



OU1 and OU2 screening results have revealed a need to sample OU5 (Woman Creek) and OU6 (Walnut Creek) and analyze for dilution series toxicity and chemical components. The water collection will be synoptic for both tests. These samples will allow us to revisit the OU1 and OU2 screening tests.

Comment 2. "Flow measurements are not taken when the samples for toxicity testing are collected." Flow data are used to calculate a contaminant load to a site, but this parameter is not called for in toxicity testing protocols. When there is flow; OU5, OU6, and OU7 will include flow measurements concurrent with chemical sampling.

Comment 3. "Lower detection limits for metal analyses of water samples may be necessary to evaluate potential toxicity indications." The detection limit range that the Rocky Flats General Radiochemistry and Routine Analytical Services Protocol (1991) (GRRASP) achieves for the metals of interest (copper, cadmium, and silver) is 5-20 µg/L. It may be that under certain conditions of hardness and pH, particular metals could cause toxicity at levels below these detection limits, but this appears unlikely based upon historic information on RFP surface water metal concentrations. The OU work plans use methods and detection limits approved by EPA and Colorado Department of Health (CDH) for all OU surface waters. These methods have been used for OU1, OU2, OU3, and OU5 metal detection. The guidelines for Data Quality Objectives (EPA/540/G-87/003) require consideration of precision, accuracy, representativeness, completeness, and comparability (PARCC) parameters. Comparability will be enhanced if the metal detection methods remain the same.

Comment 4. "Total organic carbon (TOC) is not always included in the list of chemical analysis parameters." We agree that a known TOC can better quantify the metal availability for aquatic organisms. TOC will be analyzed in samples from the Woman Creek, Walnut Creek, and Landfill drainage during the OU characterization. The toxicity testing data for OU1 are contained in the Draft Final Phase 3 RFI/RI Report, 881 Hillside Area (OU1), Volume 13, Appendix E, Environmental Evaluation. Fathead minnow mortality was significant at only one of eleven sites. However, this location, Antelope Springs (SW104), is fed by subsurface flow not influenced by RFP. In general, the headwaters of seeps do not provide a favorable environment for aquatic life. Further details on the water chemistry of location SW104 will be forthcoming with subsequent OU5 sampling and analysis.

Furthermore, the *Ceriodaphnia sp.* data from OU1 showed 25% or greater mortality from seven out of the eleven sites sampled. The Surface Water Division (SWD) reviewed the toxicity data and surface water chemical data for OU1 and discussed potential causes of the mortality with experts. Current thinking is that the problem may be the fluctuating water balance in combination with low hardness values. Low hardness may result in increased bioavailability of metals. A complete suite of water

James K. Hartman  
November 25, 1992  
92-RF-13805  
Page 3

quality data is planned for OU5 to elucidate relationships of (*in situ*) water quality and toxicity test results.

The OU1 EE mentions the significant toxicity encountered by *Ceriodaphnia sp.* (page E-60), but detailed explanations of the usefulness of these data, relationships to other aquatic data, and suggested actions were not adequately discussed. To allow for efficient use of funds, toxicity testing will be conducted under OU5 and OU7 investigations in accordance with the EPA concerns discussed in points 1-4 above.

Preliminary toxicity data for OU2 are available. These data show a minimum survival for *Ceriodaphnia sp.* of 13/20, occurring in Pond B-5. The fathead minnow results in Pond B-3, Pond B-4, and Pond B-5 had survival of 10/20, 6/20, and 10/20, respectively. These ponds are downstream from the Sewage Treatment Plant, and historical tests have shown that the ammonia levels are associated with high mortality in fathead minnows. The ammonia concentrations for this test ranged from 11 to 30 mg/L. Ammonia toxicity has been demonstrated in fathead minnows in concentrations as low as 7 mg/L.

#### STANDARD OPERATING PROCEDURE (SOP) REQUEST

The DOE letter of November 11, 1992, suggested a SOP be prepared for aquatic and sediment toxicity sample collection and testing including the collection of data "necessary to support the interpretation [of aquatic toxicity]." Procedures and methods are already in place and govern the sample collection (EMD Operating Procedures #5-21000-POPS-SW), water toxicity testing (*Methods for Measuring the Acute Toxicity of Effluent to Freshwater and Marine Organisms*, USEPA 600/4-85/013, March 1985, and *Requirements for Whole Effluent Toxicity Testing*, EG&G Rocky Flats, EMD, September 1992), and sediment toxicity testing (*Standard Guide for Conducting Sediment Toxicity Tests with Freshwater Invertebrates*, ASTM Committee E-47 on Biological Effects and Environmental Fate, Method E-1383-90, Annual Book of ASTM Standards, Vol. 14.02) activities. If there are any deficiencies or issues with these established SOPs please notify us and appropriate action will be initiated.

#### CONTRACT LABORATORY PROGRAM (CLP) vs. CLEAN WATER ACT STANDARDS

Regarding the requested evaluation of CLP protocols against the Clean Water Act (CWA) criteria and standards, such an evaluation has already been incorporated into the comprehensive benchmarks table. These benchmarks comprise all standards which are likely to be used to determine ARARs for clean-up activities, and include numerous water quality standards adopted in Colorado under the authority of the CWA. Because no ARARs have been selected from the comprehensive benchmarks table, no final determination can be made as to the adequacy of proposed analytical methods.

Surface water samples are currently analyzed in accordance with an agreement between DOE and EPA under the NPDES FFCA. Under this agreement, EPA has approved

James K. Hartman  
November 25, 1992  
92-RF-13805  
Page 4

analytical methods and detection limits for metals analysis in all required surface water monitoring activities (91-RF-4614) any changes to surface water analytical methodology would require EPA approval.

Please contact Mark Buddy at extension 8519 or Holly Wolaver at extension 8652, with any questions on this letter or any clarifications that you may require regarding current or future EE aquatic toxicity testing programs.



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