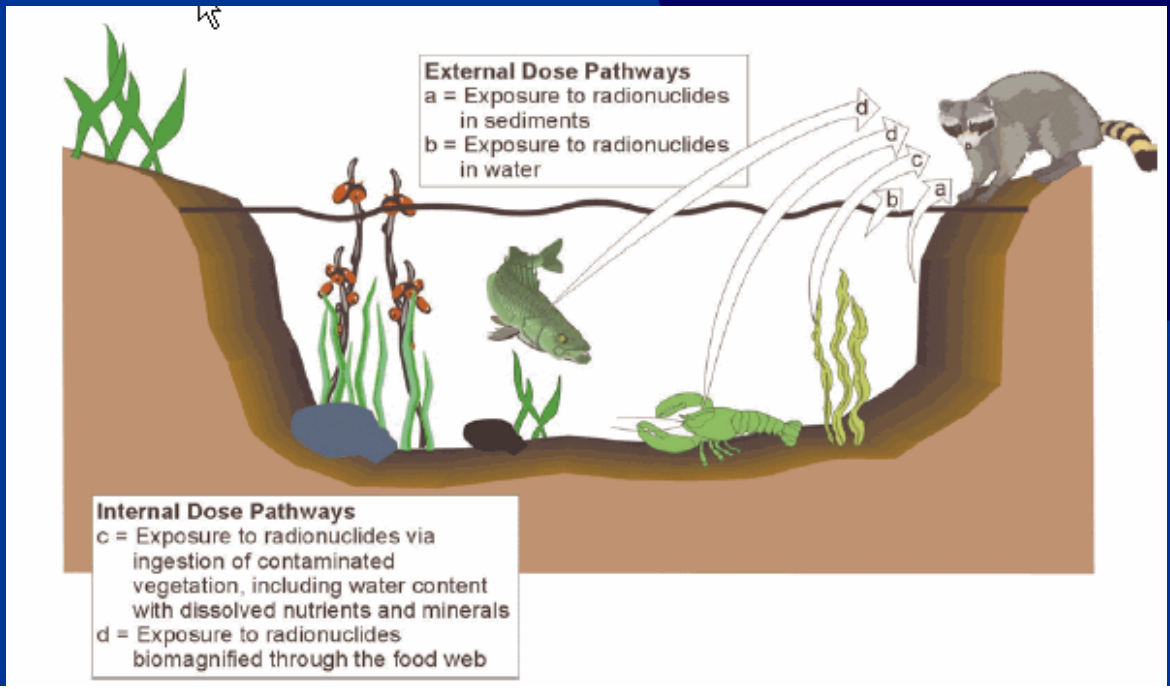
- Establish risk-based Biota Concentration guides (BCGs), or ecological benchmarks, for radioactively contaminated sites
- Fits with Superfund framework for developing eco benchmarks
- Derived from DOE Graded Approach guidance
  - » Includes same dose levels for tissue death
  - » Strong recommendation to look at chemical eco effects



EPA

REB Exposure Scenarios

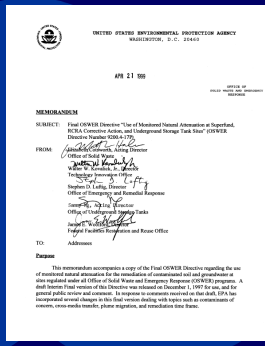
- Includes 12 animal or plant benchmark scenarios
  - »6 generic composite only
  - »6 species-specific/site-specific



EPA

MNA for Inorganics (metals and radionuclides) Policy document

- Will complement 1999 overall MNA policy document "Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites"
  - » Will help clarify policy issues unique to inorganics not addressed in 1999
- 3 Volume ORD MNA for inorganics documents will be technical support document for this policy document
  - » Also complemented by 2010 ITRC guidance on MNA for inorganics



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

APR 21 1999

OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE

MEMORANDUM

SUBJECT: Final OSWER Directive "Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites" (OSWER Directive Number 9200.4-17P)

FROM: Elizabeth Cotsworth, Acting Director
Office of Solid Waste

Technology Innovation Office

Stephen D. Luftig, Director
Office of Emergency and Remedial Response

Office of Underground Storage Tanks

Federal Facilities Restoration and Reuse Office

TO: Addressees

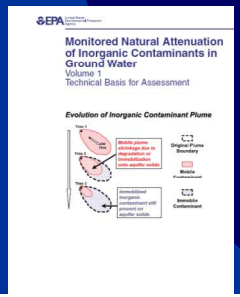
Purpose

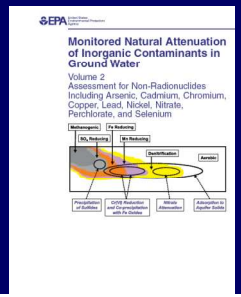
This memorandum accompanies a copy of the Final OSWER Directive regarding the use of monitored natural attenuation (MNA) at Superfund, corrective action, and underground storage tank sites regulated under all Office of Solid Waste and Emergency Response (OSWER) programs. A draft Interim Final version of this Directive was released on December 1, 1997 for use, and for general public review and comment. In response to comments received on that draft, EPA has incorporated several changes in this final version dealing with topics such as contaminants of concern, cross-media transfer, plume migration, and remediation time frame.

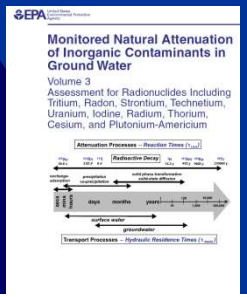
EPA

Technical Background Documents for MNA Guidance for Inorganics

- 3 Technical Reports "Monitored Natural Attenuation of Inorganic Contaminants in Ground Water"
  - » "Volume 1 - Technical Basis for Assessment" 2007
  - » "Volume 2 - Assessment for Non-Radionuclides Including Arsenic, Cadmium, Chromium, Copper, Lead, Nickel, Nitrate, Perchlorate, and Selenium" 2007
  - » "Volume 3 - Assessment for Radionuclides Including Americium, Cesium, Iodine, Plutonium, Radium, Radon, Strontium, Technecium, Thorium, Tritium, Uranium" 2010







EPA

CPM Calculator Scenarios

- The CPM calculator has three major sub calculators based on the field survey scenario:

1. Ground based scanning of surface contamination
2. Ground based scanning of volumetric contamination *(under development)*
3. Air based scanning of contamination *(under consideration)*

EPA

CPM tool caveats

- The CPM tool is intended to facilitate use of Real-Time measurement techniques to supplement sampling **NOT** replace sampling
- The CPM tool only addresses gamma emitters
- The CPM tool assumes uniform contamination

EPA

Part 2.
Communication within EPA

EPA

Meetings with EPA Staff

- EPA has had 12 annual meetings with regional & HQ staff who work on radiation sites, to discuss:
  - Lessons learned (things not to repeat)
  - Success stories (things to do again)
  - Need for new guidance/tools
- Regional staff determine agenda
- Meeting co-hosted by HQ lead staff on:
  1. radiation issues and
  2. general remedy selection issues

EPA

Email Lists

- EPA HQ maintains email list of regional staff working on radiation sites, to distribute:
  - Draft guidance for comments
  - Final guidance
  - Queries to assist in site-specific issues

Internet

- All guidance (documents, models) on CERCLA radiation approach are on the internet
  http://www.epa.gov/superfund/health/contaminants/radiation/index.htm

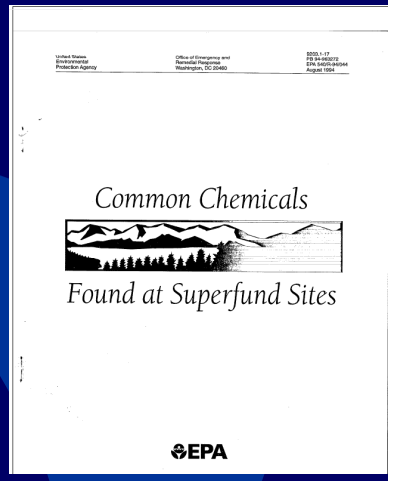
Part 3.
Involving Stakeholders

Community Involvement

- EPA has many tools to facilitate meaningful involvement by communities near sites
- EPA hosts a community involvement national conference
- EPA has 2 tools designed specifically for use at radiation sites that are based on earlier tools for chemical sites

Booklet: Common Chemicals

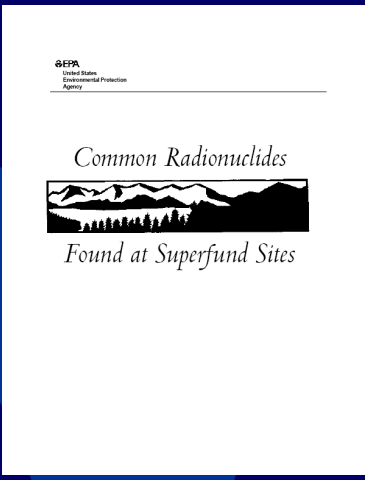
- *Common Chemicals Found at Superfund Sites* (8/94) OSWER Directive 9203.1-17
- Booklet for the general public. It contains information on
  - » Health effects of chemicals commonly found at Superfund sites
  - » EPA policies for cleaning up these chemicals
    Note this booklet has been superceded by a website



EPA

Booklet: Common Radionuclides

- *Common Radionuclides Found at Superfund Sites* (7/02) OSWER Directive 9200.1-34
- Booklet for the general public. It contains information on
  - » Health effects of radionuclides commonly found at Superfund sites
  - » EPA policies for cleaning up these radionuclides



EPA

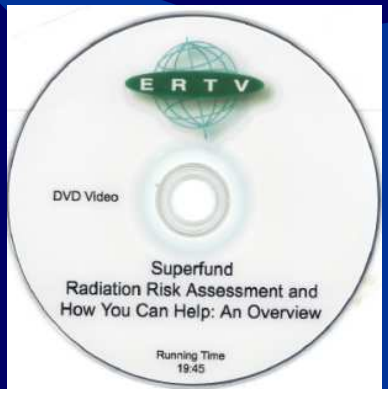
Video: Chemical Risk Assessment

- *Superfund Risk Assessment and How you can Help, an Overview* (1999) OSWER Directive 9285.7-29A
- Video for the general public. It contains information on:
  - » The Superfund risk assessment process when addressing chemical contamination
  - » How the public is involved site-specifically

EPA

Video: Radiation Risk Assessment

- *Superfund Radiation Risk Assessment and How you can Help, an Overview* (3/05) OSWER Directive 9200.4-37
- Video for the general public. It contains information on:
  - » The Superfund risk assessment process when addressing radioactive contamination
  - » How the public is involved site-specifically



EPA

Part 4.
Relevance of Superfund Approach to International Radiation Community

EPA

Role of International Information in Superfund

- EPA does not use risk management framework used by ICRP/IAEA and most other agencies addressing radiation
- However, EPA does use technical information from international guidance
  - » EPA PRG calculator uses IAEA transfer coefficients
- Material in EPA guidance/tools is freely available and may be used in international (e.g., IAEA, other country) guidance

How can EPA guidance & tools be used directly?

- Ideal for radiation/chemical risk comparisons at mixed waste sites
  - » Most chemical site cleanup programs have cleanup levels similar to EPA's cancer risk range (10^{-4} to 10^{-6})
  - » Can change default input parameters in PRG/DCC calculators to match up with those used by chemical program in your country

International Information Sharing

- Representatives from France, UK, Russia, Australia, Iraq, and Norway (RSL chair) have presented at EPA internal meeting and conducted site visits
- French ASN hosted EPA visit of 3 French sites
- UK EA hosted EPA RPM for SRS visit to Sellafield for one week
- UK EA hosted EPA RPM for Livermore site working at Sellafield for 6 months

For More Copies or Information

- Guidance documents are on Superfund Radiation Webpage:
  - » http://www.epa.gov/superfund/health/contaminants/radiation/index.htm

  EPA/ITRC training on EPA Superfund radiation approach
  - » http://www.clu-in.org/conf/itrc/radscleanup_060507/
- Guidance documents for overall cleanup level issues are on Superfund Remedy Decisions Webpage:
  - » http://www.epa.gov/superfund/policy/remedy/sfremedy/index.htm
- For further information or questions, Stuart Walker
  - » Phone: (703) 603-8748
  - » Fax: (703) 603-9133
  - » Email: Walker.Stuart@epa.gov

EPA

EPA