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Tom Carpenter, Executive Director
Hanford Challenge
2719 E. Madison St. Ste. 304
Seattle, WA 98112

Re: Radioactive microparticles in Hanford Plutonium Finishing
Plant workers' vehicle and house dusts

Dear Mr. Carpenter:

This cover letter summarizes findings in our research report, *Radioactive microparticles in Hanford Plutonium Finishing Plant workers' vehicle and house dusts*. This report, along with a larger but similar study performed by WRPS, found radioactive microparticles in the Plutonium Finishing Plant (PFP) area at Hanford, and on personal vehicles used at the PFP by Hanford employees.

The March 2018 WRPS report found biologically-significant plutonium particles onsite at the PFP, including an example particle with a calculated dose (CEDE) of 94.8 millirem (mRem) if inhaled. By comparison, the maximum allowable offsite radiation dose limit for *all* emissions from a federal facility is 10 mRem per year (42 USC Section 61, subpart H). This means that a single PFP particle can exert nearly 10 times the EPA allowable standard for an offsite emission (or equal to the dose from 10 X-rays). This finding by the Department of Energy's contractor WRPS, utterly conflicts with representations of Hanford officials as to the *de minimis* nature of the 42 plutonium workers acknowledged to have been exposed by Hanford management following bio-assay testing.

Our report confirms the presence of americium, uranium and thorium in multiple dust samples from personal vehicles driven out of the radiation protection zones at the PFP. Radioactive microparticles containing thorium and/or uranium were found in the vehicle samples, including metallic radioactive microparticles that are fairly unique to the Hanford site. These metallic particles are not found in nature. Metallic uranium and thorium particles can be found at other locations at Hanford, and are not necessarily unique to the PFP. They are not however, naturally found in uncontaminated soil or bedrock. Primary plutonium particles, such as those found at the PFP by WRPS, were not found in the vehicle samples.

In our study, thirty samples were tested by various means including alpha/beta counting and gamma spectroscopy. Five dust samples with elevated alpha count rates were tested for transuranic isotopes by Eberline Analytical of Oak Ridge, TN, a commercial alpha spectroscopy laboratory. Two of these five were confirmed to contain americium-241, a transuranic isotope. One analysis is still pending as of this writing. Four additional samples were tested for radioactive microparticles using scanning electron microscopy and X-ray analysis (at Microvision Laboratories in Massachusetts). Microvision found radioactive thorium and uranium microparticles, including metallic uranium, as well as mercury and other toxic metals in the vehicle dust samples.

Alpha counting revealed one bulk vehicle dust & grime sample that had a 7-fold increase over the normal and expected alpha emission rate (a greater than two standard deviation difference). This result means that there is a 95% chance or better that the vehicle user or mechanic would be exposed to radiotoxic alpha particles while working on this contaminated vehicle. This result is an important reminder. For at least three of the thirty tested personal vehicles, there remains residual alpha-radiation contamination despite being cleaned and released for use by the Dept. of Energy.

The gamma spectral and scanning electron microscopy analyses were performed by three different laboratories (two independent commercial labs and Hanford's own laboratory). Together, these laboratories have documented onsite and off-site contamination in worker vehicles resulting from Hanford-related activities. These data document serious air-borne release hazards.

A broader independent study is needed that looks at residual contamination in the communities around Hanford and assesses health risks associated with that contamination. Protective steps may need to be taken as in the example of the contaminated vehicle identified in this study.

Signed:

Marco Kaltofen

8/27/18

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