

US EPA ARCHIVE DOCUMENT



U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF SITE REMEDIATION AND RESTORATION

U.S. ENVIRONMENTAL PROTECTION AGENCY

TO: Anna Krasko, EPA RPM

FROM: Cornell Rosiu, EPA

DATE: January 6, 2000

SUBJECT: Centredale Manor/ Preliminary identification of soil and sediment maximum concentrations that exceed ecological screening-level benchmarks

At your request, site soil data in Table 2 (Summary Statistics of Constituents Detected in Soil) dated 12/02/99 was reviewed and soil maximum concentrations for the majority of chemicals tested (as time permitted) were compared to soil ecological screening-level benchmarks on a chemical by chemical basis. Likewise, sediment maximum concentrations from data Tables 2 through 6 for samples AD-01 through -05 were compared to sediment ecological screening-level benchmarks on a chemical by chemical basis. Results of these comparisons are presented in a brief narrative at the bottom of this memo that approximates the style of presentation in your "Draft Approval Memo to Perform an EE/CA for NTCRA".

The following methods were used in deriving soil or sediment ecological screening level benchmarks. Three categories of soil ecological screening-level benchmarks were used in preliminary comparison of site data to (1) wildlife, (2) soil invertebrate, and (3) terrestrial vascular plant benchmarks. The soil chemicals identified in the narrative below had maximum detected concentrations that exceeded any of these categories, but often exceeded two or more. Wildlife benchmarks were derived from Sample et al. (1996) no observed adverse effect levels (NOAELs) in exposure models that assumed dietary consumption of contaminated soil by short-tailed shrew, mink or American robin. The wildlife benchmark used in comparisons to site data was the lowest value among these three representative species. Soil invertebrate benchmarks were obtained from Efroymson et al. (1997a) which were concentrations at the 10th percentile in an effects database measuring 20% reduction in growth, reproduction, or activity as an indicator of biologically significant effects (i.e., lowest observed adverse effect levels - LOAELs). Finally, terrestrial vascular plant benchmarks were from Efroymson et al. (1997b) which were concentrations at the 10th percentile in an effects database measuring phytotoxicity.

Sediment screening-level benchmarks were derived from EPA (1996) which were either interim EPA sediment quality criteria or NOAA's Effects Range - Low (ER-L) values. The sediment chemicals

identified in the narrative below had maximum detected concentrations that exceeded either of these EPA Ecotox thresholds.

If you have any questions don't hesitate to call me at 617-918-1345.

Literature Cited

Efroymson, R.A., M.E. Will and G.W. Suter. 1997a. *Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision*, issued November 1997 by the Risk Assessment Program Health Sciences Research Division, Oak Ridge National Laboratory, ES/ER/TM-126/R2.

Efroymson, R.A., M.E. Will, G.W. Suter and A.C. Wooten. 1997b. *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision*, issued November 1997 by the Risk Assessment Program Health Sciences Research Division, Oak Ridge National Laboratory, ES/ER/TM-85/R3.

EPA. 1996. Ecotox Thresholds, *ECO Update*, Vol. 3, No. 2, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, EPA 540/F-95/038.

Sample, B.E., D.M. Opresko, and G.W. Suter. 1996. *Toxicological Benchmarks for Wildlife: 1996 Revision*, issued June 1996 by the Risk Assessment Program Health Sciences Research Division, Oak Ridge National Laboratory, ES/ER/TM-86/R3.

Narrative Description of Results

Soil on Centredale Manor and Brook Village properties, and in the floodplain downstream was contaminated by VOCs, SVOCs, Pesticides/PCBs and Dioxins that exceeded risk-based soil ecological benchmarks, including the following highest concentrations:

- 1,2,4-trichlorobenzene at 340,000 ppb;
- benzene at 480,000 ppb;
- chlorobenzene at 1,000,000 ppb;
- toluene at 430,000 ppb;
- xylenes at 380,000 ppb;
- benzo(a)pyrene at 7,100 ppb;
- 4,4'-DDD at 1,200 ppb;
- 4,4'-DDE at 2,200 ppb;
- 4,4'-DDT at 410 ppb;
- aldrin at 1,200 ppb;
- chlordane at 350 ppb;
- dieldrin at 9,900 ppb;
- Aroclors 1242, 1248 and 1254 at 230,000 to 1,300,000 ppb;

- total PCBs at 1,300,000 ppb; and
- 2,3,7,8-TCDD at 340 ppb.

Metals in soil also exceeded risk-based ecological benchmarks for soil, including the following highest levels:

- aluminum at 16,100,000 ppb;
- antimony at 27,800 ppb;
- arsenic at 49,300 ppb;
- cadmium at 180,000 ppb;
- chromium at 472,000 ppb;
- copper at 934,000 ppb;
- lead at 3,160,000 ppb;
- manganese at 6,420,000 ppb;
- mercury at 7,400 ppb;
- silver at 35,500 ppb;
- vanadium at 72,500 ppb; and
- zinc at 3,330,000 ppb.

Sediments near Allendale Dam were contaminated with SVOCs, Pesticides/PCBs, Dioxins, and metals that exceeded risk-based sediment ecological benchmarks, including the following highest concentrations:

- Anthracene at 720 ppb;
- Acenaphthylene at 770 ppb;
- benzo(a)anthracene at 2,500 ppb;
- benzo(a)pyrene at 2,900 ppb;
- phenanthrene at 2,100 ppb;
- pyrene at 6,600 ppb;
- fluoranthene at 4,100 ppb;
- fluorene at 320 ppb;
- naphthalene at 290 ppb;
- chrysene at 3,600 ppb;
- dieldrin at 170 ppb;
- 4,4'-DDE at 170 ppb;
- endosulfan I at 28 ppb;
- total PCBs at 9,100 ppb;
- 2,3,7,8-TCDD at 93 ppb;
- lead at 629,000 ppb;
- silver at 8,900 ppb;
- cadmium at 5,500 ppb;
- chromium at 382,000 ppb; and
- mercury at 890 ppb.