

March 26, 2020 revision-

1. Decided not to extrapolate room sizes.
2. Decided not to run the ACF backwards where the detector would be the source to keep all consistent.
3. For dust ACF (ground plane only) decided to do 4 scenarios:
 - a. Composite 1
 - b. Composite 2
 - c. Wood floor, drywall walls, drywall ceilings
 - d. Concrete floor, drywall walls, drywall ceilings

April 2, 2020

1. Add the receptor positions for ACF.

1. Dust ACF floor only – ground plane

There exists a need to develop an area correction factor (ACF) for the dust media. Currently Exposure to Settled Dust on Surfaces addresses ingestion (no issues) and external exposure. The external exposure is operating on the assumption of an infinite plane. ACFs would be developed for the existing room sizes for ground plane only. During consideration of this exercise, make sure the concrete ACF (for 2D SPRG and SDCC) and soil ACFs (for PRG and DCC) were developed using the proper baselines. The equation image below shows where the new ACFs would be applied.

Add the receptor positions from 3D

Run	Room size
1	10x10x10
2	50x50x10
3	100x100x10
4	200x200x20
5	400x400x40

External

$$BPRG_{res-dust-ext} \left(pCi/cm^2 \right) = \frac{TR \times t_{res} \text{ (year)} \times \lambda \left(\frac{1}{\text{year}} \right)}{\left(\frac{1 - e^{-kt_{res}}}{kt_{res}} \right) \times \left(1 - e^{-\lambda t_{res}} \right) \times SF_{ext-gp} \left(\frac{\text{risk/year}}{pCi/cm^2} \right) \times F_{in} \times F_i \times F_{AM} \times F_{OFF-SET} \times ACF_{ext-gp}}$$

$$ET_{res} \left(\frac{24 \text{ hours}}{\text{day}} \right) \times \left(\frac{1 \text{ day}}{24 \text{ hours}} \right) \times EF_{res} \left(\frac{350 \text{ days}}{\text{year}} \right) \times \left(\frac{1 \text{ year}}{365 \text{ days}} \right) \times ED_{res} \text{ (26 years)}$$

2. 3D redo

There exists a need to reevaluate the MCNP baseline runs for the existing 3D surface factors and expand on the scenario/media combinations. The green scenarios would be first, yellow second, red last. The blue scenarios were done previously and should be redone for consistency.

Scenario/Media*	Floor	Walls	Ceiling	Justification
Glass 1	Concrete	Glass	Drywall	resident
Glass 2	Wood	Glass	Drywall	resident
Glass 3	Concrete	Glass	Concrete	resident
Glass 4	Wood	Glass	Concrete	resident
Glass 5	Concrete	Glass	Wood	resident
Glass 6	Wood	Glass	Wood	resident
Glass 7	Glass	Glass	Glass	Previous
Steel 1	Concrete	Steel	Drywall	Worker/farmer
Steel 2	Concrete	Steel	Concrete	Worker/farmer
Steel 3	Concrete	Steel	Steel	Worker/farmer
Steel 4	Soil	Steel	Steel	Worker/farmer
Steel 5	Soil	Steel	Wood	Worker/farmer
Steel 6	Wood	Steel	Steel	Worker/farmer
Steel 7	Wood	Steel	Wood	Worker/farmer
Steel 8	Wood	Steel	Drywall	Worker
Steel 9	Steel	Steel	Steel	Container/Previous
Wood 1	Wood	Wood	Wood	Worker/resident/Previous
Wood 2	Wood	Wood	Drywall	Worker/resident
Wood 3	Concrete	Wood	Drywall	Worker/resident
Wood 4	Soil	Wood	Wood	Farmer/worker
Wood 5	Soil	Wood	Steel	Farmer/worker
Wood 6	Concrete	Wood	Steel	Farmer/worker
Wood 7	Wood	Wood	Steel	Resident/worker
Concrete 1	Concrete	Concrete	Concrete	Resident/worker/Previous
Concrete 2	Concrete	Concrete	Drywall	Resident/worker
Concrete 3	Concrete	Concrete	Steel	Resident/worker
Concrete 4	Soil	Concrete	Steel	Resident/worker
Concrete 5	Wood	Concrete	Drywall	Resident/worker
Concrete 6	Wood	Concrete	Wood	Resident/worker
Concrete 7	Wood	Concrete	Steel	Resident/worker
Concrete 8	Wood	Concrete	Concrete	Resident/worker
Adobe 1	Adobe	Adobe	Adobe	Rural resident/Previous
Adobe 2	Adobe	Adobe	Wood	Rural resident
Adobe 3	Soil	Adobe	Wood	Rural resident
Adobe 4	Adobe	Adobe	Steel	Rural resident
Adobe 5	Soil	Adobe	Steel	Rural resident
Drywall 1	Concrete	Drywall	Drywall	Resident/worker
Drywall 2	Concrete	Drywall	Concrete	Resident/worker
Drywall 3	Concrete	Drywall	Wood	Resident/worker
Drywall 4	Concrete	Drywall	Steel	Resident/worker
Drywall 5	Wood	Drywall	Drywall	Resident/worker

Scenario/Media*	Floor	Walls	Ceiling	Justification
Drywall 6	Wood	Drywall	Concrete	Resident/worker
Drywall 7	Wood	Drywall	Wood	Resident/worker
Drywall 8	Wood	Drywall	Steel	Resident/worker
Drywall 9	Drywall	Drywall	Drywall	Previous
Composite 1**				Resident/worker/Previous
Composite 2**				Resident/worker/Previous

*For room sizes (10x10x10, 50x50x10, 100x100x10, 200x200x20, 400x400x40).

*For room positions (center, center wall, corner, average).

*For source thicknesses of (ground plane, 1cm, 5cm, 15cm, and infinite).

**Composite 1 room material = drywall room, glass window, wooden doors, drywall walls, concrete floor, drywall ceiling

**Composite 2 room material = concrete room, wooden doors, concrete floor, drywall ceiling

3. 3D redo with no ceiling contamination

- There exists a need for MCNP surface factors without a contaminated ceiling. The walls and floor would be contaminated. See item 2 for scenarios.
- Additional runs with walls contaminated 6 ft high simulating spills splashing. See item 2 for scenarios.

4. 3D redo with no floor contamination

There exists a need for MCNP surface factors where the floor has been remediated or never contaminated, but walls and ceiling are still contaminated. See item 2 for scenarios.

5. 3D redo with no floor or ceiling contamination

There exists a need for MCNP surface factors where the floor and ceiling have been remediated or never contaminated, but walls and ceiling are still contaminated. See item 2 for scenarios.

6. 2+D analysis for floors only

There exists a need for MCNP surface factors where only the floor is contaminated. The contamination would be GP through SV. See item 2 for scenarios.