

**FW: 120th WIPP Quarterly -follow up**

Maestas, Ricardo, NMENV
 Sent: Monday, November 26, 2012 3:49 PM
 To: Allen, Pam, NMENV

October WIPP file

From: Joni Arends [mailto:jarends@nuclearactive.org]

Sent: Monday, October 29, 2012 4:09 PM

To: Skibitski, Thomas, NMENV

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Subject: Re: 120th WIPP Quarterly -follow up

Good afternoon,

In response to the 120th WIPP Quarterly (October 25th, 2012) presentation about the americium air emissions at WIPP, I mentioned the "Bad to the Bone" report by the Institute for Energy and Environmental Research. I mentioned in the context of the new scientific information that has resulted in lowering the maximum contaminant levels for plutonium in drinking water 100 times from 15 picocuries per liter to 0.15 picocuries per liter. The more protective standards have been adopted by Colorado. I recognize that the presentation was about air emissions. I provide the following with respect to radionuclides in the environment that can migrate from air to water to soil. Thank you for your consideration of this submittal.

In 2010, the State of New Mexico, through the Water Quality Control Commission, adopted 1.5 picocuries per liter standard for the White Rock Canyon reach of the Rio Grande, which requires monitoring and public notification. The WQCC said, "discharges from Los Alamos National Laboratory (LANL) could threaten public water supplies on the Rio Grande."

The Bad to the Bone article states - my emphasis added are in bold -

Evolving federal guidance : Late 1950s to 2002

In 1959, the National Bureau of Standards published its Handbook 69 (NBS 69), which established the maximum permissible annual average concentrations of radionuclides in air and water calculated on the basis of a dose to the whole body or to the critical organ. Organs in radiation protection sometimes correspond to actual organs and sometimes they are more abstract, based on experiments and models of the movement of radionuclides in the body (called biokinetics). In the case of bone-seeking radionuclides, the long-established understanding that radium-226 behaves much like calcium in the body and concentrates in the bone led to the definition of the "marrow-free skeleton" as the critical organ, or the organ that would receive the maximum dose. NBS 69 published air and water concentration limits for radium-226, with a dose limit of 30 rem per year to the "bone" thus defined.

It was recognized at the time that other radionuclides that went to the bone did not behave in exactly the same way as radium-226. Specifically, they might not be as uniformly distributed in the bone as radium. Hence, for these radionuclides, a "safety factor" of 5 was established in estimating MCLs for air and water. This effectively reduced bone dose allowed for workers from these radionuclides to 6 rem. The critical organ was still said to be the marrow-free skeleton (the "bone"), but implicitly, by using a safety factor of 5, NBS 69 left the door open for revisions in how the distribution of plutonium and other alpha-emitting, long-lived transuranic radionuclides (such as americium) might be viewed in the future, given their differences from radium-226.

The dose to the bone, as then defined, for an MCL of 15 picocuries per liter works out to 1.8 millirem per year for all alpha-emitting, long-lived transuranic radionuclides of concern, except neptunium-237, for which it is about 3 millirem per year. Hence, the gross alpha MCL set in 1976 so far as it concerned alpha-emitting, long-lived transuranic radionuclides was clearly set to produce doses less than the 4 millirem limit set for other man-made radionuclides.

In 1988, the EPA adopted a different scientific understanding of the bone for the purposes of radiation protection. In Federal Guidance Report 11, the EPA defined two organs related to the bone: the "bone marrow" and the "bone surface." This was because it was discovered that radionuclides like plutonium-239 had a tendency to disproportionately affect endosteal cells, which are located close to the bone surface. Also, the dose conversion factors (the values for dose per unit intake of radioactivity) for alpha-emitting, long-lived transuranic radionuclides published in Federal Guidance Report 11 were far greater than those implied in the MCL published in NBS 69.

As a result of these two changes, the doses from ingestion of plutonium in drinking water estimated according to the more modern understanding increased dramatically. The estimated cumulative dose to the critical organ over a lifetime due to ingesting water contaminated with plutonium-239 at the MCL of 15 picocuries per liter increased about 180 times when Federal Guidance Report 11 was used compared to NBS 69. Both the change in the critical organ (marrow-free skeleton to bone surface) and the increase in dose per unit intake played a significant role in the larger Federal Guidance Report 11 estimate.

The understanding of plutonium biokinetics has further evolved since 1988. In recent years, dose conversion factors for various ages have been published. This means that the lifetime dose can now be computed assuming an intake each year of a person's life of water contaminated at the MCL. Such calculations are possible using Federal Guidance Report 13 dose conversion factors, which the EPA published in 2002 on a compact disk.

Using these more up-to-date, age-specific dose conversion factors, we calculated that the dose to the maximally exposed organ (the bone surface) using Federal Guidance Report 13 would be about 100 times greater than that to the bone as defined in NBS 69 (the marrow-free skeleton). This means that, according to the most current figures published by the EPA, the MCL for plutonium-239 and other alpha-emitting, long-lived transuranic radionuclides is too high by a factor of about 100. In other words, in order to remain within the intent and spirit of the 1976 regulations, the MCLs for alpha-emitting, long-lived transuranic radionuclides should be reduced from 15 picocuries per liter to 0.15 picocuries per liter (annual average).

In considering this recommendation, IEER also looked at limits for plutonium-239 limit that exist in other standards. The surface water standard of the State of Colorado is the most relevant, since that state has been host to one of the most important plutonium handling and processing facilities in the United States, the Rocky Flats Plant near Denver. The statewide standard for plutonium-239 for surface water is 0.15

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11/30/2012 3:22 PM

The report is available at: <http://ieer.org/article/science-for-democratic-action/volume-13-number-3/>

Best,
Joni

On 10/26/12 10:16 AM, Skibitski, Thomas, NMENV wrote:

Aloha,

Attached please find a scanned copy of the sign in sheet from yesterday's meeting. Below are the action items I recorded for the next meeting which has been scheduled for January 24, 2013.

Action Items from the 120th WIPP Quarterly meeting.

Check on percentage of level 6 truck inspections and confirm that appropriate inspections are being performed in Raton.

Collaborate with DOE about potential availability of stipend money for local responder training.

Anne deLain Clark will include paragraph about NMDOT public meeting on transportation regarding road construction and WIPP truck detours. Specifically address the upcoming north by-pass closure around Carlsbad at the beginning of the year (2013).

George B. will refer questions in item #16 to Joe Franco:

A request for response to the following:

How are WIPP management and operations responsibilities shared among the three partners of the NWP co-permittee?

How have responsibilities changed for WIPP sub-contractors?

What are the performance measures for NWP for Fiscal Year 2013?

Are they the same as the WIPP performance measures?

What meeting and tour is being planned for the Canadian Joint Review Panel on November 14-15?

Are agencies other than DOE and EPA involved?

If you have any corrections, please forward them to me and Trais Kliphuis.

Thanks,

TS

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