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**Date:** Sunday, June 29, 1997 1:35 pm  
**Subject:** P-4 Update

Sediment Team:

Most data from last P-4 sampling event now in, so good time to start looking at it, preparing for P-4 reach report, and thinking about adjustments to conceptual model and characterization strategy. Attached sheets contain: 1) new Pu data from 5/97 P-4 sampling event and misc. notes on samples/analyses, 2) all our Pu data from P-4, grouped into "bins", and 3) a revised estimated Pu inventory. Caveats: new Pu data hand-entered from lab reports and not fully proofed etc., so some numbers may change a bit; particle size data not yet in, which may help shed light on some of the Pu data; subdivisions and grouping of geomorphic units + sediment layers may change after more pondering of data, along with thickness estimates for the thick sand bodies; Eric and I still need to get real site-specific bulk density data, which could tweak est. inventory a bit.

A major goal of this sampling event was to reduce uncertainty in av. Pu concentration + Pu distribution, with many samples allocated accordingly. How did we do? Randy: did we achieve our predicted reduction in uncertainty, or does the variance still remain as high (or higher?) than before? i.e., does it look like the Crystal Ball sample allocation process is an effective way to help distribute samples to reduce uncertainty in inventory?

Johnnye: what do you need to get started on revised risk assessment for reach report? Distributions from Randy? "Final" geomorphic calls from me?

Below are some quick preliminary summaries and comments of implications of new data.

Av. Pu concentrations: dropped some (~25%) for young channel sands ("bin 1") and more (~35%) for old channel sands ("bin 2"); rose for both young and old overbank deposits (+60% and +200%).

Areal extent: warmest overbank sediments in P-4 West assigned to much smaller area than before, and big chunk of P-4 West floodplain to south ("fla") shown to have quite low but above background Pu, reflecting large supply of "clean" sediment from south canyon wall plus some contribution from upstream in Pueblo Cyn (passing over floodplains in reach P-3). This low Pu sediment partly dumps onto c5 unit, explaining relatively low Pu in upper fine-grained sediments there.



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Channel vs. overbank concentrations: the data, particularly in P-4 East, show nice break in Pu concentrations between coarse channel sands (av. Pu = 1.1 pCi/g for young sands) and probable contemporaneous finer-grained overbank deposits (av. = 6.2). Highest values in both east (18 pCi/g) and west (170!) are in buried fine-grained deposits of inferred limited distribution.

Depth variations: we sampled depth profiles to 1.7-2 m in each of the thick sand units (c3, c4a, c4b, c5), largely to see if warmer stuff buried at depth and if we could pin depth of Pu-bearing sands. Only one, c3, showed significantly higher Pu at depth than in surface layers, and Pu values there consistent with buried c5/c4b vintage sands. Buried sands below c4b and c5 comparable to surface data, indicating we captured the peak of contamination in channel deposits in previous analyses. The big surprise to me, one that still puzzles me, is that in each section I tried (based on stratigraphy) to sample deep enough to get below the post-1943 sands, but all of the deepest samples still show elevated Pu (1.3-3.2 pCi/g). Possibilities are 1) post-lab sediments much thicker than I thought, or 2) there was significant downward translocation of Pu-bearing fine sediments below the old channels. I favor (2). Whatever the explanation, we haven't yet clearly defined the bottom of contamination. Important issue to try to address in P-3, and possibly with a few more samples in P-4.

Inventory: My quickly revised inventory suggests about 10% more Pu in P-4 West than before, and about 50% more in P-4 East. Pu distribution between overbank sediments and channel sediments is still estimated at about 30-40% overbank and 60-70% channel. I'm guessing that the biggest remaining uncertainties in the inventory are 1) the average Pu-bearing thickness of the thick sand deposits, including the portion in each "bin", and 2) the average concentration of the highest-Pu unit (bin 5). I'm also guessing that the numbers used here lead to overestimations in both cases (thickness estimates for sand bodies not well accounting for thinning of deposits near margins of units; av. Pu in warmest unit heavily biased by one high sample, with sampling biased to fine-grained layers).

Please feel free to contact me with any thoughts, comments, clarifications, progress, etc. Note that we now have coordinates on new sample points, and maps with these plotted will soon be available for whoever is interested. And now back to LA-3, LA-4, etc. etc.

Steve

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