SUBJECT: DCAS position on "technical shortfall" of thorium in vivo monitoring as a basis for finding of insufficient accuracy

The purpose of this paper is to provide DCAS's position on one issue that arose during the discussions at the February 9, 2012 Fernald Work Group meeting and the February 29, 2012 Advisory Board meeting about using Th in vivo monitoring results as the basis for reconstructing a bounding dose resulting from Th exposures. At the Advisory Board meeting, this issue was termed a "technical shortfall," and was framed by the question, "Is the Mobile In Vivo Radiation Monitoring Laboratory (MIVRML) adequate to produce sufficiently accurate dose reconstructions for doses arising from Th exposures."

From the transcripts of these meetings, it appears that the discussion of this issue followed these lines. Even if the limit of detection of the MIVRML is 6 mg of Th (the concerns about whether this is true represent other issues not addressed by this paper), the missed doses to certain organs or tissues would be very large, so large in fact that the discussants questioned whether an estimate that could be no smaller than that very large number could be considered "sufficiently accurate." There was additional information that demonstrated that a missed dose calculation for four different organs or tissues would result in compensable claims, even for a relatively short duration of exposure.

DCAS does not consider this a new issue. It arose during the early days of the program, shortly after the current method for dealing with missed internal doses was developed. Once the missed dose method was developed it soon became evident that claimants with potential exposure to uranium or plutonium for a relatively modest duration of time would be compensated for lung cancer even if they had a complete bioassay records, and every bioassay result was less than the detection level. DCAS decided at that time that this was an appropriate outcome. When dose reconstructions are performed that include missed doses, cancers of those tissues and organs for which the bioassay method is not sensitive enough to identify a dose smaller than that needed for compensation are compensated. At the same time, cancers of those tissues and organs for which the bioassay method is sensitive enough to identify a dose smaller than that needed for compensation are compensated only when the complete dose reconstruction arrives at a dose large enough for compensation.

To illustrate the logic of this position, DCAS reviewed exposure scenario 1.e. from SCA's memo report, "SC&A Final Position on the Th-232 In-vivo Data Quality and Adequacy for FEMP Workers," dated January 30, 2012. That scenario demonstrates the potential for large missed committed bone and lung doses when using the MIVRML. According to that scenario, the missed 50-year committed doses could be 9.7 Sv (970 Rem) to bone surfaces and 0.8 Sv (80 Rem) to the lung. The scenario doesn't specify exactly what the intake would be in this scenario, but DCAS calculates that it would be roughly 4600 Bq of Th-232 and 4600 Bq of Th-228. Based on that intake, the 50-year committed dose to the pancreas would be roughly 0.03 Sv (3 Rem), and the missed dose to other organs that are modeled by the "highest non-metabolic organ" will be similar. Thus DCAS concludes that this "technology shortfall" does not prevent the program's ability to complete sufficiently accurate dose reconstructions.