

THE UNIVERSITY OF IOWA



October 12, 2001

Dear Sirs,

As the Project Director for the DOE collaborative agreement- Former Worker Program for AEC contract workers in the Middletown Iowa IAAP, I would like to comment upon the dose reconstruction process proposed. There does not appear to be sufficient documentation of the proposed process for one to have confidence that this reconstruction will have any validity. At the least there should be some evidence that NIOSH would have available to it relevant historical exposure data for work settings similar to those of claimants from which to make any extrapolations on the claimants possible exposures.

It is my opinion that where there is insufficient data to make individual determinations of radiation dose the number and magnitude of assumptions needed to arrive at a "reconstructed" or estimated dose is likely to be so great as to preclude reliability of such an estimate. We have documentation from the IAAP/IOP facility in Middletown, Iowa that the personal exposure assessment was both incomplete and inadequate. In the first case we know of, several groups of workers who worked in close proximity to the fissile material, or pits, who were never or seldom badged. These groups include the guards who were responsible for receiving and supervising transport and storage of pits, the transport staff, and a variety of tradesmen, (largely mechanics) who performed a variety of tasks in the production areas.

Personal interviews of production workers also indicate that even if badges were provided, they often were not worn by these workers in the bays but were left either in their lockers or on a main storage board. In addition, only a small minority of the workforce identified as Line 1 workers were ever issued badges-by our estimates approximately 20 percent.

Data from area monitoring in this facility documents cases of exposure in excess of OSHA standards. The 23-39-21 Yard C storage building had a yearly average of 18.2 rem. The 1-73 storage and receiving building had a yearly average of 16.9 rem. The 23-39-21 Yard C storage building had a yearly average of 14.6 rem. The 1-77 storage and receiving building, which replaced the 1-73 storage, and receiving building had a yearly average of 11.7 rem. The 23-39-7 Yard C storage building had a yearly average of 7.8 rem. The limited information for some of the workers is restricted to whole-body exposure data (film badges) from external sources.

Much of the uncertainty regarding exposure assessment arises from the fact that there is no or limited neutron exposure data for many workers. There is some neutron data from some of the other facilities, but it is more recent and may not include all energies of neutron radiation exposure and may not be relevant to the types and degrees of exposure experienced by this cohort. Accurate

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monitoring of neutron radiation levels presents some unique problems not encountered in the monitoring of beta, x and gamma radiation. A primary consideration in neutron dosimetry is the range of energies to which people may have been exposed. Energies of beta, x and gamma radiations span only three or four orders of magnitude. A simple reading of an OSL dosimeter yields relevant dose information. Neutron energies, on the other hand, may span ten orders of magnitude—a range beyond the scope of any single dosimetric material to detect with a satisfactory degree of accuracy.

The energy response variation of dosimetric materials used in beta, x and gamma ray detection is relatively uniform. The response variations are easily identified and corrected so that accurate readings may be quickly and precisely obtained. Neutron energies cause a wider response variation, making accurate analysis more difficult to achieve. In addition to the difficulties involved in monitoring neutron energies alone, the presence of x and gamma radiation influences the sensitivity of some neutron dosimetric materials. The fact that no one dosimeter is useful for monitoring the complete range of neutron energies complicates badging. In recent years Landauer, Inc. (the company who performed most of the recent radiation exposure monitoring), has offered a family of neutron dosimeters, each designed for a particular application to ensure precise and accurate radiation measurement.

Additionally, no data are available on work related diagnostic x-ray exposure which was a large part of the quality assurance process. Limited data exist for exposures to extremities. We do not have any bioassay or smear data information on radionuclides that were ingested or inhaled, (e.g. tritium, plutonium), no urinalysis, fecal or in vivo measurement results, and no nasal smear data. We also do not have information on dermal absorption or wound absorption. We have heard reports of limited sampling for Cesium-137. We have recently been informed that Californium-252 may have been used on site.

Curiously, not one radiation related incident or investigation report was included in the voluminous safety and hygiene records for the entire period.

Unfortunately there is no available documentation regarding protocols for area, or even personal, exposure monitoring. No data are available to indicate that adjustments were made to account for dosimeter responses to low energy radiation. It appears that monitoring was inadequate as well as incomplete. There was apparently no system for detection of neutron radiation, an expected hazard with fissionable uranium and plutonium. In addition there was documented suspicion from the health and safety records of airborne plutonium. There are records on the site documenting that soil was tested for plutonium contamination, however results of these tests have not been found. Perhaps more disturbing yet is the fact that there are records documenting the collection and transport of clothes to Pantex for suspected plutonium contamination.

Lastly, there is considerable qualitative data regarding removable radioactive contamination both from various indoor work sites on Line 1 swiped in June 2000, and more worrisome, pages of positive swipe tests from the containers in which the pits arrived.

October 23, 2001

On the basis of these concerns regarding the completeness, adequacy, and accuracy of available exposure assessment records, I am suggesting that dose reconstruction is unlikely to yield useful or reliable information and that Special Exposure Status ought to be granted to AEC cohorts without adequate radiation exposure data.

Sincerely,

A handwritten signature in black ink, appearing to read "Laurence Fuortes". The signature is written in a cursive style with a large, prominent initial "L".

Laurence Fuortes M.D.
Project Director