Subj: **A few thoughts on 99Tc**
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Please note that this preliminary comment quick perview, so speak, on Tc99, bu thought you shou aware of an new, additional on the subje assume some are subject to after he loo deper in

Chris,

A few thoughts on the 99Tc.

1) First, as you probably know already, this is a non-naturally occurring radionuclide. Background is zero. Very small amounts of it may be found from atmospheric testing of nuclear weapons. 99Tc is very soluble and mobile in the hydrosphere. EPA has no standard, as you know. DOE probably has some "guidance" concentrations in place. I have not looked extensively yet.

2) What could the source of 99Tc be in the IEL? Best explanation, in my opinion: "recycled" uranium. "Recycled" U is U recovered from irradiated nuclear reactor fuel in Pu production reactors. During part of the Cold War, the government was concerned with a uranium shortage, so they elaborately recovered U from Pu production reactors. In these devices, 238U is placed around a fission reactor core, and neutrons from the core are captured by 238U, producing 239Pu. The 238U also contains 235U which captures neutrons (producing 236U) and also some of the 235U undergoes fission. 99Tc is a prominent fission product. The government would take out the irradiated U, extract Pu, then extract U. The U would be re-used. The separation process would also concentrate 99Tc as a concomitant with U. "Recycled U" is well known to contain 99Tc, along with 236U.

3) The presence of 99Tc fits perfectly with our findings of 236U. [redacted] (Non-technical comment)

4) U-laden wastes, in contact with water, should easily leach to produce 99Tc in solution. Tc forms a very soluble substance, pertechnecate, which moves with the water solvent front - it interacts very weakly with aquifer solids. Its mobility in groundwater is very well known. In this sense its behavior is much different from Pu. 99Tc is a low energy beta emitter with a half life of 212000 y.

5) I do not have your documents from today in front of me at home. However, I remember the levels of a few pCi/L were found. These would seem to be extraordinarily high. A quick cursory study of the literature - I found some data on 99Tc levels in surface waters near Savannah River - the great majority of these are much lower than IEL's. Please see attached paper (PDF journal article by Beals). FYI, 1 Bq/L would be 27 pCi/L.

At any rate, the 99Tc needs more attention. Again, comparison to drinking water standards (for beta) is nonsense. The real question is why is it present at all? What is there that is producing it in the water? The previous neglect of 99Tc is as fraudulent (or more so) in both the regulatory and scientific senses, as has been Pu.

Best regards, Mike K.

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