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CC sreneau@lanl.gov:smtp

From: (Steven Reneau) sreneau@lanl.gov:smtp
Postmark: Nov 04,97 7:40 AM Delivered: Nov 04,97 7:40 AM

Subject: Reach LA-1 Sediment Investigations

Comments:
See document for message.

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Analytical results from our most sediment sampling event in reach LA-1 have been received, and as usual they both provide confirmation for some parts of our evolving conceptual model and some surprises.

Reach LA-1 was divided into several sub-reaches in order to evaluate a series of potential contaminant sources. LA-1 West is in TA-41 and includes the outfall channel of Hillside 138, a known source of Pu and possibly Hg below the laundry facility for the original TA-1 plutonium processing facility; sampling both upstream and downstream of Hillside 138 was conducted to evaluate possible upstream sources, in addition to contributions from this PRS. LA-1 Central is in TA-2 immediately downstream of the Omega West reactor, where there is a significant source for Sr-90 in the alluvial groundwater. LA-1 East is in TA-21 downstream of the outfall channel for the old TA-21 laundry facility, another potential source of Pu.

Pu-239,240

Pu-239,240 was used as an indicator contaminant in this sampling round because of its pervasive occurrence in sediment samples collected previously as part of OU 1098 (TA-2 and TA-41) characterization activities, and we obtained Pu analyses on 43 new sediment samples. Pu is present above background levels in virtually all of our sediment samples. The 2nd and 3rd highest values for Pu-239,240, 19.1 and 15.4 pCi/g, were obtained from overbank sediments in a "c2" or "c3" geomorphic unit in LA-1 West upstream of Hillside 138, indicating a significant source for Pu farther upstream. The highest value, 19.3 pCi/g, was obtained from overbank sediments in a "f1" unit in LA-1 East, suggesting contributions of Pu from the TA-21 laundry facility. The highest concentration within coarse-grained channel sediments, 2.19 pCi/g, was also obtained in LA-1 East in a "c3" unit. Maximum and average concentrations are lower in LA-1 Central and LA-1 West downstream of Hillside 138, suggesting that Hillside 138 is not the major upstream Pu source as originally inferred based on prior TA-1 sampling activities. It is also notable that both maximum and average concentrations of Pu are higher in LA-1 sediment than in LA-2 sediment downstream of DP Canyon, suggesting that DP Canyon may be less significant as a source for Pu in upper Los Alamos Canyon than previously believed. A preliminary estimate of Pu inventory in the sub-reaches indicates that 93-98% of the Pu is contained within relatively fine-grained overbank sediments, with only a small percentage in coarser-grained channel deposits. The estimated Pu-239,240 inventory in LA-1 West and East (~20 nCi/km) is higher than downstream in LA-2 but still lower than in the Pueblo Canyon reaches P-1 and P-4.

Metals

We obtained data for the Target Analyte List metals in 11 sediment samples. Pb was the most commonly detected metal above background levels, although it was only detected above background in LA-1 West. The highest concentration for Pb was 40.4 ppm in a surficial (0-28 cm) overbank sediment layer. Cu was also detected slightly above background in several samples in reaches LA-1 West and LA-1 East, with a maximum of 14.5 ppm in an overbank sediment layer at depth (34-48 cm) below a "f1" surface. Hg was only detected above background in one sample, 0.16 ppm in overbank

sediments at depth (28-49 cm) in LA-1 West downstream of Hillside 138. This is only slightly higher than the highest Hg we have found in LA-2, 0.14 ppm.

PCBs

PCBs had previously been detected in some of the OU 1098 sediment samples, and we obtained data for PCBs in 9 new samples spread between all of the sub-reaches. PCBs were reported above detection limits in 3 of our samples in LA-1 Central and LA-1 East. The highest value, 1 ppm, was reported from overbank sediments at depth (32-47 cm) in LA-1 East. The next highest value 0.052 ppm, was also from LA-1 East and was close to the detection limits.

Sr-90

TA-2 is known to be a source for Sr-90 in alluvial groundwater, but prior data were ambiguous as to whether it contributed Sr-90 to the surface sediments. We obtained several Sr-90 analyses from overbank sediments in LA-1 Central to further evaluate its possible presence, but Sr-90 was not detected in our samples. This supports inferences that there are no significant sources for Sr-90 in surface sediments in Los Alamos Canyon upstream of DP Canyon.

Remaining Issues

The largest unresolved issues pertaining to contaminants in sediments in LA-1 are to clearly identify the primary upstream source for Pu and the concentrations of Pu present in this area. Based on prior sampling in TA-1, the best candidate for the main source may be Hillside 137 which is below an outfall from the old "D Building", the original Manhattan Project plutonium processing facility. We will be mapping and sampling in this area and upstream, in an attempt to better constrain the western limit of lab-derived contaminants. Other issues to address in a second sampling round may include improving estimates of average Pu concentrations and Pu inventory in the previously sampled reaches, and improving our understanding of other analytes present in low concentrations, such as Pb, Hg, and PCBs.

Please feel free to contact me if you have any questions or if you would like more information.