Review of the Resuspension Factor Employed during the Residual Contamination Period at General Steel Industries

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The selection of the appropriate resuspension factor (RF) to be used during periods of residual contamination is discussed in ORAU-OTIB-0070 (Sharfi 2012). Although this document suggests a default value of 10^{-6} m^{-1} during residual periods, in cases where the contaminated area is still involved in active operations, it states that a site-by-site analysis of the appropriateness of the 10^{-6} m^{-1} value should be done. In NIOSH's latest assessment of inhalation doses during the residual period at GSI (i.e., after 6/30/1966) a resuspension factor of $1x10^{-6}$ m^{-1} was used (Allen 2013). In a recent review, SC&A questioned the appropriateness of this value and suggested that the use of a value of 10^{-5} m^{-1} would be more appropriate when one considers the conditions in existence at the plant during the residual period (Anigstein and Mauro 2013). SC&A's concerns were largely based on the abrupt reduction of the RF value from 10^{-5} to 10^{-6}, even though the facility continued to conduct normal operations during this period. It was argued that the potential existed for active disturbance of the residual contamination.

NIOSH has re-evaluated the RF value during the residual contamination period and now believes that a value of 10^{-5} is more appropriate. The reasons for this determination are:

1. The initial surface contamination value of 1.34×10^{5} dpm/m^2 was estimated using modeled values as opposed to having been measured. Thus, there is a degree of uncertainty associated with this value.

2. There were reports that certain sections of the GSI facility had been cleaned prior to the conduct of the FUSRAP contamination surveys. Because of this, the contamination depletion factor of 0.00067 d^{-1} was based on the average value observed at other AWE facilities. Thus, there is also some degree of uncertainty associated with this value as well.

3. As SC&A pointed out, the facility was actively involved in steel processing activities, resulting in the increased potential for the resuspension of particulates.

Because of the uncertainties in the initial contamination value and the source depletion rate, as well as the degree of activity associated with ongoing operations, NIOSH has decided that it would be appropriate to use a claimant favorable RF value of 10^{-5} throughout the entire covered period, including that associated with residual contamination. Appendix BB of TBD-6000 will be revised to use this value in all dose reconstructions. It should be pointed out that, even though the RF was increased by an order of magnitude, there will only be minor increases in internal dose. This is because the air concentrations during the residual period were estimated to be very low. For example, using an RF of 10^{-5} m^{-1}, the air concentration at the end of the residual contamination period is 2.3×10^{-3} dpm/m^3.

References

Allen, D. 2013. "GSI White Paper: Issues Raised in February 21, 2013 Work Group Meeting." http://www.cdc.gov/niosh/ocas/pdfs/dps/dc-gsiwgiss-0413.pdf

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Sharfi, M. M. 2012. "Dose Reconstruction During Residual Radioactivity Periods at Atomic Weapons Employer Facilities," ORAUT-OTIB-0070, Rev. 01. http://www.cdc.gov/niosh/ocas/pdfs/tibs/or-t70-r1.pdf.