



WAYNE STATE
UNIVERSITY

12 January 2005

To: Parties Concerned about the Industrial Excess Landfill, Uniontown, OH

The intent of this letter is to clarify several matters relating to the apparent presence of plutonium (Pu) in the Industrial Excess Landfill Site. It is apparent that EPA and other government agencies have focused mainly on the drinking water standards for gross alpha activity, and have not considered the true underlying issue, namely, whether the presence of Pu in the IEL groundwaters represents a non-natural situation. As scientists who have specifically studied and researched numerous issues relevant to environmental Pu, we would like to discuss several points. Our hope is that members of the public community will consider all technical viewpoints that have been expressed to date.

- 1) There appears to be a lot of attention paid to whether Pu can or does contribute to the gross alpha activity drinking water standard or not. First of all, the gross alpha standard is designed as a crude evaluator of the general presence of naturally occurring ^{238}U series radionuclides, and was never intended to evaluate the activities of anthropogenic alpha emitters such as $^{239+240}\text{Pu}$. To apply this gross standard to a specific, non-naturally occurring radionuclide such as Pu, while neglecting to set an appropriate activity standard for $^{239+240}\text{Pu}$ (that is meaningful in the context of background), is fraudulent in both the scientific and regulatory senses.
- 2) EPA has long maintained the position that, since $^{239+240}\text{Pu}$ activities are less than this gross alpha standard, it must represent a "background" occurrence rather than a situation that is locally unusual. One must first consider the origin of background plutonium, namely, 1950's-1960's atmospheric testing of nuclear weapons. These tests have globally distributed Pu in surface soils at activities on the order of 1 Bq/kg $^{239+240}\text{Pu}$. It is not reasonable to expect that these activities in surface soils, and even lower activities in the subsurface environment, can account for any significant concentrations of $^{239+240}\text{Pu}$ in water. Indeed, many studies of $^{239+240}\text{Pu}$ in water have determined "background" $^{239+240}\text{Pu}$ activities several orders of magnitude lower than EPA's gross alpha standard. There are two reasons why $^{239+240}\text{Pu}$ activities in "background" waters are so low: 1) the activities in soil are very low to begin with, and 2) $^{239+240}\text{Pu}$ is highly particle reactive, and it tends to stay associated with solid phases and dissolves to only a very limited extent.
- 3) When $^{239+240}\text{Pu}$ is found in groundwater at levels above "background", it has been found to originate from some specific local source. While the analytical data produced by USEPA and Ohio EPA over the past >10 years do not adequately address whether Pu is present or not, there is at least the indication of the possible presence of $^{239+240}\text{Pu}$ at elevated levels, which is not disproved by the collective data.
- 4) Since the IEL data do not disprove, and to some extent suggest, that $^{239+240}\text{Pu}$ is present at elevated activities in IEL vicinity groundwater, the key unaddressed questions are: A) Is

non-background Pu present in soils and groundwaters at IEL? B) Where is it present and in what physicochemical and isotopic forms? C) How did it get there?

- 5) The situation at another site, the Nevada Test Site (NTS), are relevant to the present questions about IEL. At NTS, 828 underground nuclear tests were conducted between 1956 and 1992 and as a result, NTS contains a large inventory (>100 million curies) of radioactive material deposited in the subsurface (Kersting et al., 1999). Kersting et al. (1999) reported Pu concentration in the groundwater samples to be ~0.2 to 0.5 pCi/L (data extracted from the figure showing the Pu concentration in unfiltered water in Kersting et al., 1999). Kersting et al. (1999) showed that Pu and other radionuclides are transported as colloidal material in the groundwater samples collected from the Nevada Test Site. They suggested that Pu is sorbed onto the colloidal sized clays in the ground water. These workers clearly demonstrated that the Pu found in the groundwater is only a very small portion of the total Pu associated with the nuclear test site.
- 6) If the highest $^{239+240}\text{Pu}$ activity reported at the IEL site (0.31 pCi/L) is taken at face value, then, it behooves us to ask how much $^{239+240}\text{Pu}$ is contained in the subsurface environment at the IEL site. This should be a major concern to everyone and the public stakeholders deserve a valid, scientifically defensible answer to this question.
- 7) It is hence our opinion that this question can only be answered by new high-volume water sampling, tests for the presence of colloidal Pu, and mass spectrometric measurements of activities and isotopic fingerprints of the Pu's origin.

In view of the gravity of the situation, we believe that responsible agencies need to focus, in a definitive manner, on the possible presence of non-background Pu in IEL soils and subsurface waters. It is irrelevant to focus meaningless attention on whether Pu significantly contributes to the gross alpha activity. In our opinion, in the near future, Pu will not contribute significantly to the gross alpha activity in drinking water, while the not-disproved subsurface Pu will remain a buried threat to humans and biota for future millennia.

Sincerely,

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Reference: Kersting, A. B.; Efund, D. W.; Finnegan, D. L.; Rokop, D. J.; Smith, D. K.; Thompson, J. L. *Nature* 1999, 397, 56-59.