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4. Spent Solvents in Scintillation Cocktails

A nuclear power facility owner/operator generates a low level radioactive wastewater. In order to measure the activity of the radionuclides in the wastewater (a measurement of radioactivity), the owner mixed four parts radioactive wastewater to 19 parts of a scintillation cocktail (xylene with traces of p-terphenyl). In the resultant mixture, beta particles from the radionuclides excite the p-terphenyl, which emits photons. The photons are detected in a scintillometer which amplifies and counts the photons on a photomultiplier tube. This count provides a measurable level of radioactivity. The xylene contributes nothing to the above described reaction and counting mechanism, other than providing a suspension media. After the treating procedure, the cocktail becomes a solid waste when it is discarded. Is the liquid waste identified as a F003 listed hazardous waste or only as a D001 ignitable characteristic waste?

In this particular process, the xylene is serving as a reaction media, in which the p-terphenyl and radioactive wastewater are suspended in order to allow a reaction to occur. The reaction in the xylene medium permits actual photon counting to determine radioactive levels. The preamble language of the December 31, 1985, Federal Register (50 FR 53316) clarified the listing of spent solvents, FOOl-F005: "the spent solvent listings cover only those 'solvents' that are used for their solvent properties that is, to solubilize (dissolve) or mobilize other constituents. For example, solvents used for degreasing, cleaning, fabric scouring, as diluents, extractants, reaction and synthesis media...." A December 6, 1988, letter from Devereaux Barnes, Director, Characterization and Assessment Division Office of Solid Waste to Arthur Moretta, EPA, Region V, reiterated this point: "The spent solvent listings cover those streams that are used to solubilize or mobilize other constituents." An argument that xylene is used as a reactant or ingredient in the formation of a commercial chemical product and

therefore not covered by the listing is not sound; the xylene is neither a reactant nor an ingredient in a commercial chemical product. The used scintillation cocktail containing xylene is defined as EPA listed hazardous waste F003.