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Date: 8/11/97 6:44pm
Subject: Preliminary Evaluation of New Sediment Data From Reach LA-2

Analyses received from 3rd LA-2 sampling event (except for particle size data). Sample locations are plotted on FIMAD plot 105747 (contact Marcia Jones, 5-2807, for copy). Below are summarized some highlights for key rad analytes (Cs-137, Sr-90, Am-241, Pu-239,240, Pu-238). Spreadsheets with data and summaries are available for interested parties. Please feel free to contact me with any requests, questions, or input.

Pu-239, 240: The distribution and concentrations of this analyte were a major uncertainty following the 2nd sampling round, due particularly to the surprise of finding relatively high Am-241 in samples where we did not look for Pu, and the possible relation of Pu to Am. There was also the possibility of significant Pu releases preceding the Cs releases (and the resulting gamma signature). Resampling of the layer with the highest observed Am-241 (~26 pCi/g) revealed 4 pCi/g Pu-239,240, indicating relatively low levels of Pu associated with the Am. The highest measured Pu-239,240, 6.4 pCi/g, was a relatively deep fine-grained layer in the c2 geomorphic unit downstream of DP Canyon, low in Cs-137 and stratigraphically below a high-Cs layer with Pu-239/238 ratio indicative of a pre-1968 deposit. This suggests that Pu concentrations in LA-2 were highest in relatively early post-1943 time, before deposition of "garden plot" sediments. Notably, one relatively deep sample in the c2 unit upstream of DP Canyon yielded a relatively high value of 5.4 pCi/g, suggesting that a significant part of the Pu in LA-2 may have been derived upstream of DP Canyon (south side TA-21, or possibly TA-2 or TA-41)

Am-241: Resampling of layer with highest previous analysis (28 pCi/g) provided similar value of 23.1 pCi/g. No higher values were found in this sampling event.

Cs-137: Sampling of the layer with the highest Cs at the "garden plot", ~2 m away from the previous sample site, yielded somewhat lower Cs concentrations (146 pCi/g, compared with 192 and 230 pCi/g from 1st sample site). A sample from a nearby correlative c3 unit yielded 122 pCi/g, and an associated floodplain site ("f1b") yielded 54 pCi/g. All other Cs analyses were comparable to previous values.

Sr-90: Sampling of the layer with the highest Sr at the "garden plot", ~2 m away from the previous sample site, yielded lower Sr concentrations than previous sampling (13.5 pCi/g, compared with 36 and 40 pCi/g from 1st sample site). A sample from a nearby correlative c3 unit yielded 30-34



pCi/g. Other Sr analyses were somewhat comparable to previous values, although some anomalies were noted. Specifically, in several units Sr concentrations from 2nd sampling event appear to be noticeably higher than from 1st and 3rd events, suggesting that there may be some discrepancies between different labs.

Inventory: The revised estimate of the Cs-137 and Sr-90 inventory in LA-2 downstream of DP Canyon is within 10% of the 5/97 estimate, indicating that it is well constrained. About 30% of each is contained within the c3 geomorphic unit, with limited areal extent, although larger amounts are stored within the widely dispersed c2 overbank sediments. The estimated Am-241 inventory is about 70% of that estimated in 5/97, and the Pu-239,240 inventory is about 30% of the prior poorly-constrained estimate. In LA-2 upstream of DP Canyon, estimated inventories of Cs-137 and Pu-239,240 are within ~10% of the prior estimates, whereas the estimated Sr-90 inventory has been reduced by about 50% (possibly related to differences between labs).

Release History and Time Trends: Available data support significant time-dependent trends in contaminant concentrations and contaminant ratios that are related to changing release history at the source areas.

Pu-239,240 apparently reached maximum concentrations 1st in reach LA-2, at least in part derived from a source in the Los Alamos Canyon watershed upstream of DP Canyon; relatively small amounts of sediment dating to this time period are apparently left in LA-2. Cs-137 and Sr-90 reached maximum concentrations later, sometime prior to 1968 (indicated by high Pu-239/238 ratios), derived from a source in the DP Canyon watershed; these sediments are mostly limited to a small area downstream of DP Canyon, including the "garden plot". Am-241 reached maximum concentrations sometime after 1968, derived from DP Canyon, and this analyte is largely stored in the widely dispersed "c2" overbank sediments. Pu-238 also has highest concentrations in c2 overbank sediments, suggesting peak releases either contemporaneously with the Am-241 or perhaps later. Due to these time-dependent variations in releases within the Los Alamos Canyon watershed, it is apparent that strict collocation of all contaminants within all sediment layers does not occur, although the key analytes Cs-137 and Sr-90 do seem to be generally collocated downstream of DP Canyon.

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