Changes to MRBCA Process (continued...)

- Toxicity values
- Dermal contact pathway (RAGS Part E)

Workgroup decided to adopt these changes at the April 28, 2005 meeting.

Changes in Toxicity Values

No. of Chemicals	Reason for Change
6	Based on DHSS comments (March 2005)
14	Updates in US EPA Region 9 PRG table (October 2004 vs. October 2002)

- Perchlorate was added.
- ***See Handout 1***

Dermal Contact Pathway (Draft Guidance Document, Feb. 2005)

- Pathways considered:
  - Dermal contact with surficial soil by resident
  - Dermal contact with surficial soil by non-residential worker
  - Dermal contact with soil by construction worker
  - Dermal contact with groundwater by resident
  - Dermal contact with groundwater by non-residential worker
  - Dermal contact with groundwater by construction worker

  Tier 1 scenario was for incidental contact with soil and water and did <u>not</u> include whole-body contact (showering or swimming).

- Evaluation was based on Risk Assessment Guidance for Superfund (RAGS) Volume I: Part A (USEPA, 1989)

- ***Workgroup decided to adopt RAGS Part E at the April 28, 2005 meeting.***

Dermal Contact with Soil (RAGS Part E)

- Only change in equation is addition of a new exposure factor.

- New exposure factor is event frequency (EV, event/day), i.e., number of times in a day dead skin area is exposed to soil.

- With the assumption EV = 1 event/day, no change in Tier 1 RBTLs.

If any other exposure factor is changed, Tier 1 RBTLs will change.

Dermal Contact with Soil (RAGS Part E)

RAGS Part E also provides guidance on:

- Skin surface area (cm^2)
- Soil adherence factor (mg/cm^2-event)
  - Activity specific
  - Skin specific
  - Weighted average approach to get recommended values

Based on this guidance, skin surface area and soil adherence factor were updated.

Comparison of Feb. 2005 with RAGS Part E Dermal Contact with Soil

- Assuming an EV of 1 event/day, no change in proposed Tier 1 RBTLs due to equation.
- New exposure factors shown in ***Handout 2***
  - Skin surface area
  - Soil adherence factor
- Changes to some RBTLs shown in ***Handout 3***
  - Adherence factor increased Tier 1 RBTLs
  - Surface area (except resident adult) increased Tier 1 RBTLs
  - Tier 1 RBTLs increased

Only decision required is event frequency for incidental dermal contact with soil (EV).

Dermal Contact with Water (RAGS Part E)

Use of RAGS Part E requires:

- Multiple changes in equation
- Possible change in exposure scenario

Dermal Contact with Water (RAGS Part E) Multiple Changes in Equation

- See attached ***Handout 4***
- Brief discussion of the basis of new equation
- Changes require:
  - 2 new exposure factors
  - One exposure factor eliminated (ET)
  - 4 new chemical-specific parameters
  - Change in symbols (PC becomes Kp)

Dermal Contact with Water (RAGS Part E) New Exposure Factors

- Event frequency (event/day)
- Event duration (hr/event)

These are required for both incidental and whole-body contact scenario.

Dermal Contact with Water (RAGS Part E) New Chemical-Specific Parameters

- Relative contribution of permeability coefficient, B (-)
- Time to reach steady-state, t^* (hr)
- Fraction absorbed water, FA (-)
- Lag time, τ_{event} (hr/event)

Only new parameter is skin thickness for which default value (10^{-3} cm) is recommended.

No decisions and no new inputs. Only new calculations with existing chemical-specific parameters.

Comparison of Feb. 2005 with RAGS Part E Dermal Contact with Water – Inorganics

No change in Tier 1 RBTLs due to equation if:

Event Frequency (EV) x Event Duration (t_{event}) = Exposure Time (ET)

Comparison of Feb. 2005 with RAGS Part E Dermal Contact with Water – Organics

- Generally the new equation will result in lower Tier 1 RBTLs.
- The effect is most significant for semi-volatile chemicals.
- See attached ***Handout 5***

Dermal Contact with Water (RAGS Part E) Possible Change in Exposure Scenario

- Incidental contact vs. whole-body contact
- Primary difference is in exposure factors
  - Skin surface area (cm^2)
  - Event frequency (event/day)
  - Event duration (hr/event)

Dermal Contact with Water (RAGS Part E) Decisions

- In Tier 1 RBTLs, should domestic water use include whole-body dermal contact, such as showering?
- If adopted, DTLs will be changed to include dermal contact pathway.
- Default exposure factors for:
  - Event frequency for incidental dermal contact with water
  - Event frequency for whole-body contact with water
  - Event duration for incidental dermal contact with water
  - Event duration for whole-body contact with water

Impact on Target Levels for Domestic Water Use Pathway

Tier 1 RBTL for domestic water use by resident (µg/L):

	Ing + Inh	Ing + Inh + DC	Ratio
1,4-Dioxane	61.1	61.0	0.998
Chlordane	1.92	0.372	0.193

Note that 1 event/day, 0.2 hr/event, 6,600 cm^2 skin surface area for child, and 18,000 cm^2 skin surface area for adult were used for showering.

US EPA Comments Construction Worker Exposure Factors

Feb. 2005 inhalation rate: 0.833 m^3/day

Alternate inhalation rate: 1.8 m^3/day

See Handout 6 for effect of this change

US EPA Comments
Calculation of Cumulative Risk

Step 1: Develop exposure model

Step 2: Identify domain for each complete exposure pathway

Step 3: Calculate representative concentration

Step 4: Select Tier 1 RBTLs from Appendix B

Additional Steps to Calculate Cumulative Risk

- Enter representative concentration from Step 3 in worksheet 1 (Table 8-1)
- Enter Tier 1 RBTLs from Step 4 in worksheet 2 (Table 8-2)
- Estimate total risk and cumulative site-wide risk in worksheet 3 (Table 8-3)