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Feasibility Study
for the Groundwater Operable Unit
at Paducah Gaseous Diffusion Plant
Paducah, Kentucky

Volume 3. Appendix B
Baseline Human Health Risk Assessment

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compose the greatest portion of the total ELCR for Areas i, j, and k.; ELCR from ^{99}Tc and uranium tend to be of minor importance relative to the contributions of total ELCR from organic compounds and metals. However, contribution of ^{99}Tc to total ELCR is notable in Areas a and b, and contribution of uranium to total ELCR is notable in Areas b and k. Excess lifetime cancer risk results for filtered samples also are similar to those from the area assessment. Generally, ELCRs from metals are lower or not present for the filtered samples, and fewer sampling points had detectable analyte concentrations. (Note that only 7 RGA sampling points had detectable concentrations of either arsenic or beryllium or both.)

Similarly, the "well-by-well" results for HI are consistent with the results from the area assessments. As with the area assessments, when unfiltered samples are assessed, HI from TCE and its breakdown products compose the greatest portion of the total HI for areas inside the security fence or associated with the TCE plumes outside the fence; HI from metals are less important in the aforementioned areas, but metals compose the greatest portion of the total HI in Areas g, h, i, and j. Hazard indices results from analysis of filtered samples also are similar to those from the area assessments. Generally, HIs are lower for most metals, and fewer sampling points had detectable concentrations.

Another uncertainty in the determination of exposure point concentrations under current conditions is the combination of the data from the Southwest Plume with other data from Area d because the Southwest Plume was not delimited at the time the BHHRA was initiated. Generally, this results in combining data from known TCE sources with data collected downgradient from a source of inorganic chemicals (i.e., SWMU 8, C-746K Landfill). To address this uncertainty and to provide a concise risk characterization of the Southwest Plume, Attachment 11 to this BHHRA was prepared. As shown there, risks from the use of groundwater in the Southwest plume are similar to those reported for other areas. Therefore, this uncertainty had a small impact on the overall risk characterization.

To further examine the uncertainty in exposure point concentrations, the concentration of the contaminant determined to pose the greatest risk via the inhalation exposure route (i.e., vinyl chloride) was analyzed further. This analysis did not focus upon the emissions of vinyl chloride from water during use but did focus upon the possible presence of vinyl chloride in enclosed spaces due to soil vapor migration. Because previsous information concerning this condition did not exist, air sampling for vinyl chloride was condected in selected enclosed areas at the PGDP in spring 2000 (i.e., the underground cable tunnel from C-337 to C-300, the underground cable tunnel from C-331 to C-531, the underground tunnel from C-333 to the approximate location of the old millwright shop, and the C-400 basement). During this sampling, vinyl chlodride was not detected at any location and a level greater than the detection limit (0.85 ppm). Because the detection limit is below the Occupational Safety and Health Administration's eight-hour time weighted average limit (1 ppm), it is unlikely that this uncertainty had any effect upon the final risk values.

6.1.3 Determination of exposure point concentrations–future conditions

Uncertainty is involved in characterizing exposure point concentrations under future conditions in this BHHRA. However, because these uncertainties are related to the modeling performed to support the examination of migration from the various sources and because these uncertainties are covered in detail in Appendix A, the Data Summary Report, of the feasibility study report, they will not be discussed here. However, note that previous work has indicated that the effects of the modeling uncertainties on risk estimates tend to be moderate.

6.1.4 Use of concentrations from total versus filtered samples

In the main parts of the area assessment and the "well-by-well" analyses, all analyte concentrations in water came from the analyses of unfiltered or total samples. The use of data from analyses of total samples is consistent with current EPA guidance (Methods Document) but introduces an additional