

From: [Champine, Brian](#)
To: [Ullrich, Elizabeth](#)
Subject: [External_Sender] Re: license amendment request to release building
Date: Friday, January 10, 2020 3:37:54 PM

Betsy,

1. The Po-210 and Ra-226 were sealed sources with no records of leaking.
2. In 1995 a large metal open shelf unit inside the Bldg. 74 room S1009 radioactive waste room was swiped and found to be contaminated with what was identified as natural uranium. The bottom shelf of the unit used to store sealed containers of natural uranium compound wastes such as uranyl acetate, uranyl nitrate, and uranium oxide, prior to disposal was contaminated. The bottom shelf was decontaminated several times but the contamination would reappear over time in subsequent periodic surveys - apparently leaking from the hollow spaces inside the metal shelf. Eventually the contaminated bottom portion of the shelf was cut free and packaged for disposal as solid radioactive waste. The contaminated portions were disposed of during either the 28 November 2000 or 26 February 2001 USU radioactive waste shipments. The remaining shelves, work area, equipment and floor were surveyed and cleared of radiological contamination IAW the procedures at that time. There is no subsequent history of uranium spills or use in Bldg. 74. By 2019, the contaminated shelf had long been properly disposed of and numerous monthly surveys have verified no removable contamination distinguishable from background levels to be present in Bldg. 74 room S1009.
3. To test our sensitivity for uranium in the measurements, we ran samples spiked with uranyl nitrate on our LSC. We calculated the expected activity based on the concentration and used the sample and blank results to calculate an LLD of 17 dpm for uranium. The energy spectrum is clearly distinguishable from H3 and C14. We recognize the unity rule applies, but in terms of 25 mrem/year, the other isotopes such as H3 and C14 would have negligible contribution. The 17 dpm LLD per sample is less than the 19.5 dpm/100 cm², showing evidence that the tests are sensitive enough.
4. Point of Contact: Any questions or concerns may be directed to the Radiation Safety Officer at (301) 295-3305 or (301) 295-9443.

Thank you,

Brian Champine, PhD, CHP
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On Thu, Dec 5, 2019 at 3:31 PM Ullrich, Elizabeth <Elizabeth.Ullrich@nrc.gov> wrote:

Brian,

As we discussed on the phone, the additional information that I need deals with the sensitivity of the measurements made for some of the alpha emitters. The NRC published screening values in the Federal Register (attached) and the NUREG 1757 series as values that will meet the 25 mrem public dose limit in Subpart E of Part 20. The constraint on these values is that, with multiple radionuclides, the unity rule applies; and these numbers are the total residual, of which not more than 10% may be removable.

The screening values of concern are for

Po210 2.51 E+3 dpm/100 Sq cm

Ra226 1.12 E+3 (NOTE: Ra226+C is 3.15 E+2)

U238 1.01 E+2 (NOTE U238+C is 19.5)

Based on the historical assessment, the U238 was in dispersible form and you did have a spill. If Po210 and Ra226 were dispersible, the above limits need to be looked at. If they were sealed sources, you should be okay.

If you cannot do surveys at these screening values, you may propose other DCGLs using DandDv2.? Which is less conservative than DandD1.0 that the screening values are based on; or RESRAD.

Contact me if you need more information or if you want to discuss this. I cannot release the facility based on the survey results in the October 1 letter. My apologies for this review being done so late after its submission.

Betsy

Betsy Ullrich, Senior Health Physicist

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