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Oak Ridge Field Office
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Alpha Fowler Bryan, M.D., Chair
St. Louis County Radioactive and
Hazardous Waste Oversight Commission
111 S. Meramec Avenue
Clayton, Missouri 63105

Dear Dr. Bryan:

RESPONSES TO QUESTIONS FROM THE ST. LOUIS COUNTY RADIOACTIVE AND HAZARDOUS WASTE OVERSIGHT COMMISSION

Enclosed is the information requested by the St. Louis County Radioactive and Hazardous Waste Oversight Commission on three issues:

- An analysis of the radiation dose to the hypothetical maximally exposed individual who drinks only water from Coldwater Creek, and eats only agricultural products grown in sediment from the creek;
- A listing of the radiological "hot spots" on the three St. Louis sites;
- A discussion of how DOE determined that water from Coldwater Creek is not a source of drinking water in the area of SLAPS and HISS.

Should you or the other Commission members need additional information, please feel free to call me.

Sincerely,

David G. Adler, Site Manager
Former Sites Restoration Division

Enclosure

cc: Commission Members
Karen Acker
Carl Breihan
Kay Drey
David W. Farquharson
Nancy Lubiewski
William Miller
Sally Price
Dr. Barry A. Siegel
Geri Rothman-Serot
Dr. Lee Sobotka

RESPONSES TO QUESTIONS FROM THE
ST. LOUIS COUNTY RADIOACTIVE AND HAZARDOUS WASTE OVERSIGHT COMMISSION

1. *What is the radiation dose to a hypothetical maximally exposed individual who drinks only water from Coldwater Creek, and eats only agricultural products grown in sediment from the creek?*

The radiation dose to such a hypothetically exposed individual was calculated using a radiation dose modelling computer code called RESRAD. RESRAD is a state-of-the-art computer program typically used by DOE for performing such dose modelling. RESRAD is also used by other federal agencies such as the Environmental Protection Agency and the Nuclear Regulatory Commission.

As with any computer modelling effort, the results are highly dependent on the initial assumptions that are used as the basis for selecting the input parameters for the program. In the case of performing this evaluation for the Commission, DOE utilized extremely conservative assumptions in selecting the input parameters. Specifically, the assumptions used for this analysis were:

- An individual drinks only water taken directly from Coldwater Creek, without treatment, from an area immediately downstream from SLAPS. The input data used was based on results from recent water sampling and analyses performed by the St. Louis County Department of Health at that location.

- All agricultural products consumed by the hypothetical individual are grown in sediment that has been deliberately removed from Coldwater Creek in the area around SLAPS and HISS, and deposited to a depth of one meter adjacent to the creek. The RESRAD program calculates the uptake of contamination into the food products and the subsequent radiation dose from consumption of these products.

- All meat products consumed by the individual are derived from animals living on and consuming food growing in the contaminated environment. Specifically, cattle are assumed to graze on grasses growing in contaminated creek sediment that has been removed from, and deposited, adjacent to the creek. It was also assumed that edible fish grow and are caught in the section of creek between SLAPS and HISS (there are no such fish known to currently exist in this portion of the creek because of the seasonal flowrates, low oxygen content, and industrial nature of the water in the creek in this area).

- All milk products are from cows grazing in grasses growing in the hypothetically deposited sediment.

Using these assumptions, the calculated hypothetical radiation dose would be 43 mrem/year. Despite the very conservative assumptions used

in this calculation (which would be very unlikely in real circumstances), the calculated hypothetical dose is less than half of the allowable annual dose guidelines used by DOE for members of the general public (100 mrem/yr). For purposes of comparison, other sources of radiation provide, on average, the following doses:

- Natural cosmic radiation — 35 mrem/yr
- Naturally occurring radiation from soils/stone — 35 mrem/yr
- Five cross-country, round-trip airline trips per year (1 mR/hr @ 33,000 ft) — 50 mrem/yr
- Average annual medical diagnostics (chest x-rays, dental x-rays, etc.) — 70 mrem/yr
- Additional dose living in Colorado (from being 1 mile high and in an area with high background levels in soil) — 80 mrem/yr
- Working in Grand Central Station in New York City (because of the granite structure) — 120 mrem/yr

Therefore, even in a worst case scenario such as is evaluated by the RESRAD model for the hypothetical Coldwater Creek person, the annual radiation exposure is similar to many other sources of natural and medical radiation in our lives.

2) What are the radiological "hot spots" on the three St. Louis sites.

The "hot spot" radiation exposures at each of the three sites are:

SLAPS	0.29 mR/hr	(at the center, north fence line)
HISS	0.016 mR/hr	(at the south end of site)
SLDS	0.38 mR/hr	(in Plant 7)

While these values represent "hot spots," they are clearly not representative of average conditions at each of the sites. At all three sites, radiation exposures range from natural background levels to the level at the hot spot for each site. For example, at HISS there are 10 locations at which radiation exposure is continuously monitored using dosimeters. At six of these locations, including at the front of the site adjacent to the Information Center, there is no detectable radiation exposure above background. At the other four locations, exposure ranges from 0.004 mR/hr to 0.016 mR/hr (at the hot spot location).

While the hot spot locations at each of the sites do not represent a

significant health concern given the current land use at each of these locations, the exposure levels at these hot spots do exceed the DOE guidelines for public exposure if one assumed an individual resided at the hot spot location 24 hours/day, 365 days/year. However, at HISS, the hot spot location is in an area that is heavily wooded with extensive underbrush and growth; at SLAPS it is adjacent to the storm water ditch along McDonnell Boulevard; and at SLDS it is in a portion of a former process area that is currently unused and not publicly accessible. Therefore, it is unlikely that an individual could attain an annual exposure level that would present a health concern.

3) *How did DOE determined that water from Coldwater Creek is not a source of drinking water in the area of SLAPS and HISS?*

In the early 1980's, DOE reviewed water supply records with local and state authorities, and the St. Louis County Water Company, to assess drinking water supply sources for the area. In 1987 and 1988, DOE also conducted a comprehensive well canvas of the area to determine whether groundwater was being used as a drinking water supply.

Both these research efforts concluded that the municipal water supply system is the only source of drinking water in the area. There are records for eight wells within a three mile radius of HISS; four were installed for irrigation, one for industrial purposes, and three abandoned wells were once used for drinking water. These former drinking water wells were closed in 1962, 1968, and 1979.