

Comments on the new Air Force report, *Topical Issues for Assessment of Dose to Palomares Accident Recovery Workers (1966)* by Steven E. Rademacher (SER), July 2020

Frank von Hippel, 27 August 2020

This Air Force report (henceforth referred to as SER) was submitted to the Court of Appeals for Veterans Claims by the counsels to the Secretary of Veterans Affairs Robert L. Wilkie a week before the oral argument in the case, *Skaar v. Wilkie*.

SER appears to be in part an attempt to rewrite history and partly an attempt to shore up the credibility of the conclusions of the 2001 report by the former Labat-Anderson (L-A) litigation-support consulting group that the Air Force commissioned and still uses to make estimates of the doses received by the veterans of the 1966 Palomares plutonium cleanup.

The L-A report was heavily criticized by Princeton Professor Frank N. von Hippel in 2017.¹ That critique was developed further in collaboration with Dr. Jan Beyea, an expert on radiation epidemiology and published in 2019 by *Health Physics*, the leading journal in the subject area.²

In SER, the Air Force has released some new information which actually strengthens the Beyea-von Hippel critique. In particular, it explains the origin of the “environmental” estimate of the Palomares cleanup veterans’ doses and provides data on the airborne concentration of plutonium during the cleanup.

Origin of the L-A Environmental Exposure Estimate. SER explains the origin of the three-page environmental-exposure estimate embedded in the 800-page L-A report, which otherwise was devoted to plutonium inhalation estimates based on measurements of plutonium in the veterans’ urine samples. SER reveals (p. ii) that the low environmental exposure estimate was apparently inserted at the last moment “based on an AF/SG request to assess supporting environmental data”. Between 2002 and 2013, the Air Force used that estimate, based on measurements of airborne plutonium in Palomares *after* the cleanup, as the basis for its advice to the Veterans Administration that the exposures of the veterans to airborne plutonium were “not significant.”³

Actual measurements of airborne plutonium during the cleanup. SER argues that the L-A environmental exposure estimate had “some conservative aspects” (p. 32). But the overall lack of conservatism is indicated by data provided in SER, Table C-1 on measurements of airborne plutonium concentrations made at the cleanup sites themselves. In the L-A estimates of plutonium inhalation (pp. 22-23), the worst-case assumption for airborne plutonium was 0.118 Bq/m³ (3.19 pCi/m³). SER reports measured levels at the cleanup sites up to 50 times higher, 5.7 Bq/m³ (153 pCi/m³).⁴

Estimates based on measurements of plutonium in the veterans’ urine. The Air Force only dropped its dependence on L-A’s baseless environmental-exposure estimate in 2013 in response to a Congressional question as to why it had not followed up on the recommendation in the L-A report (p. 32) for additional work, including that “[a]dditional effort is needed to reconcile the estimated intakes and doses derived from the urinary bioassay data with the estimates from environmental measurements.”

Instead of responding to this question, the Air Force pivoted to the use of the lowest estimated plutonium intake based on urine-measurements of the L-A report’s “high 26” cleanup veterans. This estimate was offered as an upper-bound estimate of the amount of plutonium inhaled by all the 1600 veterans other than the “high 26.”⁵

SER follows L-A in arguing that “high 26” probably received the highest doses of the approximately 1600 veterans. Several arguments are made for why the “high 26” should have received the highest dose. One is that they were among the early arrivals at the site when the concentrations of airborne plutonium were supposedly highest (SER, p. v):

Early presence was an important factor in exposure potential. Over time, airborne resuspension of ground-deposited plutonium decreases rapidly. During remedial actions that enhanced airborne resuspension, e.g., plowing and scraping, mitigation by application of water suppression and access restrictions were effective, as observed in air sampling results.

This claim is contradicted, however, by the data provided in SER Table C-1 for the measured levels of airborne plutonium at the cleanup sites. The two highest measurements shown (153 pCi/m³) did indeed occur on 20 and 22 January 1966, the first and third days of measurements but the next highest measurement (72.1 pCi/m³) occurred on March 16, one day before the last measurements.⁶

In fact, as detailed by Beyea and von Hippel, the plutonium inhalation estimates made in the L-A report or the “high 26” were not the highest among the L-A estimates based on off-site urine samples. Those L-A estimates ranged up to 38 times the estimate for the lowest of the high-26 used by the Air Force for its recommended dose estimates for all the Palomares veterans other than the “high 26”.⁷ Doses estimated by L-A from on-site urine samples ranged up to 588 times the estimate for the lowest of the “high-26”.⁸

L-A dropped all the measurements of on-site urine samples from its analysis because of possible contamination. SER tries to bolster that claim, but it was and is improper to discard the L-A inhalation estimates for 98 percent of the veterans.⁹ They may or may not be high because of contamination but they should not be disregarded. They constitute the high end of an uncertainty range and 38 CFR 3.311 states,

“When dose estimates provided pursuant to paragraph (a)(2) of this section are reported as a range of doses to which a veteran may have been exposed, exposure at the highest level of the dose range reported will be presumed.”

Conclusion. SER was apparently commissioned to rebut the Beyea-von Hippel critique of the Air Force’s use of the L-A report as a basis of its recommendations to the Veterans Administration of estimated dose for the Palomares cleanup veterans. In fact, however, it provides additional information that strengthens that critique.

¹ Frank N. von Hippel, *Assessment of the U.S. Air Force’s estimates of the radiation doses received by the veterans of the cleanup of plutonium from two nuclear bombs that fell on Palomares, Spain in 1966* (Princeton University, Program on Science and Global Security Working Paper, 7 December 2017)

² Jan Beyea and Frank von Hippel, “History of Dose, Risk, and Compensation Assessments for US Veterans of the 1966 Plutonium Cleanup in Palomares, Spain,” *Health Physics*, posted 24 July 2019, https://journals.lww.com/health-physics/Fulltext/2019/12000/History_of_Dose,_Risk,_and_Compensation.13.aspx.

³ Air Force Medical Service, Office of the Surgeon General, “Air Force Releases Reports on Palomares, Spain and Thule Airbase, Greenland Nuclear Weapons Accidents,” press release, 22 May 2002.

⁴ SER Table C-1 shows no values lower than 4.5 Bq/m³. Presumably this is the lowest reading considered significant.

⁵ Air Force Surgeon General Thomas Travis, “HQ USAF Memorandum for the House Armed Services Committee,” 6 December 2013.

⁶ Many measurements in SER Table C-1 are described as “negative.” The fact that “negative” measurements were made often on the same day and the same site as very high measurements raises the question as to whether “negative” means that the measurement was not useable. Indeed, the Strategic Air Command report on the cleanup

cited by SER states that the Staplex Air Samplers that were used had “frequent malfunctions of the flow meter due to plugging with dusts”, Historical and Research Division, Headquarters, Strategic Air Command, *Sixteenth Air Force: Operation Recovery, 17 January -7 April 1966*, SAC Historical Study #109, 1968, p. 152.

⁷ Beyea and von Hippel, *op. cit.*

⁸ *Op. cit.*

⁹ L-A estimated doses for 1456 Palomares cleanup veterans.