



**Washington Group International**

Integrated Engineering, Construction, and Management Solutions

# Updating Hazard Categorization Thresholds

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# Issues

- ◆ **Consistent methodology for derivation of HC 2 and HC 3 Threshold Quantities (TQ)**
- ◆ **Updating HC 2 and HC 3 TQ based on later ICRP (e.g., 68, 71 and 72 ) information**
- ◆ **Consideration of more realistic exposure pathways for HC 3 facilities**

# Approach

- ◆ **Develop a defensible technical basis and use a consistent methodology for Category 2 and Category 3 TQ**
- ◆ **Used a representative set of radionuclides**
- ◆ **Used a conservative meteorology – such as F stability and a wind speed of 1 m/s**
- ◆ **Used dry deposition velocity of 1 cm/s except for gases (e.g., tritium)**

## Approach – Cont'd

- ◆ Dose threshold for Category 2 – 10 rem at 300 m
- ◆ Dose threshold for Category 3 – 1 or 5 rem at 100 m
- ◆ Used ICRP 72 (public, 50-yr adult DCFs)
- ◆ Considered methodology in draft STD-1189 (Cat 2 – 100 rem at 100 m)

# Approach – Cont'd

- ◆ List of candidate isotopes

**H-3**

**Co-60**

**Sr-90**

**Cs-137**

**Np-237**

**U-234**

**U-235**

**Pu-238**

**Pu-239**

**Pu-240**

**Pu-241**

**Pu-242**

**Am-241**

**Cm-244**

**Cf-252**

# Analysis

- ◆ **Case A – Update TQs using existing methodology with new ICRP values (applies to Cat 2 TQs only)**
- ◆ **Case B – Case A changes with conservative meteorology and new dose threshold (Cat 2 TQs only)**
- ◆ **Case C - Case A changes with conservative meteorology and new dose threshold of 5 rem (Cat 3 TQs only)**

# Analysis – Cont'd

- ◆ **Case C - Case A changes with conservative meteorology and new dose threshold of 1 rem for Cat 3 TQs.**

# Results – Case A

- ◆ In general, TQs for HC 2 increased by a factor of 4 to 5.
- ◆ Significantly raises potential for HC 3 facilities with safety-class SSCs.

## Results – Case B

- ◆ **Meteorology: F stability, 1 m/s, 3 cm roughness, 1 cm/s dry deposition (particulates only).**
- ◆ **Considered two new dose thresholds: 10 rem at 300 m and 100 rem at 100 m with similar TQ results.**
- ◆ **Draft DOE-STD-1189, App. A uses 100 rem at 100 m.**

## Results – Case C

- ◆ **Meteorology (F stability, 1 m/sec, etc. ) same as Case B but addresses HC 3 TQs.**
- ◆ **Two dose thresholds considered: 1 rem at 100 m and 5 rem at 100 m.**
- ◆ **1 rem at 100 m very close agreement with current TQs.**

# Conclusions

- ◆ Due to several issues and magnitude of changes, TQs were not updated in supplemental guidance.
- ◆ TQs will be addressed during a general revision of STD-1027 planned for later.

# Justification for Revision to STD-1027

- ◆ **Uses latest ICRP dose values for the various receptors**
- ◆ **Uses conservative meteorological conditions (consistent with STD-1189)**
- ◆ **Consistent HC 2 and HC 3 methodology**
- ◆ **Dose thresholds for categorization consistent with other DOE guidance (i.e., STD-1189)**

# Impacts of STD-1027 Revision

- ◆ **Potential for safety class SSC in HC-3 facilities for sites with boundaries closer than 300 meters (exists today)**
- ◆ **Increase in Radiological (< HC 3) facilities across the DOE-Complex (for 5 rem at 100 meters)**