

DCAS-TIB-0010

Best-Estimate External Dose Reconstruction for Glovebox Workers

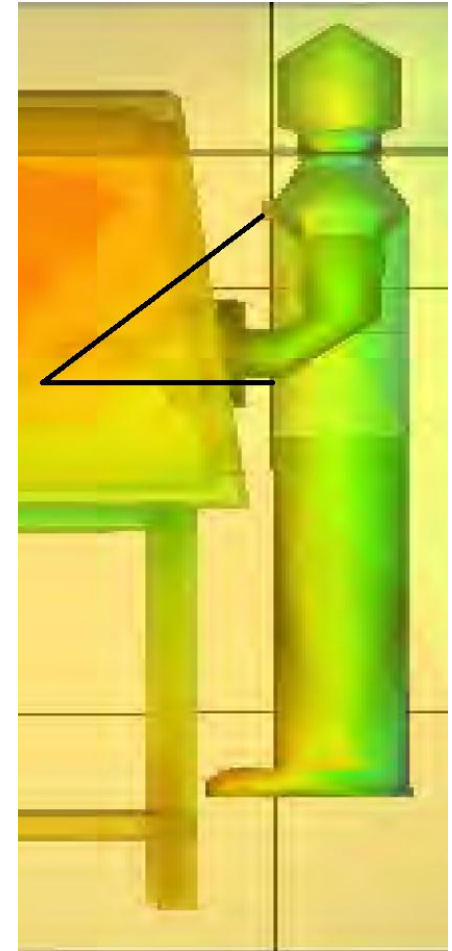
Report from the Procedures Review Subcommittee

Presented to the
Advisory Board on Radiation and Worker Health
Idaho Falls, Idaho

July 16–17, 2013

DCAS-TIB-0010 Summary

- Exposure geometry is a concern for claimants who worked with gloveboxes. Under-estimation could occur if the claimant wore his/her dosimeter on the lapel, due to distance differences between the source, the organ of interest, and the dosimeter.



DCAS-TIB-0010 Summary (Con't)

- This TIB provides correction factors for best-estimate DR to organs located in the lower torso from photons emanating from gloveboxes when a dosimeter is worn on the lapel.
- NIOSH calculated the gamma flux at 30 points covering the chest and at 30 points covering the abdomen, and then determined the ratio of each abdomen flux to each chest flux. The mean ratio was then selected as the correction factor.

DCAS-TIB-0010 Timeline

- December 30, 2005 – NIOSH Issued Revision 2
- June 8, 2006 – SC&A Review (SCA-TR-TASK3-0001)
- August 3, 2007 – SC&A Modified Checklist
- November 7, 2007 – NIOSH Initial Response
- October 14, 2008; March 22, 2011; April 11, 2012; and February 5, 2013 – Discussed at Subcommittee Meetings; Findings Resolved
- June 18, 2010 – NIOSH Issued Revision 3
- November 8, 2011 – NIOSH Issued Revision 4

Findings Summary: DCAS-TIB-0010

- 9 Findings in total – complete histories captured in the Board Review System (BRS)
 - <http://app-cinc-dcas.cdc.gov:8106/documents/default.aspx?mode=ASSIGNED>
 - Resolution spanned over 6 years (6/2006 to 2/2013)
 - 6 findings are Closed
 - 3 findings are In Abeyance
- The following slides provide summary information on the resolution of each Finding – Details in BRS and handout

DCAS-TIB-0010 Review Findings

#	Finding	Resolution
1	The TIB lacks transparency. The radioactive source is not identified; neither its exact dimensions nor location are given, nor is the thickness of the walls presented.	Closed on March 22, 2011. The requested information was provided in Appendix B.
2	Lower torso organs not specified.	Closed on April 11, 2012. The phrase “other cancers that appear in the region of those organs” (i.e., stomach, liver, bladder, prostate, ovaries, testes, genitalia) was added to Section 2.0 to allow for cancers such as sarcomas, Hodgkin’s lymphomas, or other cancers that might occur anywhere, but would only require the adjustment if they occurred in the region defined by the specified organs.

DCAS-TIB-0010 Review Findings

#	Finding	Resolution
3	Correction factors do not represent worst-case assumptions.	<p>Closed on October 14, 2008.</p> <p>The Subcommittee is of the opinion that this is a NIOSH policy decision and has been handled appropriately.</p>
4	Analysis is needlessly complex.	<p>Closed on October 14, 2008.</p> <p>This was more of an observation than a finding.</p>

DCAS-TIB-0010 Review Findings

#	Finding	Resolution
5	We question the design of the analysis that compares the particle flux over locations on the torso, rather than modeling the variation of dosimeter response with location.	Statuses of these two findings were changed to In Abeyance on February 5, 2013. The Subcommittee agrees with the use of the 95 th percentile instead of the mean for the correction factor.
6	We question the assumptions made concerning the glovebox model, e.g., wall thickness, Lexan window, etc..	

Finding TIB-0010-05/06 Details

- Instead of the mean from the 30 by 30 array of fluxes, SC&A believed it would be better to compare the gamma flux to each organ (e.g., stomach, liver, bladder, prostate, ovaries, testes, genitalia) and the lapel monitor location.
- Alternatively, it was agreed to utilize the 95th percentile from the 30 by 30 array of fluxes as a claimant-favorable correction factor.
- Using the 95th percentile negated the need for “fine-tuning” the assumptions utilized by NIOSH.

DCAS-TIB-0010 Review Findings

#	Finding	Resolution
7	We question the use of an anatomical illustration of a human torso rather than the ORNL-developed ICRP Reference Man-based anthropomorphic phantoms.	<p>Closed on October 14, 2008.</p> <p>Since the SC&A-calculated correction factor (CF) based on the Hp(10) dose rate was the same as the CF calculated using the anatomical illustration, the additional work to model the ICRP Reference Man is not warranted.</p>
8	The use of the Attila software is questioned.	<p>Status changed to In Abeyance on February 5, 2013.</p> <p>The Subcommittee agrees with the use of the 95th percentile, instead of the mean, for the correction factor.</p>

DCAS-TIB-0010 Review Findings

#	Finding	Resolution
9	The use of Rocky Flats to validate the model is questionable; Rocky Flats data is for glovebox and non-glovebox workers, information is lacking regarding the radiation sources, etc.	<p>Closed on October 14, 2008.</p> <p>RFP data was used only as a proof of principle; it was not used in the justification of the glovebox factor.</p> <p>The RFP data has been removed from DCAS-TIB-0010.</p>

Questions?