



Battelle

Pacific Northwest Laboratory

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Date November 18, 1977

To HM Parker

From KL Swinth *KL Swinth*

Subject Information on $^{103}\text{Pd}-^{51}\text{Cr}$ Inhalation Experiment

This note is to inform the Human Subjects Committee of Battelle's involvement in a project that will involve human subjects. Human volunteers will be administered a radioactively labelled aerosol by Harwell (England) to simulate an exposure to plutonium. The exposures will be the sole responsibility of Harwell and will be performed under sponsorship of the IAEA. Following exposure, the subjects will be available for counting at laboratories in Europe, Asia, and North America. I have been requested (by the U.S. Laboratories and DOE) to coordinate the activities of the North American Laboratories in counting these subjects when they are made available by Harwell. This will involve the coordination of counting schedules, establishing a minimum set of counting procedures, data collection, and data analysis. DOE recognizes the need for this project and has made funds available to Battelle for these coordination activities.

These subjects will be invaluable as calibration sources for facilities used to assess the deposition of inhaled plutonium in accidentally exposed workers. Such workers exist at every major nuclear site in the country, including Hanford. Our capability to assess the depositions in these workers is marginal at best. The thorax phantoms used to calibrate such facilities have proven inadequate. In a previous $^{103}\text{Pd}-^{51}\text{Cr}$ experiment it was found that participants had a pronounced tendency to underestimate the subject's contents, in some instances by a factor of three or more. Only 1 laboratory out of 13 produced estimates in satisfactory ($\pm 30\%$) agreement with the independently known values. Since phantoms do not adequately resemble humans for the low photon energies involved in plutonium counting, the availability of human subjects exposed to known quantities of materials simulating plutonium is invaluable. These subjects can be used to calibrate the instruments employed in the routine analysis and protection of plutonium workers.

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Obtaining and exposing the human subjects will be done under the direction of D. Newton at Harwell and will unambiguously be his responsibility. Harwell has exposed subjects for three previous experiments without complications, including an experiment in 1972 during which Battelle counted the subjects. Changes in counting procedures, in counting equipment, in the laboratories involved, in the exposure aerosol, etc. make a new experiment essential in our efforts to protect the workers from the hazards of overexposure to plutonium. The U.S. Laboratories want to take advantage of the availability of these calibration sources and Battelle's role will be to coordinate this activity.

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