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RESULTS OF PHASE III SEDIMENT SAMPLING

WEYERHAEUSER EVERETT

FORMER MILL E/KOPPERS FACILITY

Prepared for

Weyerhaeuser Company

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1 INTRODUCTION

This report describes the activities EMCON performed during the Phase III sediment sampling conducted for Weyerhaeuser in the Snohomish River, adjacent to the Former Mill E/Koppers Facility. Activities conducted were consistent with the scope of work presented in EMCON's proposal dated February 2, 1995. The scope of work consisted of the following:

- Work Plan Preparation
- Field Investigation
- Data Validation, Evaluation, and Reporting.

A draft and final work plan for the Phase III sediment sampling were prepared by EMCON based on discussions with Weyerhaeuser personnel and Lawrence McCrone of PTI Environmental Services in January and June of 1995. Field investigation activities were conducted in accordance with the final *Weyerhaeuser Everett Sediments Work Plan* (EMCON, 1995). A description of the field activities and a summary of the field findings and chemical analysis results are presented in this report.

The purpose of the sediment sampling was to augment data collected during the Phase I and II sediment sampling performed in 1992. The Phase III sediment sampling locations were located in areas where Phase I or II sediment samples showed chemical concentrations greater than the Sediment Management Standards (SMS) marine sediment cleanup screening levels (CSLs) for one or more contaminants. Three chemicals, arsenic, naphthalene, and acenaphthene, exceeded the Department of Ecology's (Ecology) screening criteria for identification of a station cluster of potential concern. Four of the Phase I sediment sample locations (SR-07, SR-10, SR-11, and SR-13) showed one or more polycyclic aromatic hydrocarbon (PAH) compounds with concentrations greater than the marine CSL chemical criteria. Two additional Phase I sample locations, SR-01/SR-02 and SR-05, showed concentrations of arsenic that were greater than the CSL chemical criteria.

The Phase III sediment samples were analyzed for the previously identified contaminants of concern, organic carbon content, grain size, and pore water salinity. Pore water measurements were collected to determine the appropriateness of marine criteria used in 1992 to identify areas of contamination, and grain size data were collected to assist with determining characteristics of the physical environment.

2 FIELD INVESTIGATION

EMCON personnel collected 18 sediment samples plus one field duplicate sample on July 24 and 25, 1995. Sample locations are shown on Drawing 1. The sample sites were located based on known Phase I locations (i.e., previous survey coordinates and stakes marking sampling stations). Survey Coordinates for Phase I Station are presented in Table 1. Drawing 1 shows the sample stations located through a survey conducted by W & H Pacific, using global positioning system (GPS) methods. Observations of sediment physical characteristics and field observations were recorded on sediment field sampling data sheets. Copies of the field sampling data sheets are included in Appendix A.

Phase III sample locations were placed 10 feet (ft) from previously sampled (Phase I) stations; therefore, the coordinates recorded on the field sampling data sheets are based on downstream ("A"), channel ("B"), and upstream ("C") designations. The original station location markers (wooden stakes) were observed at all of the stations except SR-01 and SR-05. At station SR-01, a non-functional oil/water separator was replaced with a new surface water outfall with a tidegate. The outfall location was also regraded. This outfall drains area adjacent to and upgradient of the Former Mill E/Koppers Facility. At station SR-05 the wooden bulkhead had partially collapsed, covering the location of SR-05 with soil and cobble. The areas sampled (i.e., 10 ft from SR-05) were not impacted by the partially collapsed bulkhead.

Sediment samples were collected from the sediment surface to a depth of 10 centimeters (cm) following procedures specified in the work plan. Samples were collected directly from the surface using a clean stainless steel spoon where sediments were exposed, and 2-inch-diameter butyl acrylate tubing was used for locations underwater at the time of sampling. The sampling method is located under "sample-type" on the field data sheets. Sediments were generally characterized as mixed fines (silt and clay) and sand. A hydrogen sulfide-like odor, characteristic of sediments from a reducing environment, was noted in the sediment samples collected from stations SR-05B and SR-10B. It was not noted at the other locations. A creosote-like odor was noted in sediment samples collected from stations SR-07A, SR-10A, SR-10B, and SR-11B. It was not noted at the other locations.

3 SAMPLE ANALYSIS

Samples were submitted to Weyerhaeuser Analytical and Testing Services (WATS) for physical and chemical analyses. Sample testing was conducted in accordance with work plan specifications and included polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8310, total organic carbon (TOC) by PSEP protocols, arsenic by EPA Method 7060, grain size by sieve and pipet (PSEP, 1986), and pore water salinity by probe (Standard Methods 210A). Sample analyses for each station are presented in Table 2.

A data validation review was conducted following the procedures presented in the work plan. Copies of the laboratory reports and the data validation review report are included in Appendix B.

4 FINDINGS

4.1 Sample Results

The results of sample analyses for conventional parameters (i.e., TOC, salinity, solids, and grain size) are presented in Table 3. The TOC concentration measured in sediment samples ranged from 0.2 percent at station SR-13B to 3.4 percent at station SR-10C. Sediment pore water salinity ranged from 4.8 parts per thousand (ppt) at station SR-10B to 14 ppt at station SR-10A. The pore water salinity was not measured at station SR-13B because the sample was too coarse to retain pore water. Total solids measurements ranged from 49.3 percent at station SR-10C to 84.2 percent at station SR-13B.

Sediment grain size results are summarized by grades in Table 3. The percent gravel (2 mm diameter and larger) ranged from 0 percent (numerous stations) to 16.9 percent at station SR-13B. The percent sand measured in sediment samples ranged from 10.6 percent at station SR-05A to 79.5 percent at station SR-13B, and the percent silt ranged from 4.0 percent at station SR-13B to 62.2 percent (average of field duplicate samples) at station SR-07A. The percent clay ranged from 0 percent at station SR-13B to 34.9 percent at station SR-01A. Results for the individual phi sizes are included in the grain size data provided in Appendix B.

Sediment sample PAH concentrations are presented in Table 4. Due to laboratory method and different instrumentation, the PAH analyses did not include analysis of acenaphthylene, phenanthrene, or 2-methylnaphthalene[1]. A summary of the detected concentrations and detection limits for PAHs in the Phase III sediment samples is presented in Table 5. PAHs were detected at all of the stations sampled.

Arsenic results are presented in Table 6. Arsenic was detected at all of the stations sampled.

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[1] None of these compounds are those which exceeded the Department of Ecology's screening criteria for identification of a station cluster of potential concern (i.e., arsenic, acenaphthene, and naphthalene).

4.2 Pore Water Salinity

Results of salinity measurements indicate that sediments fall within a low salinity sediment range as defined by chapter 173-204 WAC Sediment Management Standards. There are currently no defined SMS chemical criteria for low salinity sediments. Phase III sampling results were evaluated against marine sediment standards, based on past comparisons to marine criteria and Ecology ranking of the site using marine sediment standards.

4.3 Grain Size

The grain size results indicate that the sample locations are generally dominated by fine grained (silt and clay) sediments, typical of relatively low energy (depositional) environments. The sample station markers observed to be still in place from sampling conducted in July of 1992 indicate that scouring may not be a significant factor for the dispersion of the nearshore sediments.

4.4 Comparison to Sediment Management Standards

Sediment sample PAH concentrations were converted to mg/kg organic carbon using the measured TOC concentrations. The converted results are presented in Table 7. Phase III results are presented by sampling location in Table 8. The Marine Sediment Quality Standards (SQS) Chemical Criteria (WAC 173-204-320) and Puget Sound Marine Sediment CSL and Minimum Cleanup Levels Chemical Criteria (WAC 173-204-520), are also shown in Table 8. Table 9 shows the results of the arsenic analyses. Results for each of the sampling areas are discussed below.

Stations SR-07A, SR-07B, and SR-07C. None of the compounds detected in the Phase III sediment samples showed concentrations exceeding the SQS chemical criteria, and all detection limits were low enough to demonstrate compliance with these criteria.

Stations SR-10A, SR-10B, and SR-10C. PAH concentrations were lower than the SQS chemical criteria, or were not detected at these stations.

Stations SR-11A, SR-11B, and SR-11C. All of the PAH concentrations and detection limits for the samples collected from these stations were less than the SQS chemical criteria.

Stations SR-13A, SR-13B, and SR-13C. The concentrations of PAHs and the detection limits reported in the samples collected from these stations were less than the SQS chemical criteria.

Stations SR-01A, SR-01B, and SR-01C. The samples at stations SR-01B and SR-01C showed concentrations of arsenic greater than the SQS chemical criterion, but below the arsenic CSL criterion. The station SR-01A sample was below both the arsenic SQS and CSL criteria.

Stations SR-05A, SR-05B, and SR-05C. Only the concentration of arsenic in the sample collected from station SR-05B was greater than the SQS criterion, but this sample was below the arsenic CSL criterion. Station SR-05A and SR-05B samples were below both the SQS and CSL arsenic criteria.

5 SUMMARY AND CONCLUSIONS

Sediment pore water salinity analyses show the sediments fall within a low salinity sediment range as defined by Sediment Management Standards. Evaluation of Phase III sediment results were based on past comparisons to marine criteria and Ecology ranking of the site based on marine sediment standards.

Phase III sediment sample results indicate that PAH concentrations in the 0-10 cm sample horizon do not exceed the SQS chemical criteria for marine sediments. Arsenic concentrations measured at the reconstructed stormwater outfall (near station SR-01) were greater than the SQS chemical criterion and indicate that the outfall may be an ongoing source of arsenic. This outfall drains area adjacent to and upgradient of the Former Mill E/Koppers Facility. The arsenic concentrations measured at SR-05, although exceeding the SQS chemical criterion, were lower than previously measured. This may be due to a different sampling horizon, or it may be related to proximity to the previous pipe (outfall) at this location.

LIMITATIONS

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

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TABLES

Table 1

Station Survey Coordinates
Phase III Sediment Sampling
Weyerhaeuser Everett Former Mill E/Koppers Facility

Station Number	Northing[a]	Easting[a]	Elevation[b]
SR-01	374503.7	1310176.8	-0.38
SR-05	375295.6	1310419.2	-1.46
SR-07	375638.6	1310505.7	-4.24
SR-10	376046.0	1310496.2	-6.23
SR-11	376146.2	1310477.0	-6.10
SR-13	376272.3	1310441.4	-3.70

[a] W&H Pacific, July, 1995 survey. Washington Coordinate System North zone and North American Datum of 83/9 used as projection..

[b] Elevations from Weyerhaeuser project datum established by Dalton, Olmsted & Fugelvand, Inc.

Table 2

Sample Analyses
Phase III Sediment Sampling
Weyerhaeuser Everett Former Mill E/Koppers Facility

Sample Number	Date Collected	Analyses[a]
SR-01A	07/24/95	Arsenic, grain size, pore water salinity
SR-01B	07/24/95	Arsenic, grain size, pore water salinity
SR-01C	07/24/95	Arsenic, grain size, pore water salinity
SR-05A	07/25/95	Arsenic, grain size, pore water salinity
SR-05B	07/25/95	Arsenic, grain size, pore water salinity
SR-05C	07/25/95	Arsenic, grain size, pore water salinity
SR-07A[b]	07/25/95	PAHs, TOC, grain size, pore water salinity
SR-07B	07/25/95	PAHs, TOC, grain size, pore water salinity
SR-07C	07/25/95	PAHs, TOC, grain size, pore water salinity
SR-07D[b]	07/25/95	PAHs, TOC, grain size, pore water salinity
SR-10A	07/25/95	PAHs, TOC, grain size, pore water salinity
SR-10B	07/25/95	PAHs, TOC, grain size, pore water salinity
SR-10C	07/25/95	PAHs, TOC, grain size, pore water salinity
SR-11A	07/24/95	PAHs, TOC, grain size, pore water salinity
SR-11B	07/24/95	PAHs, TOC, grain size, pore water salinity
SR-11C	07/24/95	PAHs, TOC, grain size, pore water salinity
SR-13A	07/24/95	PAHs, TOC, grain size, pore water salinity
SR-13B	07/24/95	PAHs, TOC, grain size, pore water salinity
SR-13C	07/24/95	PAHs, TOC, grain size, pore water salinity

[a] Analyses: Arsenic by Method 7060 (USEPA, 1986); grain size by sieve and pipet (PSEP, 1986); pore water salinity by Method 210A (Standard Methods); PAHs = polycyclic aromatic hydrocarbons by Method 8310 (USEPA, 1986); TOC = total organic carbon by PSEP protocols (1986).
[b] Field duplicate samples.

Table 3

Results of Conventional Analyses
Phase III Sediment Sampling
Weyerhaeuser Everett Former Mill E/Koppers Facility

Sample Number	TOC[a] (percent)	Salinity (ppt)[b]	Solids (percent)	Gravel (percent)	Sand (percent)	Silt (percent)	Clay (percent)
SR-01A	NA[c]	12	50.8	0.0	15.5	49.9	34.9
SR-01B	NA	10	59.8	0.0	53.6	34.8	11.5
SR-01C	NA	12	53.6	0.0	20.2	53.7	26.1
SR-05A	NA	11	51.8	3.0	10.6	55.3	23.4
SR-05B	NA	10	51.6	0.0	26.1	56.9	17.0
SR-05C	NA	12	54.9	2.5	18.0	54.3	25.2
SR-07A[d]	2.4	9.1	53.9	0.0	23.4	59.6	17.1
SR-07B	2.9	12	52.8	0.0	27.9	54.9	17.3
SR-07C	2.8	13	55.4	5.0	27.3	57.8	9.9
SR-07D[d]	2.5	9.1	54.8	0.0	22.1	64.7	13.2
SR-10A	3.0	14	55.5	0.0	41.9	41.0	17.1
SR-10B	3.0	4.8	62.5	8.7	52.6	32.4	6.3
SR-10C	3.4	13	49.3	0.0	29.4	49.0	21.6
SR-11A	2.3	12	54.5	0.0	38.7	45.1	16.2
SR-11B	1.3	12	67.7	0.0	50.9	39.5	9.6
SR-11C	1.3	8.0	67.9	7.8	62.5	21.7	8.0
SR-13A	1.1	11	75.5	6.1	57.6	32.5	3.9
SR-13B	0.2	NM[e]	84.2	16.9	79.5	4.0	0.0
SR-13C	1.7	10	63.8	5.8	53.4	30.5	10.3

[a] TOC = total organic carbon.
[b] ppt = parts per thousand.
[c] NA = not analyzed.
[d] Samples SR-07A and SR-07D were collected as field duplicate samples.
[e] NM = not measured; sample was sandy and did not contain sufficient pore water for measurement.

Table 4

Sediment Sample PAH Results
Phase III Sediment Sampling
Weyerhaeuser Everett
Former Mill E/Koppers Facility

SITE	DATE	DEPTH (ft)	Naphthalene (mg/kg)	Acenaphthene (mg/kg)	Fluorene (mg/kg)	Anthracene (mg/kg)	Fluoranthene (mg/kg)	Pyrene (mg/kg)	Benzo(a) anthracene (mg/kg)
SR-07A	07/25/95	0.30	0.098	0.140	0.097	0.011	0.075	0.063	0.015
SR-07B	07/25/95	0.30	0.250	0.310	0.130	0.025	0.180	0.144	0.040
SR-07C	07/25/95	0.30	<0.023	<0.045	0.011	0.017	0.110	0.080	0.048
SR-10A	07/25/95	0.30	<0.023	0.120	0.0063	0.023	0.180	0.140	0.039
SR-10B	07/25/95	0.30	<0.020	0.320	0.032	0.038	0.160	0.110	0.880
SR-10C	07/25/95	0.30	<0.026	<0.051	0.016	0.020	0.190	0.130	0.036
SR-11A	07/24/95	0.30	<0.023	<0.046	0.014	0.036	0.300	0.250	0.084
SR-11B	07/24/95	0.30	<0.019	<0.037	0.0051	0.047	0.051	0.066	0.002
SR-11C	07/24/95	0.30	0.0053	<0.0079	0.0044	0.0082	0.085	0.085	0.023
SR-13A	07/24/95	0.30	<0.0036	<0.0071	0.0041	0.012	0.120	0.069	0.022
SR-13B	07/24/95	0.30	<0.0032	0.0066	0.0043	0.0024	0.013	0.019	0.0079
SR-13C	07/24/95	0.30	<0.020	<0.039	0.0085	0.068	0.440	0.280	0.130

Values represent total concentrations unless noted < = Not detected at indicated reporting limit — = Not analyzed

Table 4

Sediment Sample PAH Results
Phase III Sediment Sampling
Weyerhaeuser Everett
Former Mill E/Koppers Facility

SITE	DATE	DEPTH (ft)	Chrysene (mg/kg)	Benzo(b) fluoranthene (mg/kg)	Benzo(k) fluoranthene (mg/kg)	Benzo(a)pyrene (mg/kg)	Dibenzo(a,h) anthracene (mg/kg)	Benzo(g,h,i) perylene (mg/kg)	Indeno (1,2,3-cd) pyrene (mg/kg)
SR-07A	07/25/95	0.30	0.030	0.022	0.010	0.0023	0.0094	0.0075	0.0024
SR-07B	07/25/95	0.30	0.065	0.064	0.023	0.0073	<0.0096	<0.0038	0.011
SR-07C	07/25/95	0.30	0.048	0.027	0.011	0.0023	<0.0091	0.0051	<0.0023
SR-10A	07/25/95	0.30	0.035	0.040	0.018	0.0036	<0.0091	<0.0036	<0.0023
SR-10B	07/25/95	0.30	0.071	0.035	0.014	0.0038	<0.0081	<0.0032	<0.0021
SR-10C	07/25/95	0.30	0.057	0.058	0.016	0.010	<0.010	<0.0041	<0.0026
SR-11A	07/24/95	0.30	0.100	0.094	0.037	0.042	<0.0093	<0.0037	0.023
SR-11B	07/24/95	0.30	0.024	0.023	0.012	0.019	<0.0075	<0.0030	<0.0019
SR-11C	07/24/95	0.30	0.033	0.027	0.011	0.013	0.0075	0.00077	0.011
SR-13A	07/24/95	0.30	0.068	0.019	0.007	0.0078	0.0021	<0.00057	0.011
SR-13B	07/24/95	0.30	0.013	0.0077	0.0034	0.0017	<0.0013	<0.00051	0.003
SR-13C	07/24/95	0.30	0.250	0.120	0.039	0.110	0.028	<0.0032	0.036

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

Table 5

Sediment Sample PAH Analysis Summary
Phase III Sediment Sampling
Weyerhaeuser Everett Former Mill E/Koppers Facility

Compounds	Number Detected	Concentration (mg/kg)		Detection Limits (mg/kg)	
		Maximum	Minimum	Maximum	Minimum
Acenaphthene	5	0.320	0.0066	0.051	0.0071
Anthracene	12	0.068	0.0024	NA	NA
Benzo(a)anthracene	12	0.880	0.002	NA	NA
Benzo(a)pyrene	11	0.110	0.0017	NA	0.0023
Benzo(b)fluoranthene	12	0.120	0.0077	NA	NA
Benzo(g,h,i)perylene	3	0.0075	0.00077	0.0041	0.00051
Benzo(k)fluoranthene	12	0.039	0.0034	NA	NA
Chrysene	12	0.250	0.013	NA	NA
Dibenzo(a,h)anthracene	3	0.028	0.0021	0.010	0.0013
Fluoranthene	12	0.440	0.013	NA	NA
Fluorene	12	0.130	0.0041	NA	NA
Indeno(1,2,3-cd)pyrene	6	0.036	0.003	0.0026	0.0019
Naphthalene	3	0.250	0.0053	0.026	0.0032
Pyrene	12	0.280	0.019	NA	NA

NOTE: NA = not applicable.

Table 6

Sediment Sample Arsenic Results
Phase III Sediment Sampling
Weyerhaeuser Everett
Former Mill E/Koppers Facility

SITE	DATE	DEPTH (ft)	Arsenic (mg/kg)
SR-01A	07/24/95	0.30	47.2
SR-01B	07/24/95	0.30	66.5
SR-01C	07/24/95	0.30	91.8
SR-05A	07/25/95	0.30	33.9
SR-05B	07/25/95	0.30	84.5
SR-05C	07/25/95	0.30	20.0

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

Table 7

Sediment Sample PAH Results - mg/kg TOC
Phase III Sediment Sampling
Weyerhaeuser Everett
Former Mill E/Koppers Facility

SITE	TOC	DATE	DEPTH (ft)	Naphthalene (in mg/kg TOC)	Acenaphthene (in mg/kg TOC)	Fluorene (in mg/kg TOC)	Anthracene (in mg/kg TOC)	Fluoranthene (in mg/kg TOC)	Pyrene (in mg/kg TOC)	Benzo(a) anthracene (in mg/kg TOC)
SR-07A	2.4	07/25/95	0.30	4.08	5.83	4.04	0.460	3.13	2.63	0.630
SR-07B	2.9	07/25/95	0.30	8.62	10.7	4.48	0.860	6.21	4.97	1.38
SR-07C	2.8	07/25/95	0.30	<0.820	<1.61	0.390	0.610	3.93	2.86	1.71
SR-10A	3.0	07/25/95	0.30	<0.920	4.80	0.250	0.920	7.20	6.60	1.56
SR-10B	3.0	07/25/95	0.30	<0.670	10.7	1.07	1.27	5.33	3.67	29.3
SR-10C	3.4	07/25/95	0.30	<0.760	<1.50	0.470	0.590	6.59	3.82	1.06
SR-11A	2.3	07/24/95	0.30	<1.00	<2.00	0.610	1.57	13.0	10.9	3.65
SR-11B	1.3	07/24/95	0.30	<1.46	<2.85	0.390	3.62	3.92	5.00	0.150
SR-11C	1.3	07/24/95	0.30	0.410	<0.610	0.340	0.630	6.54	6.54	1.77
SR-13A	1.1	07/24/95	0.30	<0.330	<0.650	0.370	1.09	10.9	6.27	2.00
SR-13B	0.2	07/24/95	0.30	<1.600	3.30	2.15	1.20	6.50	9.50	3.95
SR-13C	1.7	07/24/95	0.30	<1.18	<2.29	0.500	4.00	25.9	16.5	7.65

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

Table 7

Sediment Sample PAH Results - mg/kg TOC
Phase III Sediment Sampling
Weyerhaeuser Everett
Former Mill E/Koppers Facility

SITE	DATE	DEPTH (ft)	Chrysene (in mg/kg TOC)	Benzo(b) fluoranthene (in mg/kg TOC)	Benzo(k) fluoranthene (in mg/kg TOC)	Benzo(a)pyrene (in mg/kg TOC)	Dibenzo(a,h) anthracene (in mg/kg TOC)	Benzo(g,h,i) perylene (in mg/kg TOC)	Indeno(1,2,3-cd)pyrene (in mg/kg TOC)
SR-07A	07/25/95	0.30	1.25	0.920	0.420	0.100	0.390	0.310	0.100
SR-07B	07/25/95	0.30	2.24	2.21	0.790	0.250	<0.330	<0.130	0.380
SR-07C	07/25/95	0.30	1.71	0.960	0.390	0.080	<0.330	0.180	<0.028
SR-10A	07/25/95	0.30	1.40	1.60	0.720	0.140	<0.360	<0.140	<0.090
SR-10B	07/25/95	0.30	2.37	1.17	0.470	0.130	<0.270	<0.110	<0.070
SR-10C	07/25/95	0.30	1.68	1.71	0.470	0.290	<0.290	<0.120	<0.080
SR-11A	07/24/95	0.30	4.35	4.09	1.61	1.83	<0.400	<0.160	1.00
SR-11B	07/24/95	0.30	1.85	1.77	0.92	1.46	<0.580	<0.230	<0.150
SR-11C	07/24/95	0.30	2.54	2.08	0.850	1.00	0.580	0.060	0.850
SR-13A	07/24/95	0.30	6.18	1.73	0.640	0.710	0.190	<0.050	1.00
SR-13B	07/24/95	0.30	6.50	3.85	1.70	0.850	<0.650	<0.260	1.50
SR-13C	07/24/95	0.30	14.7	7.06	2.29	6.47	1.65	<0.190	2.12

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

Table 8
PAH Results (mg/kg TOC) for Criteria Comparison
Phase III Sediment Sampling
Weyerhaeuser Everett Former Mill E/Koppers Facility

Sample No.	SR-07A	SR-07B	SR-07C	SR-10A	SR-10B	SR-10C	SQS	CSL
Naphthalene	4.08	8.62	0.820 U	0.920 U	0.670 U	0.760 U	99	170
Acenaphthylene	NA	NA	NA	NA	NA	NA	66	66
Acenaphthene	5.83	10.7	1.61 U	4.80	10.7	1.50 U	16	57
Fluorene	4.04	4.48	0.390	0.250	1.07	0.470	23	79
Phenanthrene	NA	NA	NA	NA	NA	NA	100	480
Anthracene	0.460	0.860	0.610	0.920	1.27	0.590	220	1200
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	38	64
LPAH	96.6	107	85.6	204	211	201	370	780
Fluoranthene	3.13	6.21	3.93	7.20	5.33	5.59	160	1200
Pyrene	2.63	4.97	2.86	5.60	3.67	3.82	1000	1400
Benzo(a)anthracene	0.630	1.38	1.71	1.56	29.3	1.06	110	270
Chrysene	1.25	2.24	1.71	1.40	2.37	1.68	110	460
Benzo(b)fluoranthene	0.920	2.21	0.960	1.60	1.17	1.71		
Benzo(k)fluoranthene	0.420	0.790	0.390	0.720	0.470	0.470		
Total benzofluoranthenes	1.34	3.00	1.35	2.32	1.64	2.18	230	450
Benzo(a)pyrene	0.100	0.250	0.080	0.140	0.130	0.290	99	210
Dibenzo(a,h)anthracene	0.390	0.330 U	0.330 U	0.360 U	0.270 U	0.290 U	12	33
Benzo(g,h,i)perylene	0.310	0.130 U	0.180	0.140 U	0.110 U	0.120 U	31	78
Indeno(1,2,3-cd)pyrene	0.100	0.380	0.028 U	0.090 U	0.070 U	0.080 U	34	88
HPAH	9.88	18.9	12.2	18.8	42.9	15.1	960	5300

Notes: SQS = Sediment Quality Standards Chemical Criteria (WAC 173-204-320)
CSL = Cleanup Screening Level Chemical Criteria (WAC 173-204-520)
LPAH calculated using highest of detected or non-detect (from Phase I samples) for "NA"
NA = not analyzed
U - the material was analyzed for but not detected at a concentration greater than the associated value. The associated value is the sample quantitation limit.

Table 8
PAH Results (mg/kg TOC) for Criteria Comparison
Phase III Sediment Sampling
Weyerhaeuser Everett Former Mill E/Koppers Facility

Sample No.	SR-11A	SR-11B	SR-11C	SR-13A	SR-13B	SR-13C	SQS	CSL
Naphthalene	1.00 U	1.46 U	0.410	0.330 U	1.60 U	1.18 U	99	170
Acenaphthylene	NA	NA	NA	NA	NA	NA	66	66
Acenaphthene	2.00 U	2.85 U	0.610 U	0.650 U	3.30	2.29	16	57
Fluorene	0.610	0.390	0.340	0.370	2.15	0.500	23	79
Phenanthrene	NA	NA	NA	NA	NA	NA	100	480
Anthracene	1.57	3.62	0.630	1.09	1.20	4.00	220	1200
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	38	64
LPAH	219	222	216	139	145	145	370	780
Fluoranthene	13.0	3.92	6.54	10.9	6.50	25.9	160	1200
Pyrene	10.9	5.00	6.54	6.27	9.50	16.5	1000	1400
Benzo(a)anthracene	3.65	0.150	1.77	2.00	3.95	7.65	110	270
Chrysene	4.35	1.85	2.54	6.18	6.50	14.7	110	460
Benzo(b)fluoranthene	4.09	1.77	2.08	1.73	3.85	7.06		
Benzo(k)fluoranthene	1.61	0.920	0.850	0.640	1.70	2.29		
Total benzofluoranthenes	5.70	2.69	2.93	2.37	5.55	9.35	230	450
Benzo(a)pyrene	1.83	1.46	1.00	0.710	0.850	6.47	99	210
Dibenzo(a,h)anthracene	0.400 U	0.580 U	0.580	0.190	0.650 U	1.65	12	33
Benzo(g,h,i)perylene	0.160 U	0.230 U	0.060	0.050 U	0.260 U	0.190 U	31	78
Indeno(1,2,3-cd)pyrene	1.00	0.150 U	0.850	1.00	1.50	2.12	34	88
HPAH	41.0	16.0	22.8	29.7	35.3	84.5	960	5300

Notes: SQS = Sediment Quality Standards Chemical Criteria (WAC 173-204-320)
CSL = Cleanup Screening Level Chemical Criteria (WAC 173-204-520)
LPAH calculated using highest of detected or non-detect (from Phase I samples) for "NA"
NA = not analyzed
U - the material was analyzed for but not detected at a concentration greater than the associated value. The associated value is the sample quantitation limit.

Table 9 *Privileged and Confidential*

Arsenic Results for Criteria Comparison
Phase III Sediment Sampling
Weyerhaeuser Everett Former Mill E/Koppers Facility

Sample No.	Depth Interval (ft)	SQS (mg/kg)	CSL (mg/kg)	Arsenic (mg/kg)
SR-01A	0-0.33	57	93	47.2
SR-01B	0-0.33	57	93	66.5
SR-01C	0-0.33	57	93	91.8
SR-05A	0-0.33	57	93	33.9
SR-05B	0-0.33	57	93	84.5
SR-05C	0-0.33	57	93	20.0

Notes: SQS = Sediment Quality Standards Chemical Criteria (WAC 173-204-320)
CSL = Cleanup Screening Level Chemical Criteria (WAC 173-204-520)

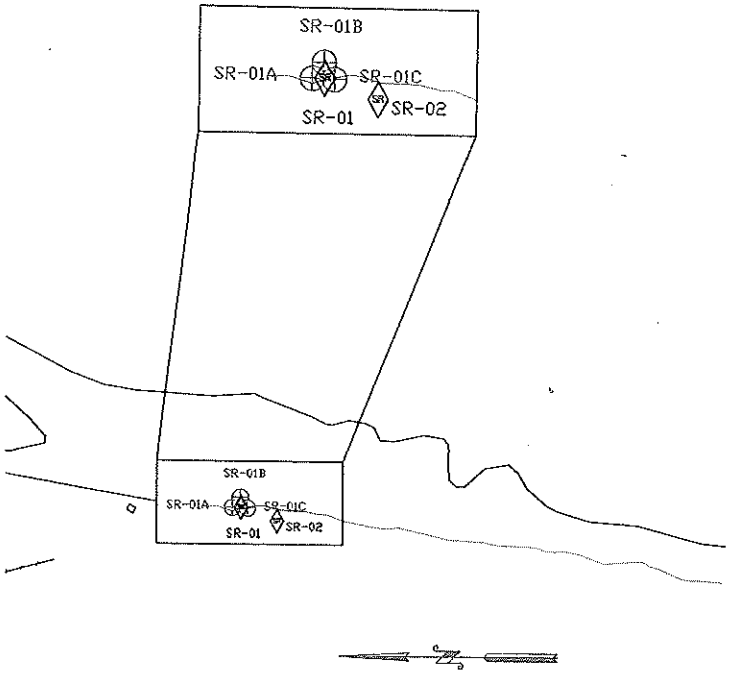
DRAWINGS

VILEGED AND CONFIDENTIAL

Legend

SR-13 ◈ Phase I Snohomish River Sediment Sample

SR-13A ⊕ Phase III Sediment Sample Location



SCALE: 1"=100'

0 100 200

FEET

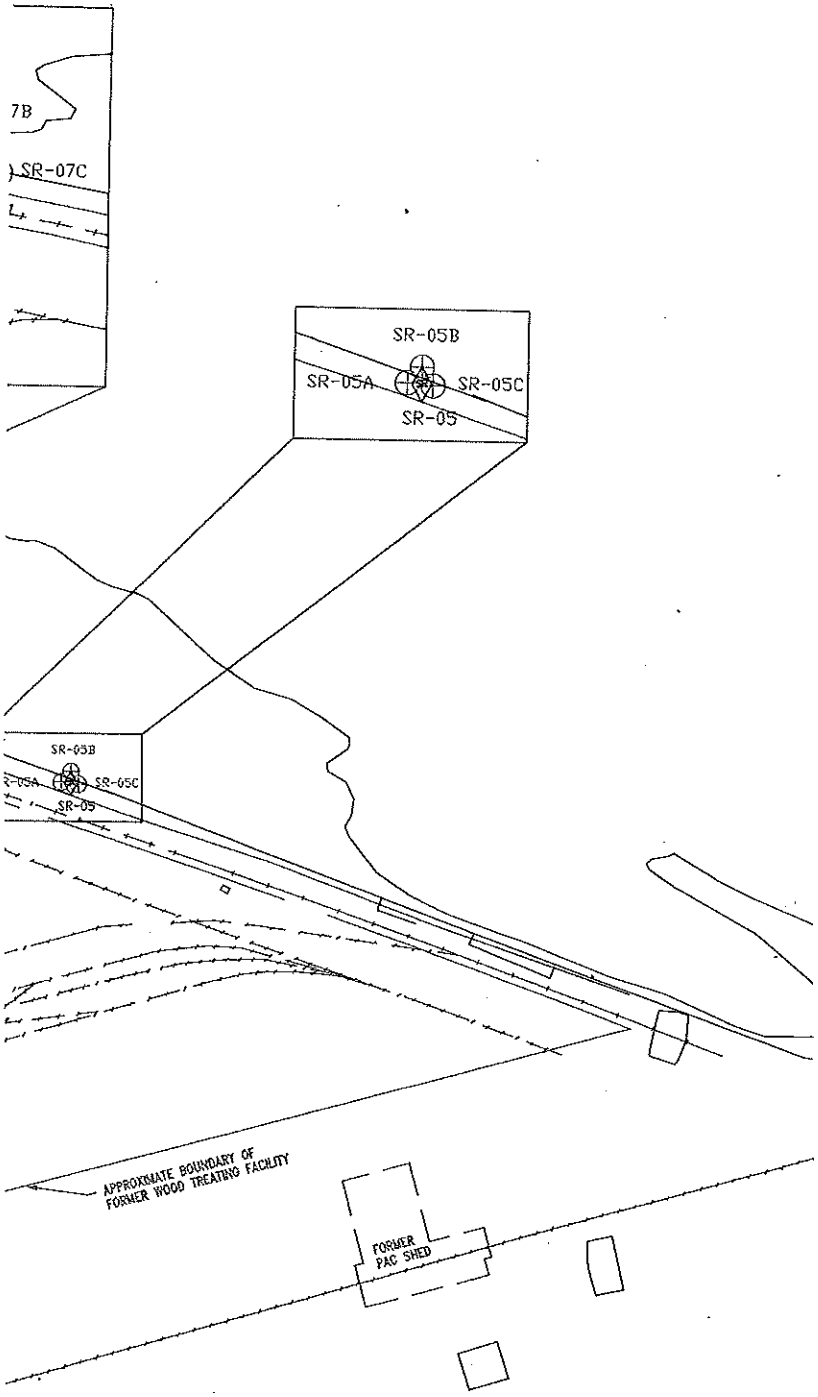
WEYERHAEUSER FORMER MILL E/KOPPERS FACILITY
EVERETT, WASHINGTON

PHASE III SEDIMENT SAMPLING LOCATIONS

DRAWING NO 1

PROJECT NO 40141-037.078

PRI



B

A

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

DATE OF ISSUE DWN BY CHK BY
DES BY APP BY

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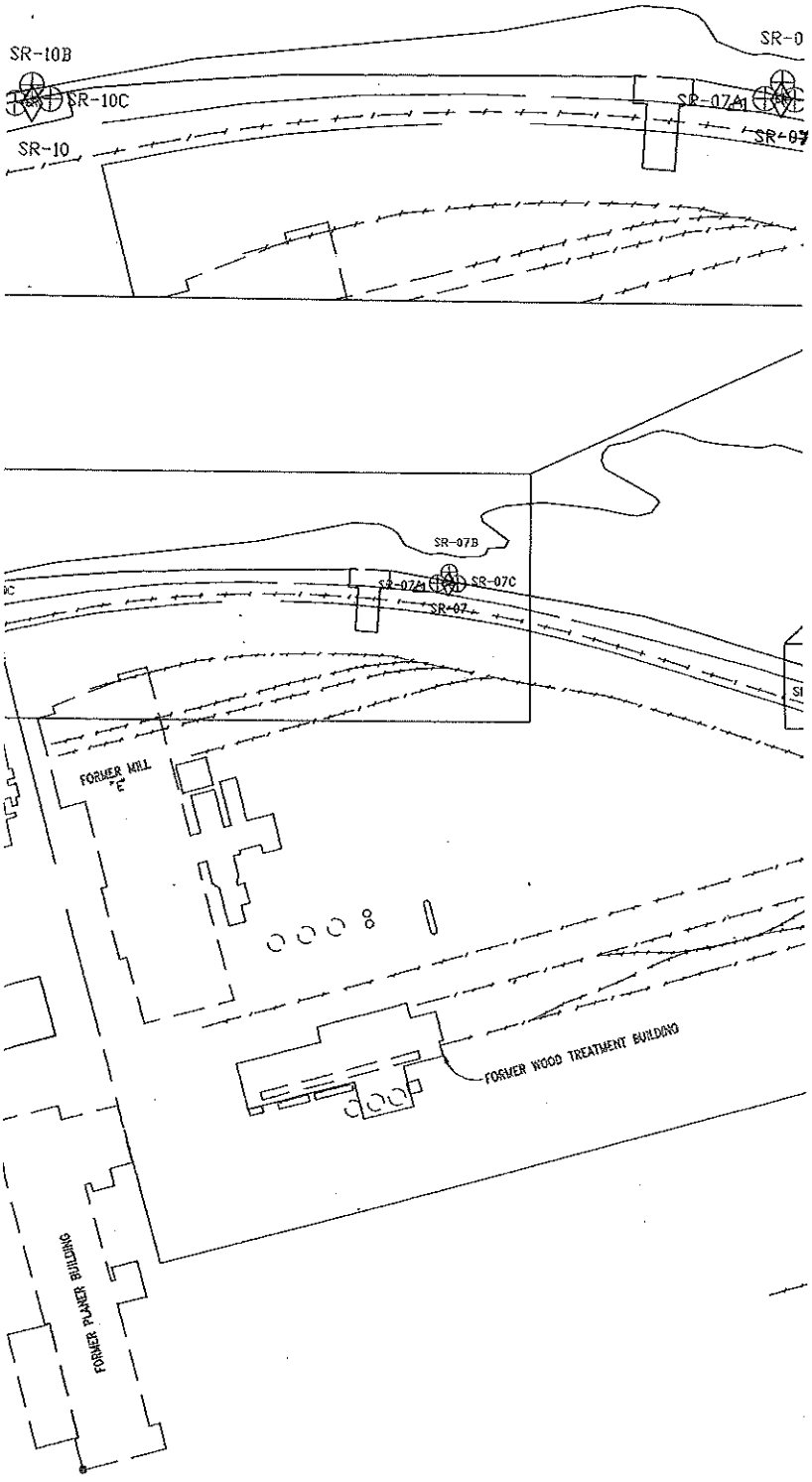
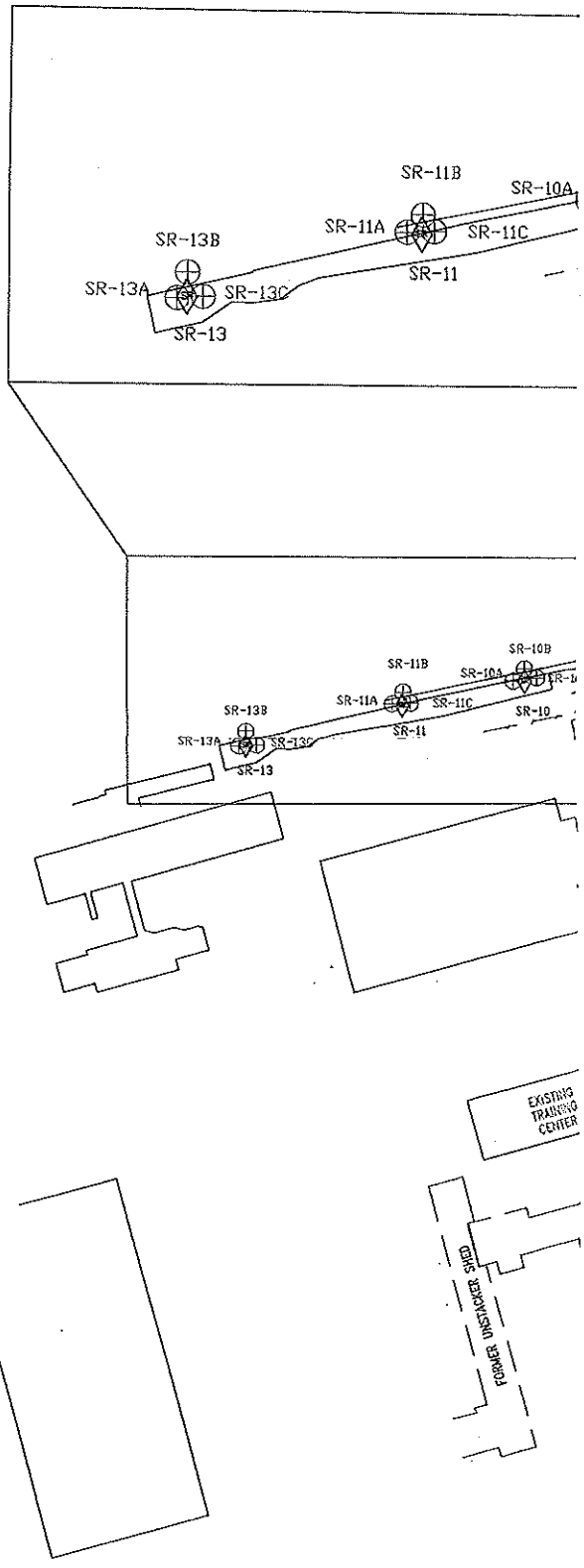
Northwest, In


SR-10B
SR-10C
SR-10
SR-0
SR-07A1
SR-07
SR-07B
SR-07A1
SR-07C
SR-07
FORMER MILL
FORMER WOOD TREATMENT BUILDING
FORMER PLANER BUILDING



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APPENDIX A

SEDIMENT FIELD SAMPLING DATA SHEETS

EMCON Northwest, Inc.

Sediment Field Sampling Data

Station No.: SR-01 A Date: 7/24/95

Coordinates: North at 10 ft downstream from trench w/ outfall Water depth: ∅ ft
East

Time: 12:35 Weather:
Replicate No.: Sampler type: SS spoon

Penetration depth: ____ cm Sample depth: 0-10 cm

Sediment Characteristics

Texture: (Smooth) / (Fine) / Coarse
Grain size: fines
Color: lt gray to black
Redox layer: Yes / (No) Depth of Redox potential discontinuity layer: ____ cm
Odors: garbage (not from sediment)
Vertical profile: 0-10 : cm/brown/black fines with fine sand, orange mottling

Biological Structures

Type: roots/plant-like
Amount: 10-25 (percent)

Debris

Type: large angular cobble on surface
Amount: ____ (percent)

Oily Sheen

Type: none
Amount: ____ (percent)

Sample Quality

Leakage:
Winnowing:
Disturbance:

Additional comments: collected from surface w/ spoon, depth (elevation) equal → bottom of trench for outfall

Sampler's name: [signature] Date: 7/24/95

EMCON Northwest, Inc.

Sediment Field Sampling Data

Station No.: SR-01B Date: 7/24/95

Coordinates: North E 10 ft offshore from Water depth: 1.2 ft
East "shoreline" *

Time: 13:10 Weather:
Replicate No.: Sampler type: 2" butyl tubing, 2 grabs per replicate

Penetration depth: 12-23 cm (① / replicate 2) Sample depth: 0-10 cm

Sediment Characteristics

Texture: Smooth / Fine / Coarse
Grain size: fines
Color: lt grey to black
Redox layer: Yes / No Depth of Redox potential discontinuity layer: cm
Odors:
Vertical profile: 0-10 cm grey/brown/black fines with few med to coarse sand, mottled

Biological Structures

Type: root
Amount: 5-10 (percent)

Debris

Type: none
Amount: (percent)

Oily Sheen

Type: none
Amount: (percent)

Sample Quality

Leakage: —
Winnowing: —
Disturbance: —

Additional comments: * shoreline is used here as location where outfall trench opens onto river

Sampler's name: Date: 7/24/95

EMCON Northwest, Inc.

Sediment Field Sampling Data

Station No.: SR-01C Date: 7/24/95

Coordinates: North 10' upstream from SR-01 Water depth: 0 ft
East

Time: 1245 Weather:
Replicate No.: Sampler type: SS spoon

Penetration depth: 10 cm Sample depth: 0-10 cm

Sediment Characteristics

Texture: Smooth / (Fine) / Coarse
Grain size: Fine w/ few gravel
Color: Gray to black
Redox layer: Yes / (No) Depth of Redox potential discontinuity layer: cm
Odors:
Vertical profile: 0-10 cm light green / brown / black fines with few fine sand, few angular gravel, orange mottling

Biological Structures

Type: peat-like
Amount: 5-15% (percent)

Debris

Type: angular cobble
Amount: (percent)

Oily Sheen

Type: none
Amount: (percent)

Sample Quality

Leakage:
Winnowing:
Disturbance:

Additional comments: Collected from ~ 10' upstream from outfall, depth (elevation) equal to outfall trench bottom

Sampler's name: Date: 7/24/95

EMCON Northwest, Inc

Sediment Field Sampling Data

Station No.: SR-05A Date: 7/25/95

Coordinates: North 10 ft downstream from SR-05 Water depth: 0.8 ft
East

Time: 0720 Weather:
Replicate No.: Sampler type: 2" butyl acrylate - 2 replicates

Penetration depth: 16 (1) 22 (2) cm Sample depth: 0-10 cm

Sediment Characteristics

Texture: (Smooth) / Fine / Coarse
Grain size: fines
Color: lt grey / brown / black
Redox layer: Yes / (No) Depth of Redox potential discontinuity layer: cm
Odors: none
Vertical profile: 0-2.5 lt grey / orange fines with few fine sand, few gravel
2.5-10 grey/black fines with few fine sand, few gravel

Biological Structures

Type: none observed
Amount: (percent)

Debris

Type: wood and metal on surface
Amount: (percent)

Oily Sheen

Type:
Amount: (percent)

Sample Quality

Leakage: -
Winnowing: -
Disturbance: -

Additional comments: collected in-line with bulkhead pilings

Sampler's name: Date: 7/25/95

EMCON Northwest, Inc

Sediment Field Sampling Data

Station No.: SR-05B Date: 7/25/95

Coordinates: North 10 ft east from Water depth: 1.4 ft
East SR-05

Time: 0745 Weather:
Replicate No.: Sampler type: 2" tubing, 2 replicates

Penetration depth: 7, 20 cm (1) (2) Sample depth: 0-10 cm

Sediment Characteristics

Texture: (Smooth) / Fine / Coarse
Grain size: fines w/ few fine sand
Color: brown
Redox layer: (Yes) / No Depth of Redox potential discontinuity layer: ~11 cm cm
Odors: H_2S
Vertical profile: 0-7 cm brown, loose fines with few sand
7-10 cm brown grading to black, loose grading to dense, fines with few fine sand

Biological Structures

Type: none observed
Amount: (percent)

Debris

Type: few sticks, branches
Amount: (percent)

Oily Sheen

Type: oil droplet observed
Amount: (percent)

Sample Quality

Leakage:
Winnowing: —
Disturbance: —

Additional comments:

Sampler's name: Date: 7/25/95

EMCON Northwest, Inc.

Sediment Field Sampling Data

Station No.: SR-05C Date: 07/25/95

Coordinates: North 10 ft upstream SL-05 Water depth: 0 ft
East

Time: 07:55 Weather:
Replicate No.: Sampler type: SS spoon

Penetration depth: cm Sample depth: 0-10 cm

Sediment Characteristics

Texture: Smooth / (Fine) / Coarse
Grain size: fines w/ few sand
Color: lt gray / brown / black
Redox layer: Yes (No) Depth of Redox potential discontinuity layer: cm
Odors: none
Vertical profile: 0-10 cm mixed mottling w/ lt gray, brown, black, orange fines, few fine sand

Biological Structures

Type: none observed
Amount: (percent)

Debris

Type: wood, few cobble on surface in area
Amount: (percent)

Oily Sheen

Type: none observed
Amount: (percent)

Sample Quality

Leakage: NA
Winnowing: ↓
Disturbance:

Additional comments:

Sampler's name: Date: 7/25/95

EMCON Northwest, Inc.

Sediment Field Sampling Data

Station No.: SR-07A Date: 7/25/95

Coordinates: North 10 ft downstream SR-07 Water depth: Ø ft
East

Time: 1115 Weather:
Replicate No.: Sampler type: SS spoon

Penetration depth: cm Sample depth: 0-10 cm

Sediment Characteristics

Texture: (Smooth) (Fine) Coarse
Grain size: fine
Color: black
Redox layer: (Yes) No Depth of Redox potential discontinuity layer: 1.5 cm
Odors: creosote
Vertical profile: 0-1.5 brown loose fine w/ few fine sand
1.5-10 black dense fine w/ few to some fine sand

Biological Structures

Type: —
Amount: (percent)

Debris

Type: —
Amount: (percent)

Oily Sheen

Type:
Amount: (percent)

Sample Quality

Leakage:
Winnowing:
Disturbance:

Additional comments: Field Duplicate SR-07D
Time = 1300. sheen = seep water

Sampler's name: Date: 7/25/95

EMCON Northwest, Inc.

Sediment Field Sampling Data

Station No.: SR-07B Date: 7/25/95

Coordinates: North 10' out in channel from SR-07 Water depth: Ø ft
East

Time: 1135 Weather:
Replicate No.: Sampler type: SS spoon

Penetration depth: cm Sample depth: 10 cm

Sediment Characteristics

Texture: Smooth / (Fine) / Coarse
Grain size: fines
Color: brown / black
Redox. layer: (Yes) / No Depth of Redox potential discontinuity layer: 1.5 cm
Odors:
Vertical profile: 0-1.5 loose brown fines
1.5-10 dense black fines

Biological Structures

Type: —
Amount: (percent)

Debris

Type: —
Amount: (percent)

Oily Sheen

Type: —
Amount: (percent)

Sample Quality

Leakage: NA
Winnowing:
Disturbance:

Additional comments:

Sampler's name: Date: 7/25/95

EMCON Northwest, Inc

Sediment Field Sampling Data

Station No.: SR-07C Date: 7/25/95

Coordinates: North 10 ft upstream from Water depth: Ø ft
East SR07 stake

Time: 11:25 Weather:
Replicate No.: Sampler type: SS Spoon

Penetration depth: cm Sample depth: 0-10 cm

Sediment Characteristics

Texture: (Smooth) (Fine) Coarse
Grain size: fines
Color: brown / black
Redox. layer: (Yes) No Depth of Redox potential discontinuity layer: 1.0 cm
Odors: — none noted
Vertical profile: 0-1 cm loose brown fines
1-10 gradings consolidation to dense, black fines

Biological Structures

Type: —
Amount: (percent)

Debris

Type: —
Amount: (percent)

Oily Sheen

Type: —
Amount: (percent)

Sample Quality

Leakage: NA
Winnowing:
Disturbance:

Additional comments:

Sampler's name: Date: 7/25/95

EMCON Northwest, Inc.

Sediment Field Sampling Data

Station No.: SR-10A Date: 07/25/95

Coordinates: North 10' downstream SR-10 Water depth: 0 ft
East

Time: 10.15 Weather: clear, sunny
Replicate No.: Sampler type: SS spoon

Penetration depth: cm Sample depth: 0-10 cm

Sediment Characteristics

Texture: Smooth / Fine / Coarse
Grain size: fines w/ trace sand
Color: brown/ gray black
Redox layer: Yes / No Depth of Redox potential discontinuity layer: 10 cm
Odors: creosote odor
Vertical profile: 0-1.5 loose brown fine, trace sand
1.5-10 gray/black fine with some sand, some angular gravel

Biological Structures

Type: —
Amount: (percent)

Debris

Type: wood chips (few)
Amount: (percent)

Oily Sheen

Type: on water from disturbed sediment
Amount: (percent)

Sample Quality

Leakage: NA
Winnowing:
Disturbance:

Additional comments: taken from between pilings for bulkhead

Sampler's name: Date: 7/25/95

EMCON Northwest, Inc.

Sediment Field Sampling Data

Station No.: SR-10B Date: 7/25/95

Coordinates: North 10 ft from shore in channel
East

Water depth: 2.6 ft

Time: 10.55 Weather:

Replicate No.: Sampler type: 2" tubing, 2 replicates

Penetration depth: 12-26 cm (1) (2) Sample depth: 0-10 cm

Sediment Characteristics

Texture: Smooth / Fine / Coarse

Grain size: fines w/ some fine to med sand

Color: brown/black

Redox layer: Yes / No Depth of Redox potential discontinuity layer: ~6 cm cm

Odors: H_2S, creosote

Vertical profile: 0-5 cm brown/loose silty sand
5-10 cm black, dense sandy silt

Biological Structures

Type: none

Amount: (percent)

Debris

Type: none observed

Amount: (percent)

Oily Sheen

Type: droplet like sheen spots - few

Amount: (percent)

Sample Quality

Leakage:

Winnowing:

Disturbance:

Additional comments: creosote odor, sheen "bubbles up" when collecting cores

Sampler's name: Date: 7/25/95

EMCON Northwest, Inc.

Sediment Field Sampling Data

Station No.: SR-10C Date: 07/25/95

Coordinates: North 10' upstream SR-10 Water depth: Ø ft
East

Time: 16.25 Weather:
Replicate No.: Sampler type: SS spoon

Penetration depth: cm Sample depth: 10 cm

Sediment Characteristics

Texture: (Smooth) (Fine) Coarse
Grain size: fines
Color: brown top, black
Redox layer: (Yes) No Depth of Redox potential discontinuity layer: 1.5 cm
Odors: —
Vertical profile: 0 - 1.5 brown loose silt
1.5 - 10 black fines with few sand

Biological Structures

Type:
Amount: (percent)

Debris

Type: wood chips, branches on surface in sample
Amount: (percent)

Oily Sheen

Type: none observed
Amount: (percent)

Sample Quality

Leakage: —
Winnowing: —
Disturbance: —

Additional comments:

Sampler's name: Date: 7/25/95

EMCON Northwest, Inc

Sediment Field Sampling Data

Station No.: SR-11A Date: 7/24/95

Coordinates: North 10.8 ft downstream from Water depth: 0 ft
East SR-11A stake

Time: 1030 Weather:
Replicate No.: Sampler type: SS spoon

Penetration depth: 10 cm Sample depth: 0-10 cm

Sediment Characteristics

Texture: (Smooth) / Fine / Coarse
Grain size: silt w/ fine sand
Color: brown w/ black
Redox layer: (Yes) / No Depth of Redox potential discontinuity layer: 1.0 cm
Odors:
Vertical profile: 0-1 cm brown mud sand with some fines
1-10 cm gray black fines with few sand, few gravel

Biological Structures

Type: 1 polychaete
Amount: (percent)

Debris

Type: —
Amount: (percent)

Oily Sheen

Type: —
Amount: (percent)

Sample Quality

Leakage: NA
Winnowing:
Disturbance: ✓

Additional comments: collected sample between bulkhead timbers/pilings

Sampler's name: Date: 7/24/95

EMCON Northwest, Inc.

Sediment Field Sampling Data

Station No.: SR-11 B Date: 7/24/95

Coordinates: North 10' east from SR-11 Water depth: 3.6 ft
East in channel

Time: 11:15 Weather:
Replicate No.: Sampler type: butyl acrylate tubing - 2 replicates

Penetration depth: 15-25 cm Sample depth: 0-10 cm
① ②

Sediment Characteristics

Texture: Smooth / Fine / Coarse
Grain size: fine sand w/ silt & clay
Color: brown / grey
Redox layer: (Yes) / No Depth of Redox potential discontinuity layer: 1.5 cm
Odors: hydrocarbon - like / creosote in lower sections of cores
Vertical profile: 0-1.5 brown mud - coarse sand w/ some fines
1.5-10 grey blotchy silts / clays

Biological Structures Type: none observed
Amount: (percent)

Debris Type: wood chips
Amount: <1 (percent)

Oily Sheen Type: small sheen-like droplets (few)
Amount: (percent)

Sample Quality

Leakage: none
Winnowing: none
Disturbance: none

Additional comments:

Sampler's name: Date: 7/24/95

EMCON Northwest, Inc

Sediment Field Sampling Data

Station No.: SR-11C Date: 7/24/95

Coordinates: North 10' upstream from SR-11, Water depth: 0.8 ft
East between bulkhead pilings

Time: 11:40 Weather:
Replicate No.: Sampler type: 2" butyl acrylate 2 replicates

Penetration depth: 14-32 cm Sample depth: 0-10 cm

Sediment Characteristics

Texture: (Smooth) / Fine / (Coarse)
Grain size: mud-coarse sand with rocks
Color: black, grey
Redox layer: (Yes) / No Depth of Redox potential discontinuity layer: ~4 cm
Odors:
Vertical profile: 0-1.5 brown silty sand
1.5-10 grey/black sand silt / silty sand
fine sand w/ depth

Biological Structures

Type: —
Amount: (percent)

Debris

Type: —
Amount: (percent)

Oily Sheen

Type: —
Amount: (percent)

Sample Quality

Leakage: —
Winnowing: —
Disturbance: —

Additional comments: collected 10' upstream between bulkhead pilings using 2" corer - tide incoming

Sampler's name: Date: 7/24/95

EMCON Northwest, Inc

Sediment Field Sampling Data

Station No.: SR-13A Date: 7/24/95

Coordinates: North 10' downstream of stake SR-13 Water depth: -0 ft
East

Time: 09.45 Weather: overcast
Replicate No.: 01 Sampler type: ~~Ekman~~ scraper w/spoon

Penetration depth: 10 cm Sample depth: 0-10 cm

Sediment Characteristics

Texture: (Smooth) (Fine) Coarse
Grain size: sand
Color: dark grey
Redox layer: (Yes) No Depth of Redox potential discontinuity layer: 2 cm
Odors: none
Vertical profile: 0-2 cm brown medium sand with few silt, some cobble
2-4 cm dark grey/black medium sand, few fines, cobble
4-10 cm brown medium sand, few fines, cobble

Biological Structures

Type: none observed
Amount: (percent)

Debris

Type: asphalt, wood, bricks
Amount: 5-40% depending on area* (percent)

Oily Sheen

Type: none observed
Amount: (percent)

Sample Quality

Leakage: N/A
Winnowing: ✓
Disturbance:

Additional comments: * asphalt, wood, and brick were present in area, sample collected from open area w/out these

Sampler's name: [signature] Date: 7/24/95

EMCON Northwest, Inc

Sediment Field Sampling Data

Station No.: SR-13B Date: 7/24/95

Coordinates: North 10 east of SR-13 Water depth: Ø ft
East

Time: 10:10 Weather:
Replicate No.: Sampler type: SS spoon

Penetration depth: 10 cm Sample depth: 0-10 cm

Sediment Characteristics

Texture: (Smooth) / Fine / Coarse
Grain size: coarse sand
Color: brown
Redox layer: Yes / (No) Depth of Redox potential discontinuity layer: cm
Odors: none
Vertical profile: 0-10 cm brown medium to coarse sand with few fines, few rounded to medium gravel

Biological Structures

Type: none
Amount: (percent)

Debris

Type: —
Amount: (percent)

Oily Sheen

Type: none observed
Amount: (percent)

Sample Quality

Leakage: NA
Winnowing:
Disturbance:

Additional comments:

Sampler's name: Date: 7/24/95

EMCON Northwest, Inc.

Sediment Field Sampling Data

Station No.: SR-13C Date: 7/24/95

Coordinates: North 10' upstream SR-13 Water depth: — ft
East

Time: 10:00 Weather: Overcast
Replicate No.: Sampler type: Scoop w/ spoon

Penetration depth: 10 cm Sample depth: 0-10 cm

Sediment Characteristics

Texture: (Smooth) / Fine / Coarse
Grain size: fine sand
Color: grey / black
Redox. layer: (Yes) / No Depth of Redox potential discontinuity layer: 0.5 cm
Odors: none
Vertical profile: 0-0.5cm brown silty sand
0.5-10 brown/grey/black mottled silty fine sand, few rounded medium gravel

Biological Structures

Type: —
Amount: (percent)

Debris

Type: —
Amount: (percent)

Oily Sheen

Type: —
Amount: (percent)

Sample Quality

Leakage: NA
Winnowing:
Disturbance: V

Additional comments: some asphalt, wood, and brick debris in general area of sample, none included in sample

Sampler's name: Date: 7/24/95

APPENDIX B

LABORATORY REPORTS AND DATA VALIDATION REPORT

Weyerhaeuser

32901 Weyerhaeuser Way South
Federal Way, Washington 98003
Analytical Chemistry Laboratories
Tacoma, Washington 98477
Tel (206) 924 6872
Fax (206) 924 6654

8/22/95

Mr. John Virgin
EMCON NW
18912 North Creek Parkway
Suite 100
Bothell, Washington 98011

Dear Mr. Virgin:

Subject: SR# 18532 Everett Koppers Sediment EMCON 40141-037.078

The final data package for service request 18532 is attached. Analyses were performed for TOC, salinity, grain size, arsenic and PAH.

Thank you for the opportunity to be of service. Please call me at (206)924-6521 if you require any additional information.

Sincerely,

Richard Bogar

Richard Bogar
Chromatography Team Leader
Weyerhaeuser Analytical and Testing Services

Attachments

An ___ stin ___ vice ___

Weyerhaeuser

Chain of Custody/Laboratory Analysis Request

629 Weyerhaeuser Way South
Federal Way, Washington 98003
Analytical Chemistry Laboratories
Tacoma, Washington 98477
Tel (206) 924 6148
Tel (206) 924 6242
Fax (206) 924 6654

Date 7/25/95 Page 1 of 2

Project Weyco Everett - Kappers # 40141-037.078
Send Report To John Virgin / ENCON
Address Bothell
Telephone # 485-5000
Samplers Name John Virgin Phone # 485-5000
Samplers Signature [signature] ext 299

Sample I.D.	Date/Time	Matrix*	Comp	Grab	Number of Containers	Base/Neu/Add/Organics GC/MS 625/8270	Volatile Organics GC/MS 624/8240	BTEX PAH-8310	Herbicide 8150 TOC	Fuel Finger Printing MOD-8015/8020 Salinity	Pesticides/PCB 608/8080 Grain Size	Dioxin – Total, OR 2,3,7,8, TCDD, TCDF	Total Petroleum Hydrocarbons – 418.1	Total Organic Halides (TOX) 415/9060	Total Organic Carbon (TOC) 415/9060	Metals (total or dissolved) List Below	Cyanide	Ph, Cond, Cl, So4, P-ortho, F, Br, NO3, NO2, (circle)	NH3-N, COD, Total-P, TKN (circle)	TCLP – Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag	TCLP – VOA, BNA (CIRCLE)	TCLP – PCB, PEST, HERB (circle)	Drinking Water
SR-07B	7/25/1135	S		G	2			X	X	X	X			A	B C	E							
SR-07A	7/25/1115	S		X	2			X	X	X	X												
SR-07C	7/25/1125	S		X	2			X	X	X	X												
SR-07D	7/25/1300	S		X	2			X	X	X	X												
SR-10B	7/25/1055	S		X	2			X	X	X	X												
SR-10A	7/25/1015	S		X	2			X	X	X	X												
SR-10C	7/25/1025	S		X	2			X	X	X	X												
SR-11B	7/24/1115	S		X	2			X	X	X	X												
SR-11A	7/24/1030	S		X	2			X	X	X	X												
SR-11C	7/24/1140	S		X	2			X	X	X	X				V								

Sample Transfer Record

RELINQUISHED BY (PRINT)	John Virgin	RECEIVED BY (PRINT)
SIGNATURE	[signature]	SIGNATURE
FIRM	ENCON	FIRM
DATE/TIME	7/25/95 12:40	DATE/TIME
RELINQUISHED BY (PRINT)		RECEIVED BY (PRINT) Carole J Lee
SIGNATURE		SIGNATURE Carole J Lee
FIRM		FIRM Weyco-SMD
DATE/TIME		DATE/TIME 7/26/95 0900

Invoice Information

P.O. NUMBER
RESULTS TO

Project Information

MILL/SITE CONTRACT
PHONE

Sample Receipt

SHIPPED VIA
SEALS INTACT TEMP
CONDITION

Special Instruction/Comments

SR Number

*Matrix: W – Water (S – Soil) SL – Sludge O – Oil X – Other, Specify Type Sediment

Preservation: ☒ 4°C ☐ Freeze ☐ Ambient ☐ Other

FS – 2000 (7/93), Printing Services TP-1 Tacoma

Analytical Testing Services

Weyerhaeuser

Chain of Custody/Laboratory Analysis Request

3290 Weyerhaeuser Way South
Federal Way, Washington 98003
Analytical Chemistry Laboratories
Tacoma, Washington 98477
Tel (206) 924 6148
Tel (206) 924 6242
Fax (206) 924 6654

Date 7/25/95 Page 2 of 2

Project Weyco Everett - Kappa #90141-037.078
Send Report To John Virgin - ENCON
Address BOTHELL
Telephone # 485-5000
Samplers Name John Virgin Phone # 485-5000
Samplers Signature [signature] ext 299

Sample I.D.	Date/Time	Matrix*	Comp	Grab	Number of Containers	Organic Analysis: Base/Neu/Acid Organics GC/MS 625/8270	Volatile Organics GC/MS 624/8240	EPH-8310	Herbicide-8150	TOC	Fuel Finger Printing (Grain Size)	Pesticides/PCBs 608/8080 (Salinity)	Dioxin – Total, OR 2,3,7,8, TCDD, TCDF	Total Petroleum Hydrocarbons – 418.1	Total Organic Halides (TOX) 415/9060	Total Organic Carbon (TOC) 415/9060	Metals (total or dissolved) list Below (Arsenic)	Inorganic Analysis: Cyanide	Ph, Cond, Cl, So4, P-ortho, F, Br, NO2, NO3, (circle)	NH3-N, COD, Total-P, TKN (circle)	TCLP – Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag	TCLP – VOA, BNA (CIRCLE)	TCLP – PCB, PEST, HERB (circle)	Other: Drinking Water
SR-13B	7/24/1010	S		X	2			X	X		X	X								A B				
SR-13C	7/24/1000	S		X	2			X	X		X	X												
SR-13A	7/24/0945	S		X	2			X	X		X	X												
SR-05C	7/25/0755	S		X	2						X	X					X			A B	D			
SR-05B	7/25/0745	S		X	2						X	X					X							
SR-05A	7/25/0720	S		X	2						X	X					X							
SR-01C	7/24/1245	S		X	2						X	X					X							
SR-01A	7/24/1235	S		X	2						X	X					X							
SR-01B	7/24/1310	S		X	2						X	X					X							

Sample Transfer Record

RELINQUISHED BY (PRINT)	RECEIVED BY (PRINT)
John Virgin	
SIGNATURE [signature]	SIGNATURE
FIRM ENCON	FIRM
DATE/TIME 7/25/95 1240	DATE/TIME
RELINQUISHED BY (PRINT)	RECEIVED BY (PRINT) Carole J Lee
SIGNATURE	SIGNATURE Carole J Lee
FIRM	FIRM Weyco-SNP
DATE/TIME	DATE/TIME 7/26/95 0800

Invoice Information

P.O. NUMBER
RESULTS TO

Project Information

MILL/SITE CONTRACT
PHONE

Sample Receipt

SHIPPED VIA
SEALS INTACT TEMP
CONDITION

Special Instruction/Comments
*Also rec'd plastic bag of sample 13A in addition to the 2 jars. Pb 7/26/95

SR Number

*Matrix: W – Water (S – Soil) SL – Sludge O – Oil X – Other, Specify Type sediment

Preservation: (4°C) Freeze Ambient Other

Printing Services TP-1 Tacoma

Request 18532

WEYERHAEUSER TECHNOLOGY CENTER
Analytical Chemistry Laboratories
Tacoma, Washington

REPORT

Everett Supplemental Sediment Sampling

Sample Designation	Analytical Lab Code	105°C Solids (wt %)	Salinity Pore Water	TOC (wt %)
SR-01A 07/24/95 1235	50734	50.8	12	-
SR-01B 07/24/95 1310	50735	59.8	10	-
SR-01C 07/24/95 1245	50736	53.6	12	-
SR-05A 07/25/95 0720	50737	51.8	11	-
SR-05B 07/25/95 0745	50738	51.6	10	-
SR-05C 07/25/95 0755	50739	54.9	12	-
SR-07A 07/25/95 1115	50740	53.9	9.1	2.4
SR-07B 07/25/95 1135	50741	52.8	12	2.9
SR-07C 07/25/95 1125	50742	55.4	13	2.8
SR-07D 07/25/95 1300	50743	54.8	9.1	2.5
SR-10A 07/25/95 1015	50744	55.5	14	3.0
SR-10B 07/25/95 1055	50745	62.5	4.8	3.0
SR-10C 07/25/95 1025	50746	49.3	13	3.4
SR-11A 07/24/95 1030	50747	54.5	12	2.3
SR-11B 07/24/95 1115	50748	67.7	12	1.3
SR-11C 07/24/95 1140	50749	67.9	8.0	1.3
SR-13A 07/24/95 0945	50750	75.5	11	1.1
SR-13B 07/24/95 1010	50751	84.2	*	0.2
SR-13C 07/24/95 1000	50752	63.8	10	1.7
	Quantitation Limit	-	2	-
	Method Number:	-	-	EPA 415.1

no - PSEP protocol per marine plants JV

* Note: Soil was very sandy with no removable pore water.

Approved Marina Ponte Date 8/21/95

Weyerhaeuser Company
Analytical Laboratories
Particle Size - PSEP
Report

Service Request 18532

Sample / Lab Code	SR-01A 07/24/95 1235 50734		SR-01B 07/24/95 1310 50735		SR-01C 07/24/95 1245 50736		SR-05A 07/25/95 0720 50737	
Phi Size	Fraction (Wt %)	Cumulative (Wt %)	Fraction (Wt %)	Cumulative (Wt %)	Fraction (Wt %)	Cumulative (Wt %)	Fraction (Wt %)	Cumulative (Wt %)
> -2.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	3.0
Total Gravel	0.0		0.0		0.0		3.0	
< -2.0 / > -1.0	0.0	0.0	2.2	2.2	0.7	0.7	0.2	3.1
< -1.0 / > 0.0	0.2	0.2	4.8	7.0	1.1	1.8	0.9	4.1
< 0.0 / > 1.0	1.0	1.2	14.2	21.2	1.7	3.4	1.5	5.5
< 1.0 / > 2.0	1.2	2.3	8.6	29.8	1.9	5.3	1.4	6.9
< 2.0 / > 3.0	3.3	5.6	9.7	39.4	3.3	8.6	3.8	10.7
< 3.0 / > 4.0	9.9	15.5	14.2	53.6	11.6	20.2	10.6	21.3
Total Sand	15.5		53.6		20.2		18.4	
< 4.0 / > 5.0	15.0	30.5	16.3	69.9	15.4	35.6	18.5	39.8
< 5.0 / > 6.0	10.6	41.1	8.4	78.3	14.3	49.9	13.8	53.6
< 6.0 / > 7.0	11.7	52.8	6.2	84.5	13.5	63.4	13.2	66.8
< 7.0 / > 8.0	12.6	65.4	4.0	88.5	10.5	73.9	9.8	76.6
Total Silt	49.9		34.8		53.7		55.3	
< 8.0 / > 9.0	11.6	77.0	2.9	91.3	7.0	81.0	7.0	83.6
< 9.0 / >10.0	8.8	85.9	1.9	93.2	4.7	85.7	4.5	88.1
< 10.0	14.1	100.0	6.8	100.0	14.3	100.0	11.9	100.0
Total Clay	34.6		11.5		26.1		23.4	

Sample / Lab Code	SR-05B 07/25/95 0745 50738		SR-05C 07/25/95 0755 50739		SR-07A 07/25/95 1115 50740	
Phi Size	Fraction (Wt %)	Cumulative (Wt %)	Fraction (Wt %)	Cumulative (Wt %)	Fraction (Wt %)	Cumulative (Wt %)
> -2.0	0.0	0.0	2.5	2.5	0.0	0.0
Total Gravel	0.0		2.5		0.0	
< -2.0 / > -1.0	0.0	0.0	0.4	2.9	0.4	0.4
< -1.0 / > 0.0	0.5	0.5	1.8	4.7	0.4	0.9
< 0.0 / > 1.0	0.6	1.2	2.1	6.8	0.4	1.2
< 1.0 / > 2.0	0.8	2.0	1.9	8.7	0.5	1.8
< 2.0 / > 3.0	5.3	7.2	4.2	13.0	3.8	5.5
< 3.0 / > 4.0	18.9	26.1	7.6	20.5	17.8	23.4
Total Sand	26.1		18.0		23.4	
< 4.0 / > 5.0	20.2	46.4	0.9	21.4	19.3	42.7
< 5.0 / > 6.0	19.1	65.5	31.2	52.5	19.3	61.9
< 6.0 / > 7.0	11.5	77.0	13.0	65.5	13.5	75.4
< 7.0 / > 8.0	6.0	83.0	9.3	74.8	7.5	82.9
Total Silt	56.9		54.3		59.6	
< 8.0 / > 9.0	3.9	86.9	8.0	82.8	4.9	87.8
< 9.0 / >10.0	2.8	89.7	5.5	88.3	2.8	90.6
< 10.0	10.3	100.0	11.7	100.0	9.4	100.0
Total Clay	17.0		25.2		17.1	

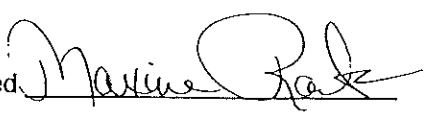
Approved _____ Date 08/21/95

Weyerhaeuser Company
Analytical Laboratories
Particle Size - PSEP
Report

Service Request 18532

Sample Lab Code	SR-07B 07/25/95 1135 50741		SR-07C 07/25/95 1125 50742		SR-07D 07/25/95 1300 50743		SR-10A 07/25/95 1015 50744	
Phi Size	Fraction (Wt %)	Cumulative (Wt %)	Fraction (Wt %)	Cumulative (Wt %)	Fraction (Wt %)	Cumulative (Wt %)	Fraction (Wt %)	Cumulative (Wt %)
> -2.0	0.0	0.0	5.0	5.0	0.0	0.0	0.0	0.0
Total Gravel	0.0		5.0		0.0		0.0	
< -2.0 / > -1.0	0.3	0.3	1.6	6.6	0.2	0.2	1.7	1.7
< -1.0 / > 0.0	0.3	0.6	1.0	7.6	0.2	0.4	2.4	4.1
< 0.0 / > 1.0	0.4	1.0	0.7	8.4	0.5	0.9	7.5	11.6
< 1.0 / > 2.0	0.5	1.4	1.1	9.4	0.5	1.5	7.4	19.0
< 2.0 / > 3.0	6.9	8.3	5.6	15.0	4.4	5.9	6.9	25.9
< 3.0 / > 4.0	19.5	27.9	17.3	32.3	16.2	22.1	16.0	41.9
Total Sand	27.9		27.3		22.1		41.9	
< 4.0 / > 5.0	19.7	47.6	23.5	55.8	25.0	47.1	13.6	55.4
< 5.0 / > 6.0	20.8	68.3	15.6	71.4	16.8	63.8	13.8	69.2
< 6.0 / > 7.0	8.1	76.5	12.0	83.3	15.0	78.8	7.0	76.2
< 7.0 / > 8.0	6.2	82.7	6.8	90.1	8.0	86.8	6.7	82.9
Total Silt	54.9		57.8		64.7		41.0	
< 8.0 / > 9.0	8.1	90.8	2.1	92.2	1.0	87.9	5.2	88.1
< 9.0 / >10.0	-0.8	90.0	0.1	92.3	4.5	92.4	5.1	93.2
< 10.0	10.0	100.0	7.7	100.0	7.6	100.0	6.8	100.0
Total Clay	17.3		9.9		13.2		17.1	

Sample Lab Code	SR-10B 07/25/95 1055 50745		SR-10C 07/25/95 1025 50746		SR-11A 07/24/95 1030 50747	
Phi Size	Fraction (Wt %)	Cumulative (Wt %)	Fraction (Wt %)	Cumulative (Wt %)	Fraction (Wt %)	Cumulative (Wt %)
> -2.0	8.7	8.7	0.0	0.0	0.0	0.0
Total Gravel	8.7		0.0		0.0	
< -2.0 / > -1.0	2.1	10.8	0.2	0.2	1.0	1.0
< -1.0 / > 0.0	4.0	14.8	0.8	1.0	1.3	2.3
< 0.0 / > 1.0	12.4	27.2	0.9	1.9	3.5	5.8
< 1.0 / > 2.0	12.0	39.2	1.6	3.5	4.3	10.1
< 2.0 / > 3.0	10.6	49.9	7.8	11.3	9.2	19.3
< 3.0 / > 4.0	11.4	61.3	18.1	29.4	19.4	38.7
Total Sand	52.6		29.4		38.7	
< 4.0 / > 5.0	16.6	77.9	22.8	52.2	15.7	54.4
< 5.0 / > 6.0	7.5	85.4	13.0	65.2	11.4	65.8
< 6.0 / > 7.0	3.1	88.6	5.4	70.6	10.7	76.5
< 7.0 / > 8.0	5.1	93.7	7.9	78.4	7.3	83.8
Total Silt	32.4		49.0		45.1	
< 8.0 / > 9.0	2.1	95.8	4.4	82.8	7.6	91.4
< 9.0 / >10.0	0.7	96.5	6.3	89.1	2.8	94.2
< 10.0	3.5	100.0	10.9	100.0	5.8	100.0
Total Clay	6.3		21.6		16.2	

Approved 

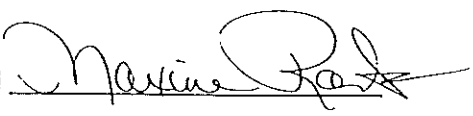
Date 08/21/95

Weyerhaeuser Company
Analytical Laboratories
Particle Size - PSEP
Report

Service Request 18532

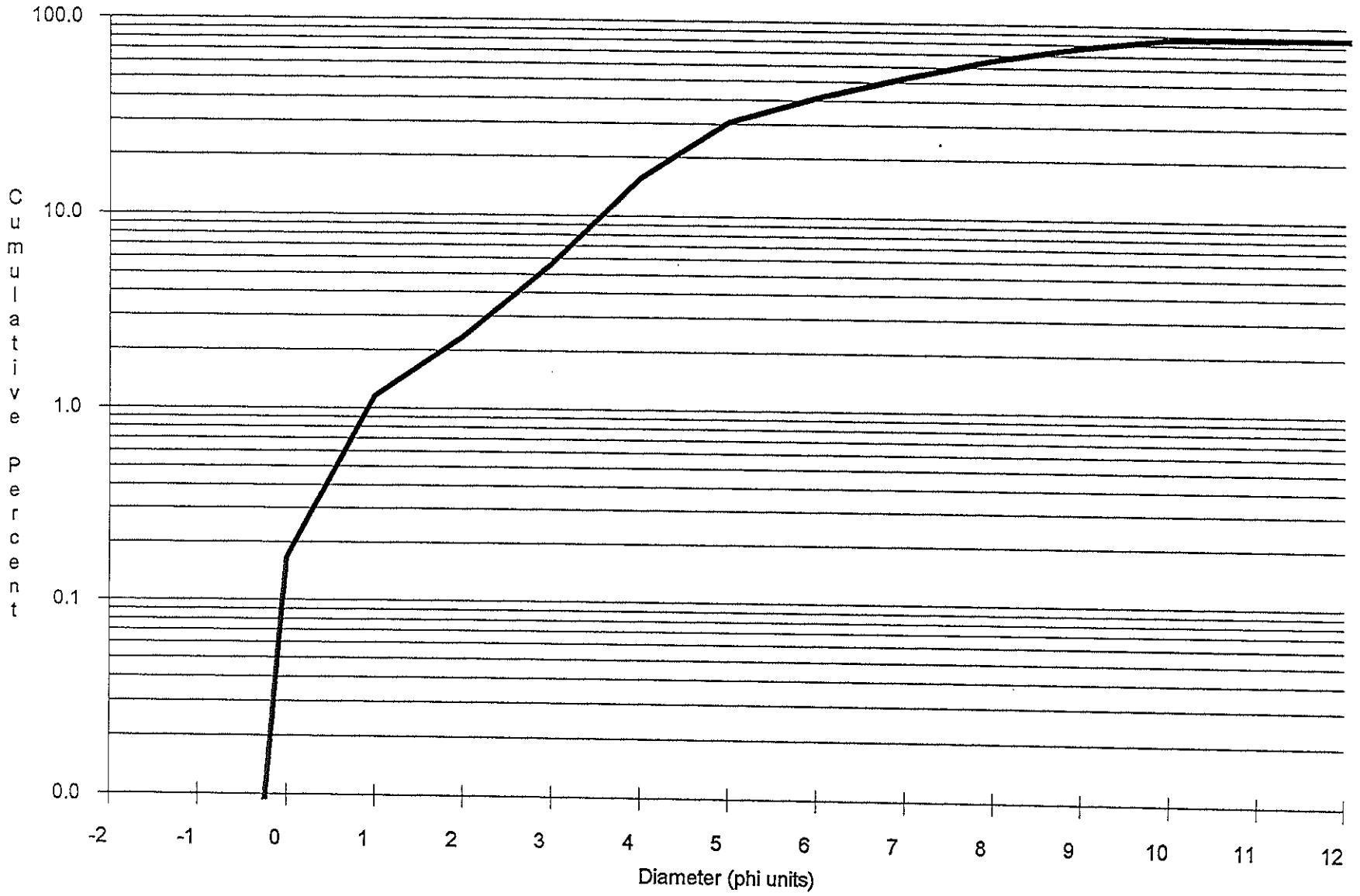
Sample / Lab Code	SR-11B 07/24/95 1115 50748		SR-11C 07/24/95 1140 50749		SR-13A 07/24/95 0945 50750		SR-13B 07/24/95 1010 50751	
Phi Size	Fraction (Wt %)	Cumulative (Wt %)	Fraction (Wt %)	Cumulative (Wt %)	Fraction (Wt %)	Cumulative (Wt %)	Fraction (Wt %)	Cumulative (Wt %)
> -2.0	0.0	0.0	7.8	7.8	6.1	6.1	16.9	16.9
Total Gravel	0.0		7.8		6.1		16.9	
< -2.0 / > -1.0	3.1	3.1	1.5	9.3	2.5	8.6	5.1	22.0
< -1.0 / > 0.0	3.5	6.7	5.6	15.0	6.1	14.7	9.0	30.9
< 0.0 / > 1.0	11.0	17.7	17.5	32.5	13.5	28.2	24.0	54.9
< 1.0 / > 2.0	8.6	26.2	19.3	51.8	17.1	45.4	28.1	83.0
< 2.0 / > 3.0	9.7	36.0	9.8	61.6	7.3	52.6	10.7	93.6
< 3.0 / > 4.0	14.9	50.9	8.7	70.3	11.1	63.7	2.7	96.4
Total Sand	50.9		62.5		57.6		79.5	
< 4.0 / > 5.0	15.1	65.9	9.0	79.3	19.3	83.0	2.8	99.1
< 5.0 / > 6.0	11.8	77.8	6.1	85.4	5.8	88.8	0.7	99.8
< 6.0 / > 7.0	7.6	85.3	4.7	90.1	4.9	93.6	0.3	100.2
< 7.0 / > 8.0	5.1	90.4	1.9	92.0	2.5	96.1	0.2	100.4
Total Silt	39.5		21.7		32.5		4.0	
< 8.0 / > 9.0	6.0	96.4	1.4	93.4	0.9	97.1	-0.1	100.3
< 9.0 / >10.0	-0.1	96.4	1.8	95.1	0.8	97.9	0.1	100.4
< 10.0	3.6	100.0	4.9	100.0	2.1	100.0	-0.4	100.0
Total Clay	9.6		8.0		3.9		-0.4	

Sample / Lab Code	SR-13C 07/24/95 1000 50752		SR-01A 0724/95 1235 Dup 50734 D		SR-10B 07/25/95 1055 Dup 50745 D	
Phi Size	Fraction (Wt %)	Cumulative (Wt %)	Fraction (Wt %)	Cumulative (Wt %)	Fraction (Wt %)	Cumulative (Wt %)
> -2.0	5.8	5.8	0.0	0.0	4.2	4.2
Total Gravel	5.8		0.0		0.0	
< -2.0 / > -1.0	6.3	12.1	0.0	0.0	2.0	6.3
< -1.0 / > 0.0	2.5	14.6	0.2	0.3	5.2	11.4
< 0.0 / > 1.0	7.2	21.8	0.7	1.0	12.9	24.4
< 1.0 / > 2.0	12.6	34.3	0.7	1.7	13.5	37.9
< 2.0 / > 3.0	8.9	43.2	1.9	3.6	10.5	48.4
< 3.0 / > 4.0	16.0	59.2	10.2	13.8	13.2	61.6
Total Sand	53.4		13.8		57.4	
< 4.0 / > 5.0	10.1	69.3	11.3	25.1	13.7	75.3
< 5.0 / > 6.0	10.1	79.4	14.4	39.5	8.9	84.2
< 6.0 / > 7.0	6.4	85.8	12.1	51.6	6.1	90.3
< 7.0 / > 8.0	3.9	89.7	12.6	64.2	3.5	93.8
Total Silt	30.5		50.4		32.1	
< 8.0 / > 9.0	2.8	92.5	12.3	76.5	1.7	95.4
< 9.0 / >10.0	1.6	94.1	9.2	85.7	0.9	96.4
< 10.0	5.9	100.0	14.3	100.0	3.6	100.0
Total Clay	10.3		35.8		6.2	

Approved  Date 08/21/95

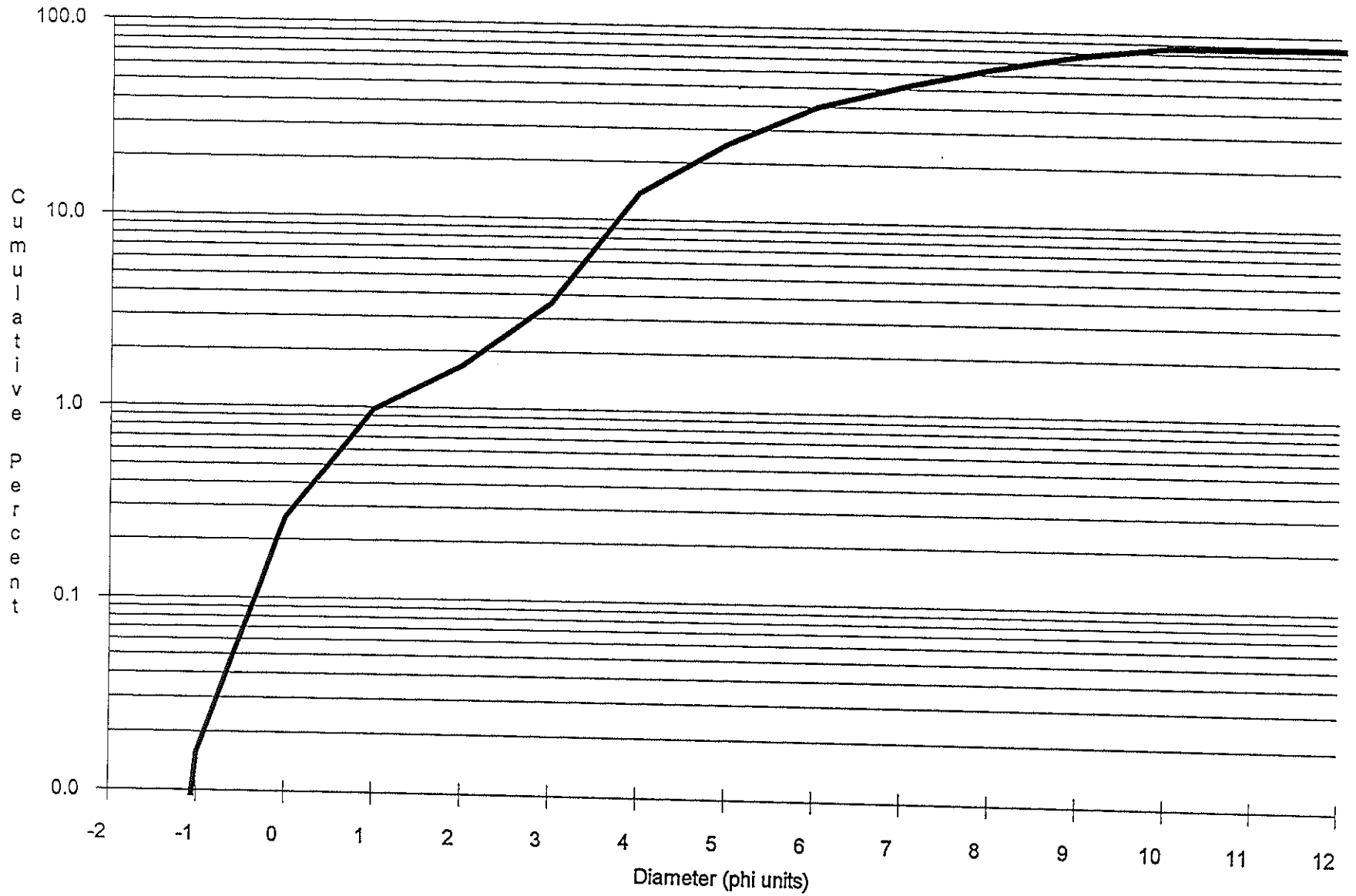
Particle Size Distribution

SR-01A 07/24/95 1235

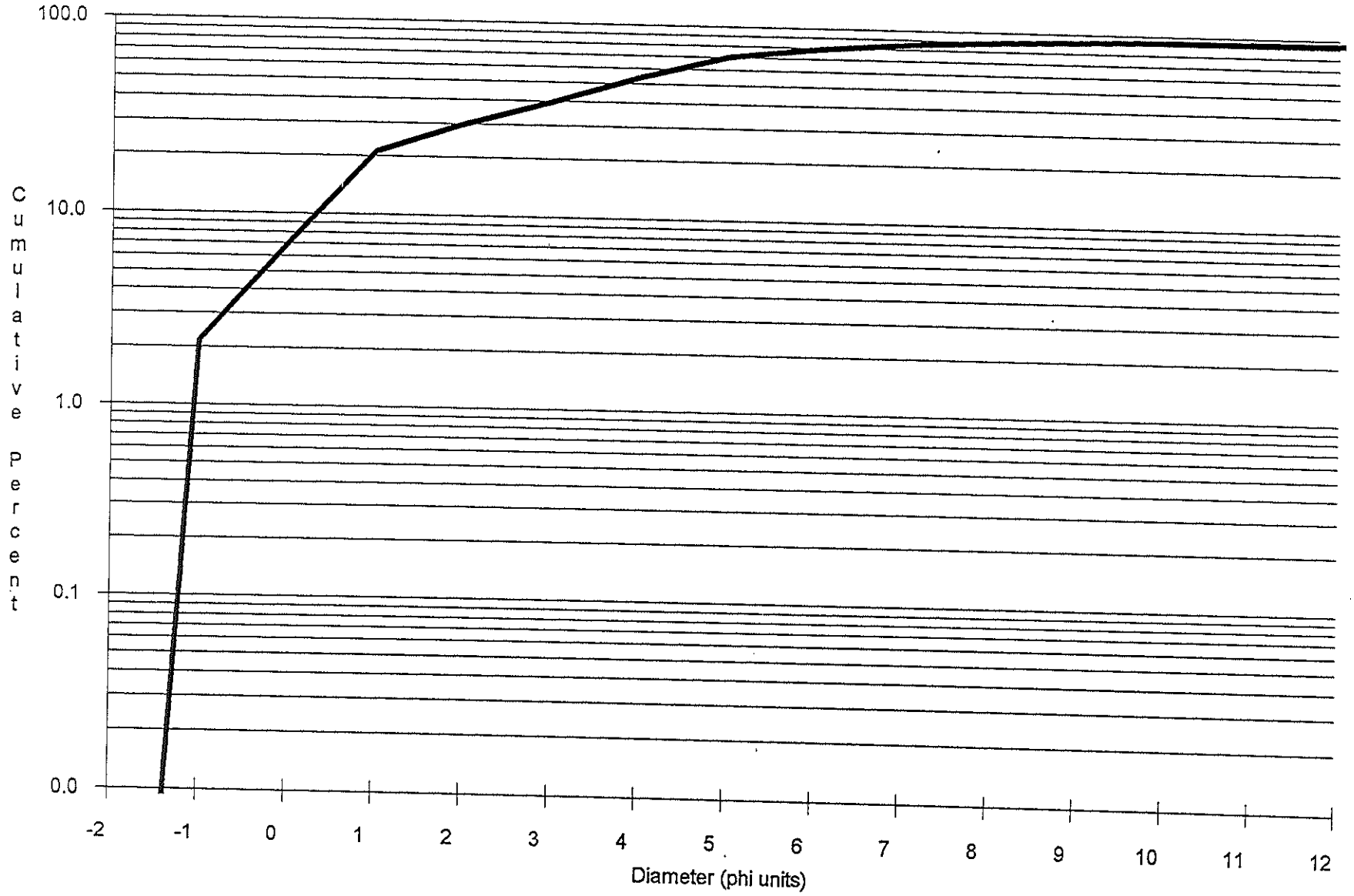


Particle Size Distribution

SR-01A 0724/95 1235 Dup

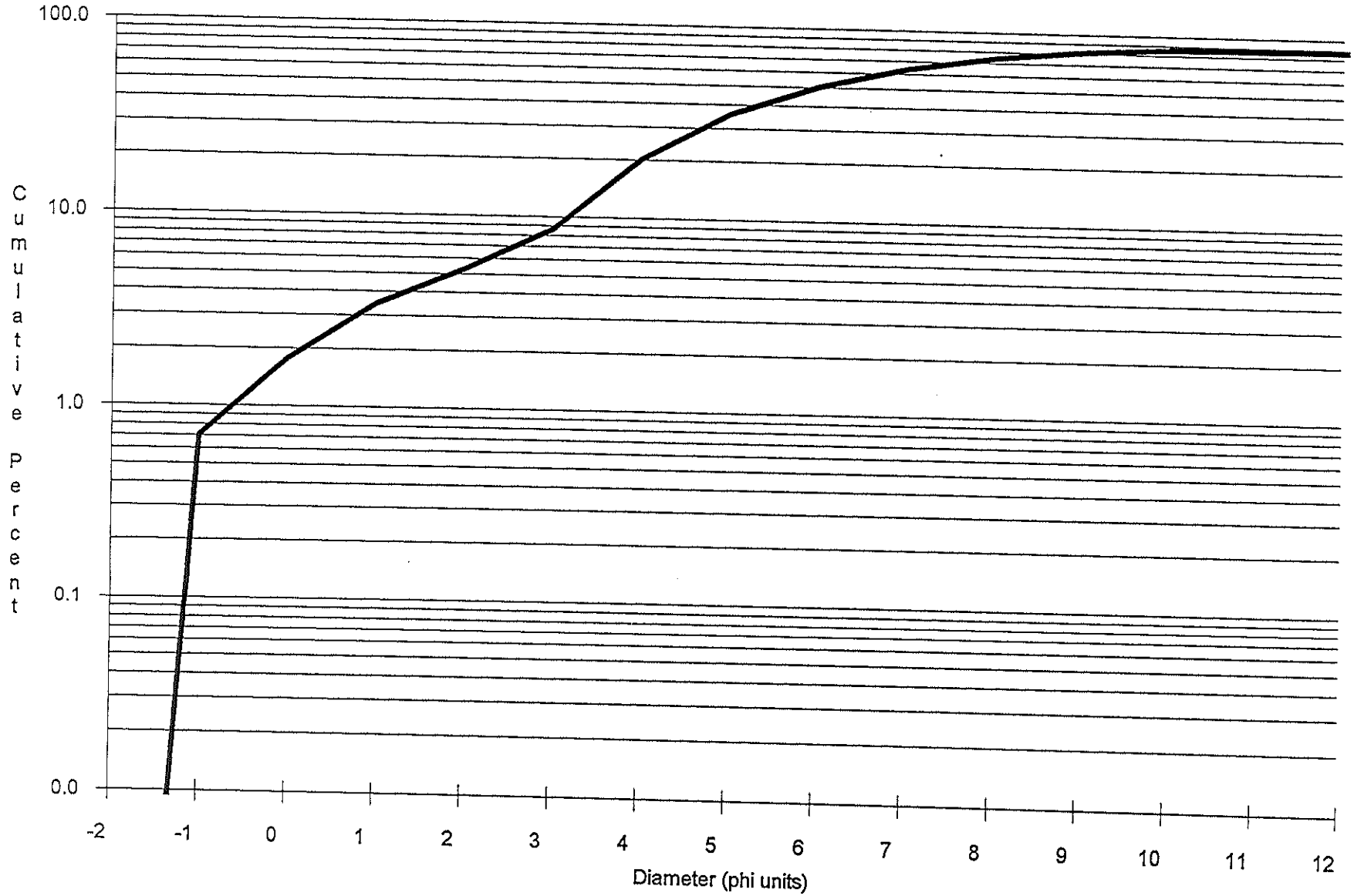


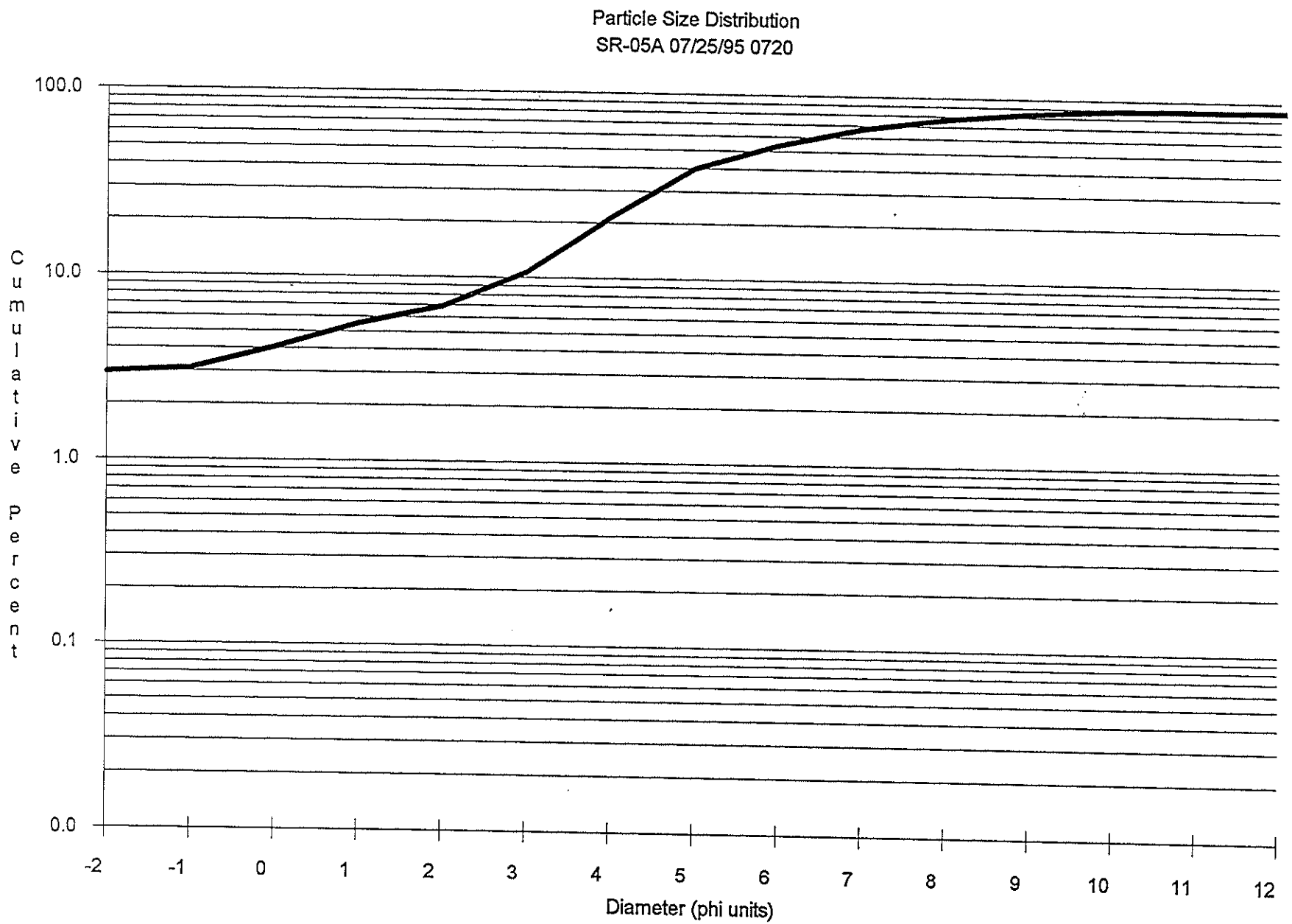
Particle Size Distribution
SR-01B 07/24/95 1310



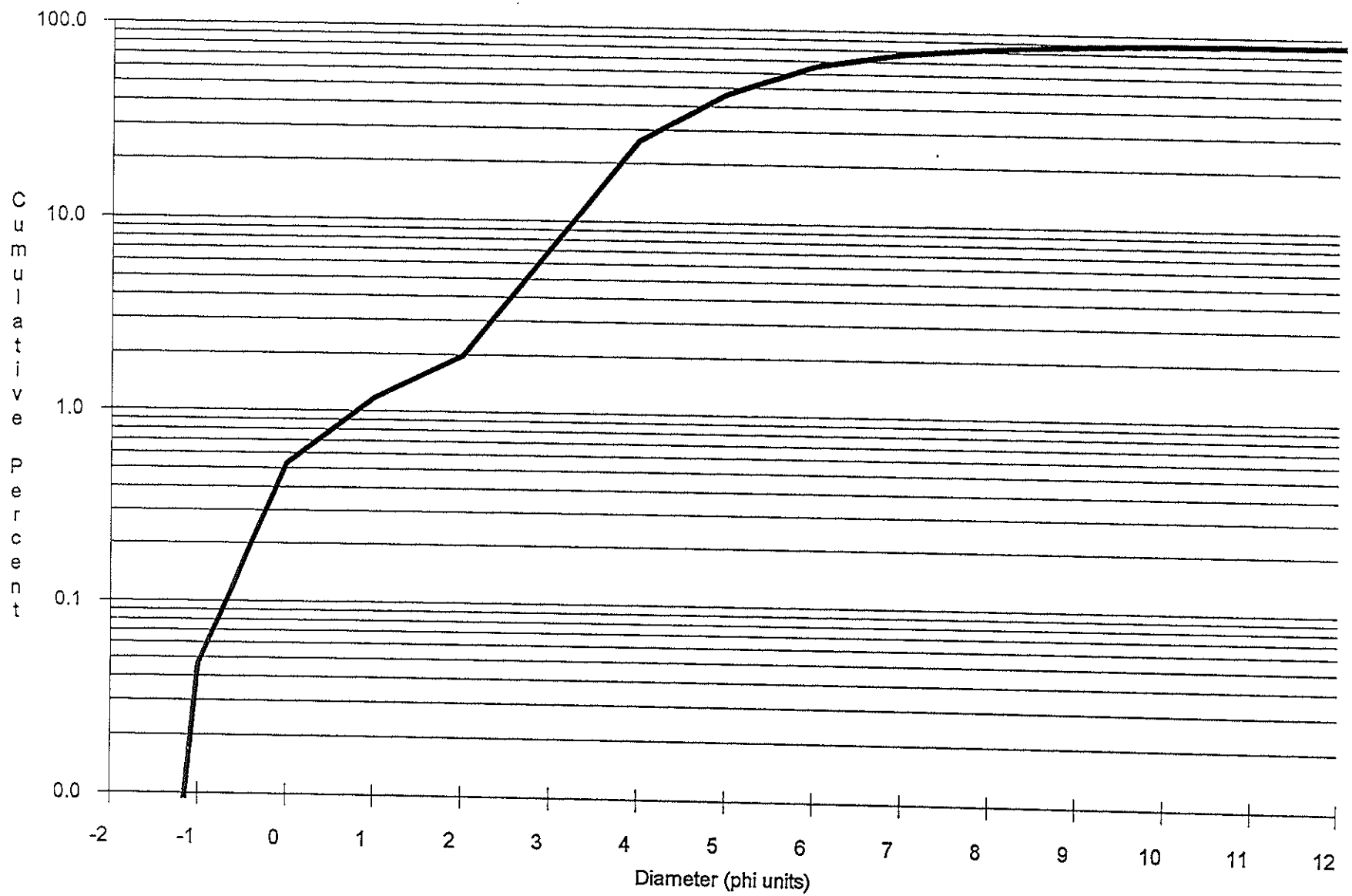
Particle Size Distribution

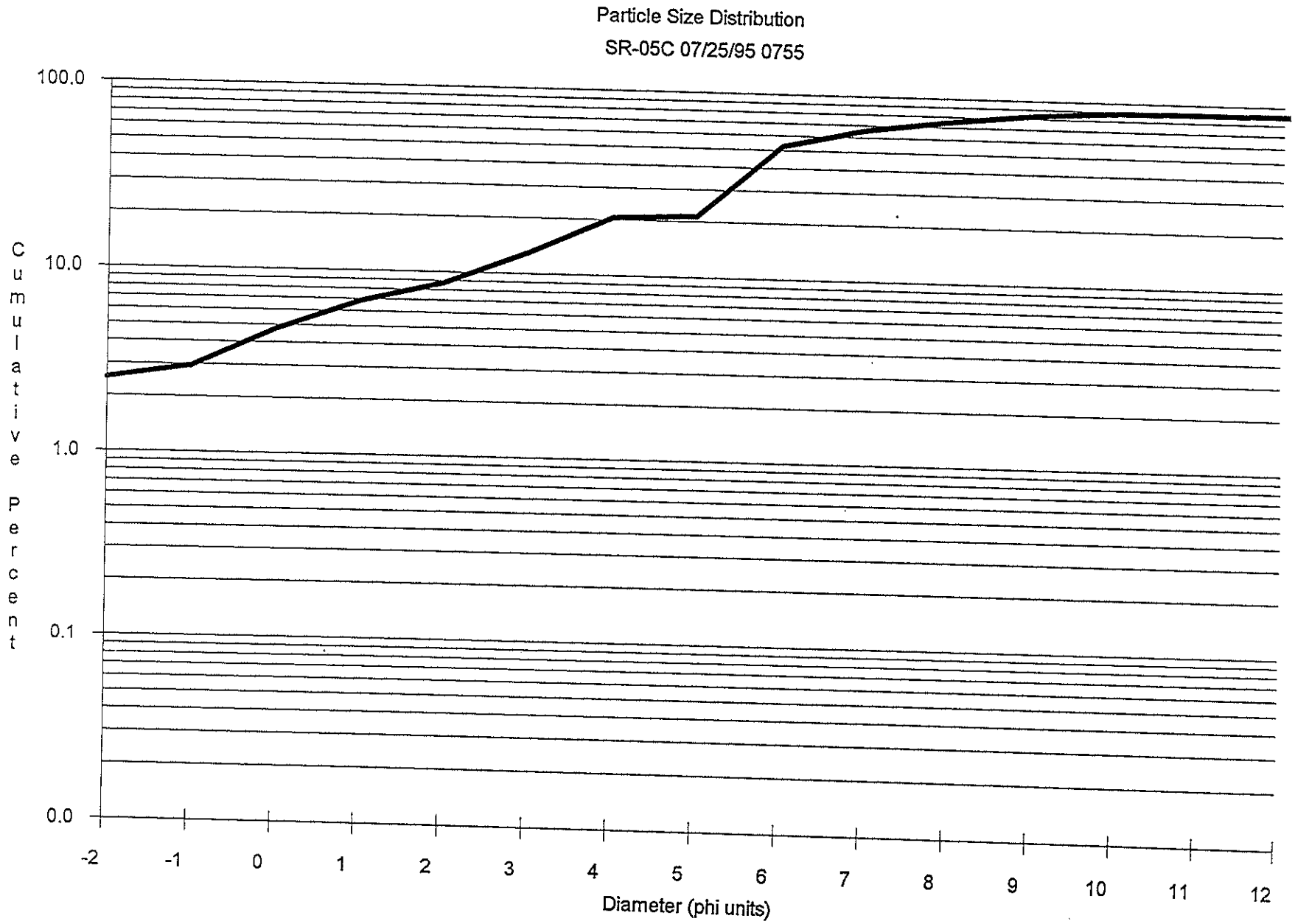
SR-01C 07/24/95 1245

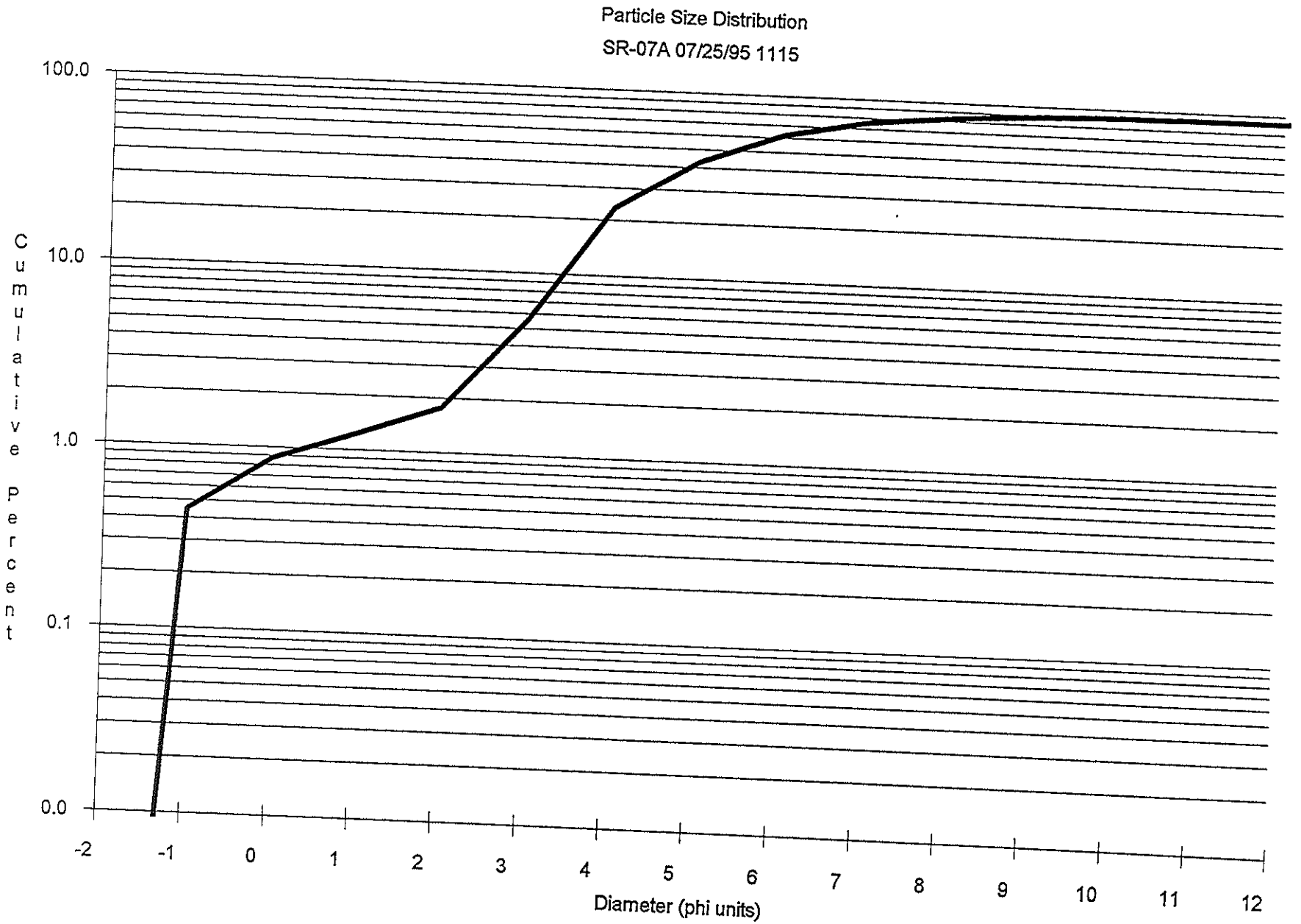


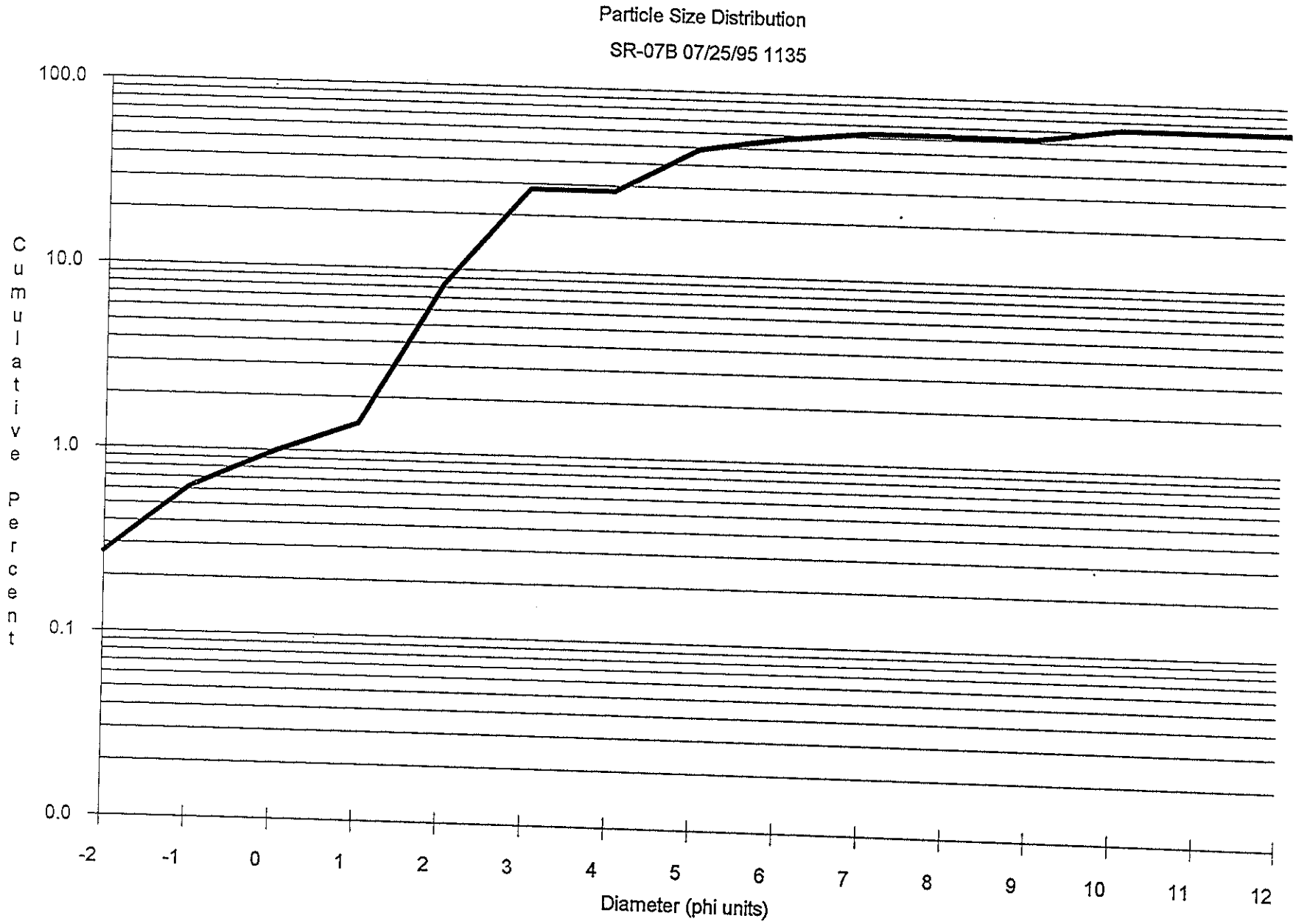

Particle Size Distribution
SR-05A 07/25/95 0720
100.0
10.0
1.0
0.1
0.0
Cumulative Percent
-2
-1
0
1
2
3
4
5
6
7
8
9
10
11
12
Diameter (phi units)

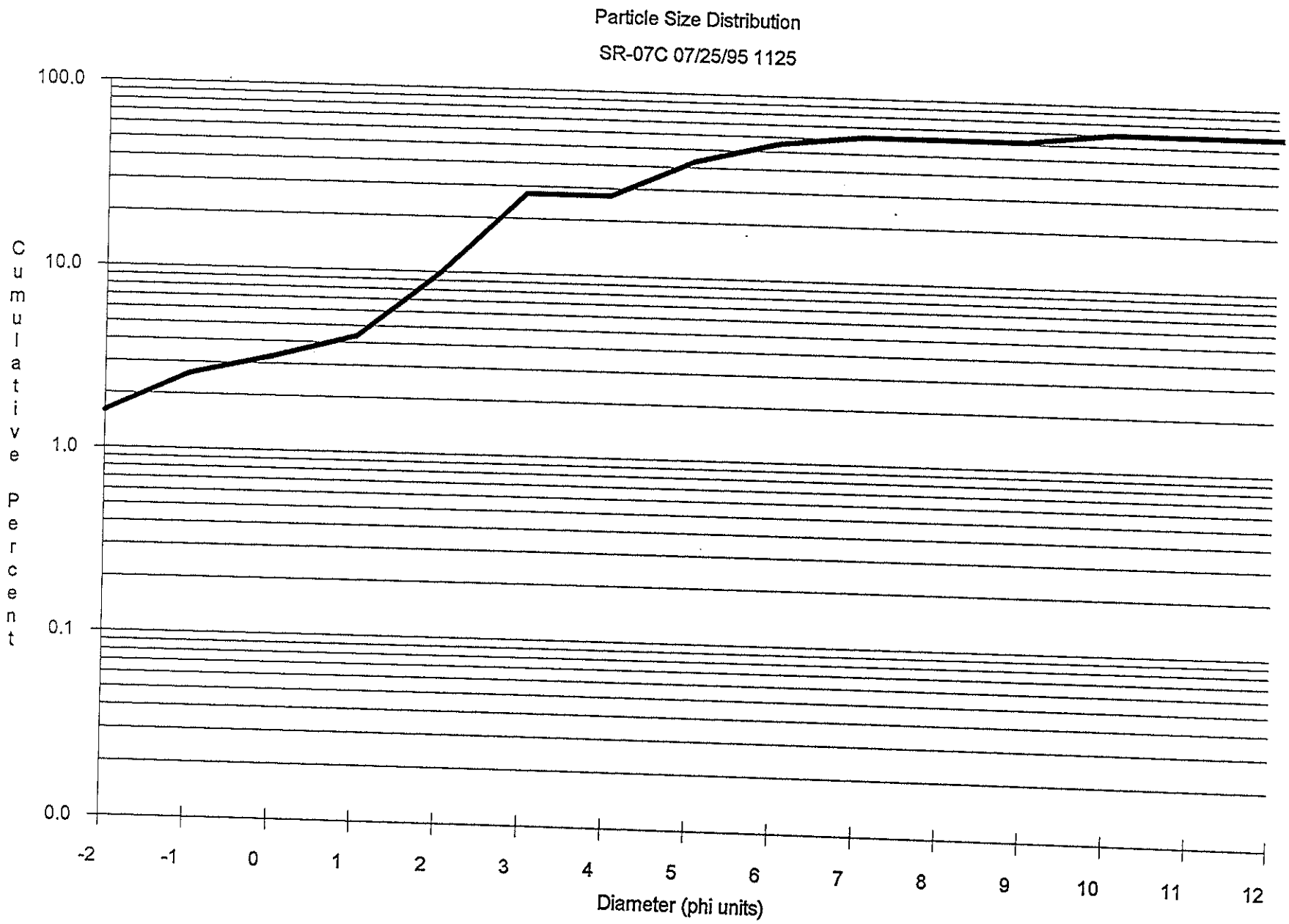
Particle Size Distribution
SR-05B 07/25/95 0745

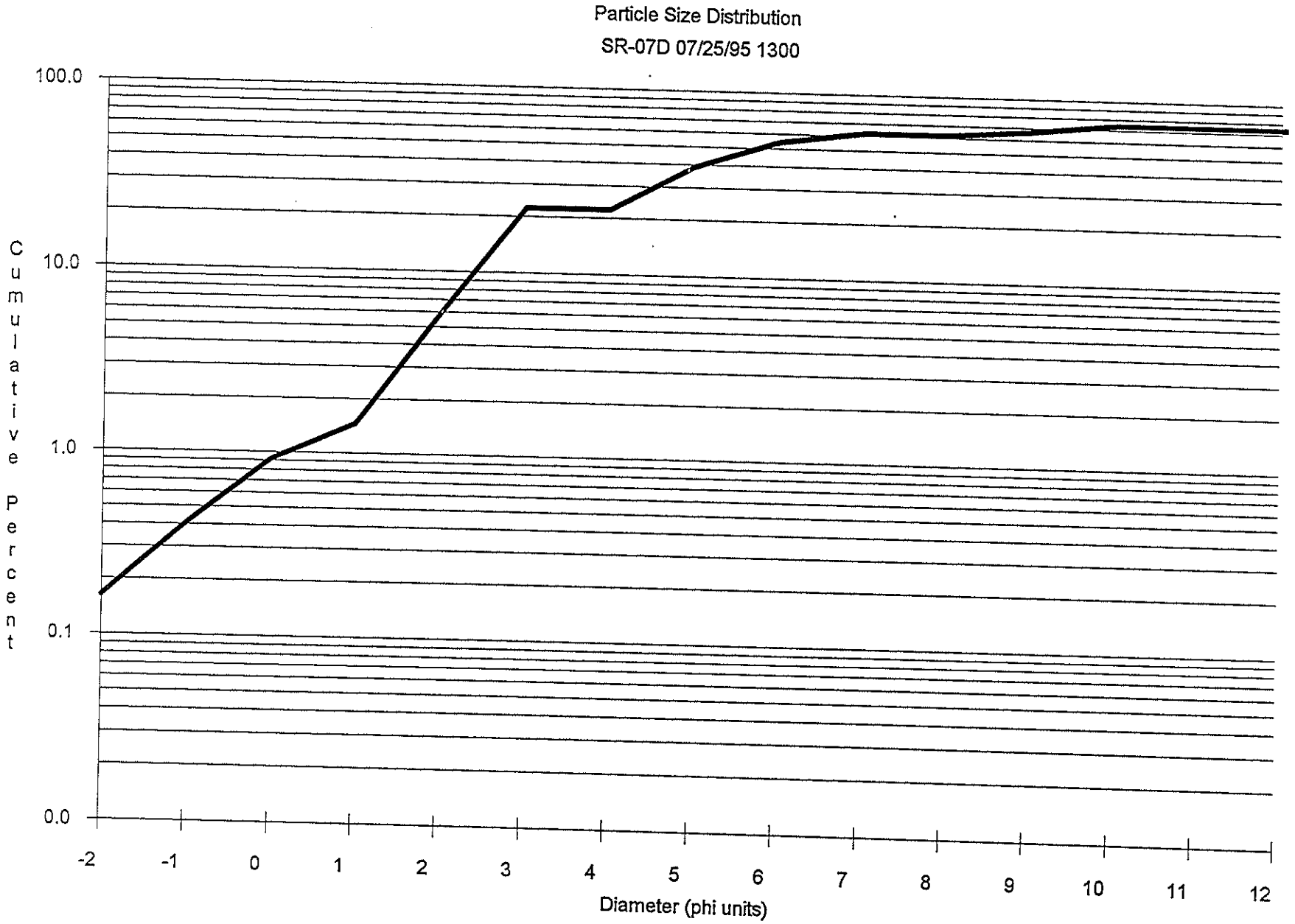



Particle Size Distribution
SR-05C 07/25/95 0755
100.0
10.0
1.0
0.1
0.0
Cumulative Percent
-2
-1
0
1
2
3
4
5
6
7
8
9
10
11
12
Diameter (phi units)

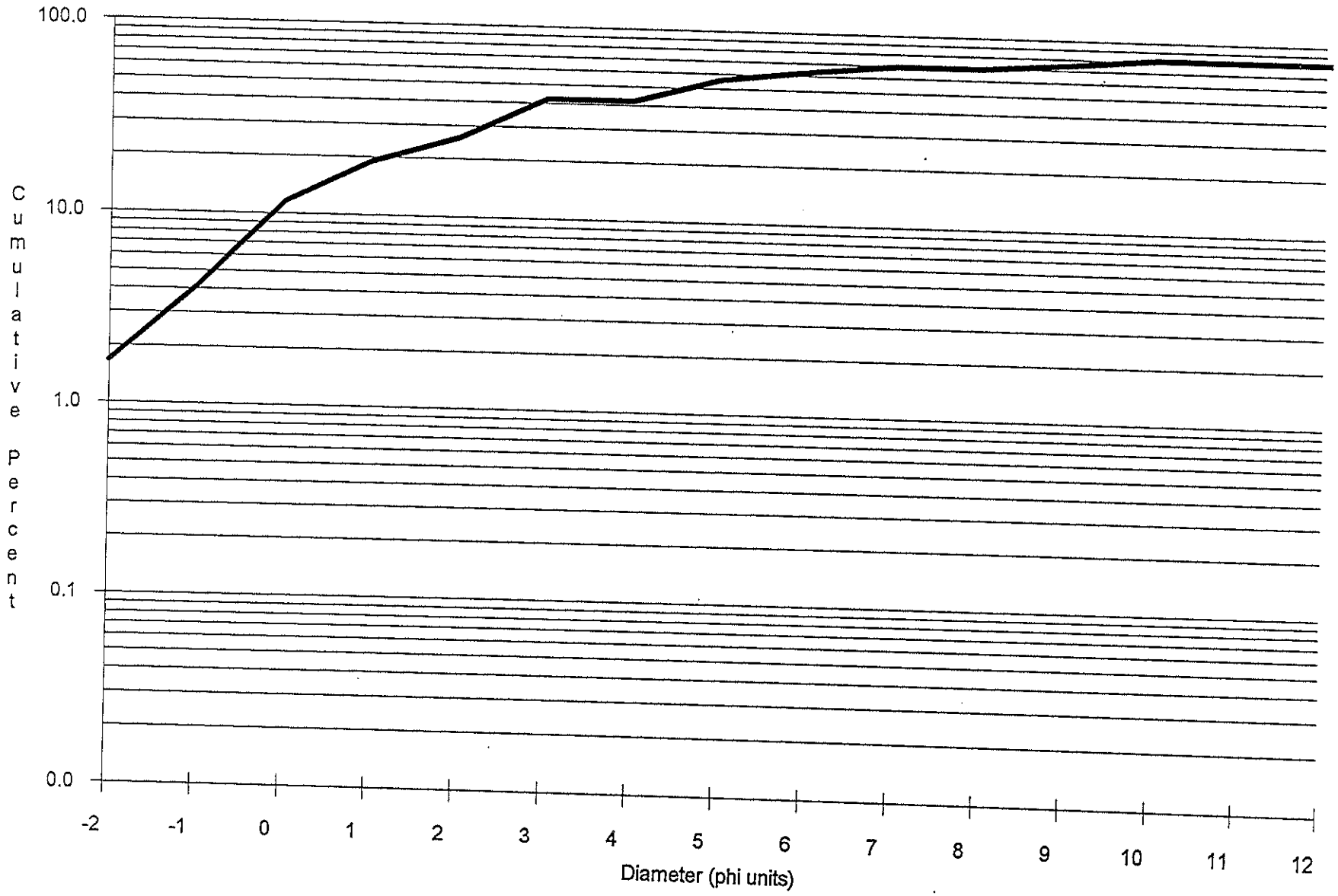

Particle Size Distribution
SR-07A 07/25/95 1115
100.0
10.0
1.0
0.1
0.0
Cumulative Percent
-2
-1
0
1
2
3
4
5
6
7
8
9
10
11
12
Diameter (phi units)

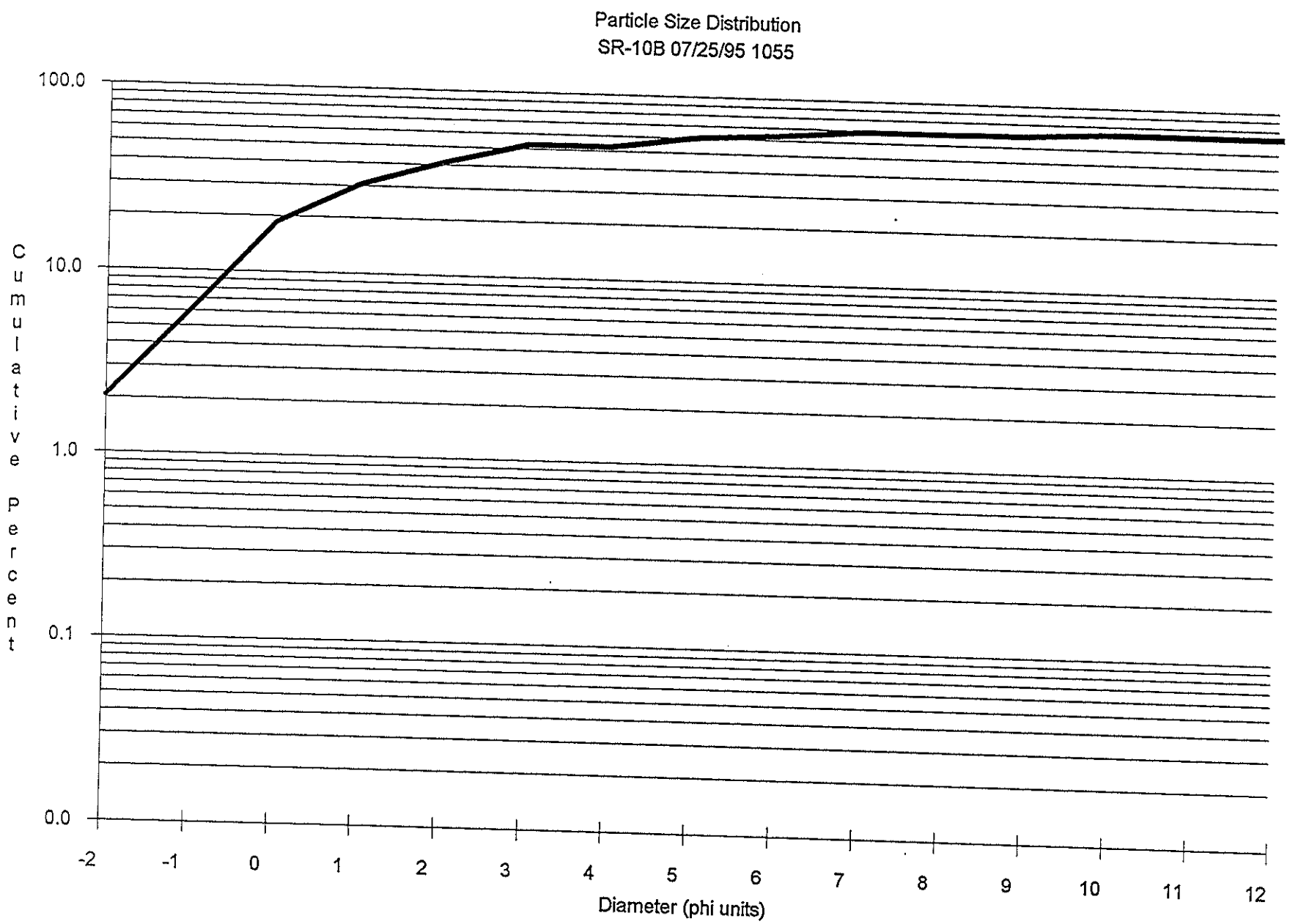

Particle Size Distribution
SR-07B 07/25/95 1135
100.0
10.0
1.0
0.1
0.0
Cumulative Percent
-2
-1
0
1
2
3
4
5
6
7
8
9
10
11
12
Diameter (phi units)

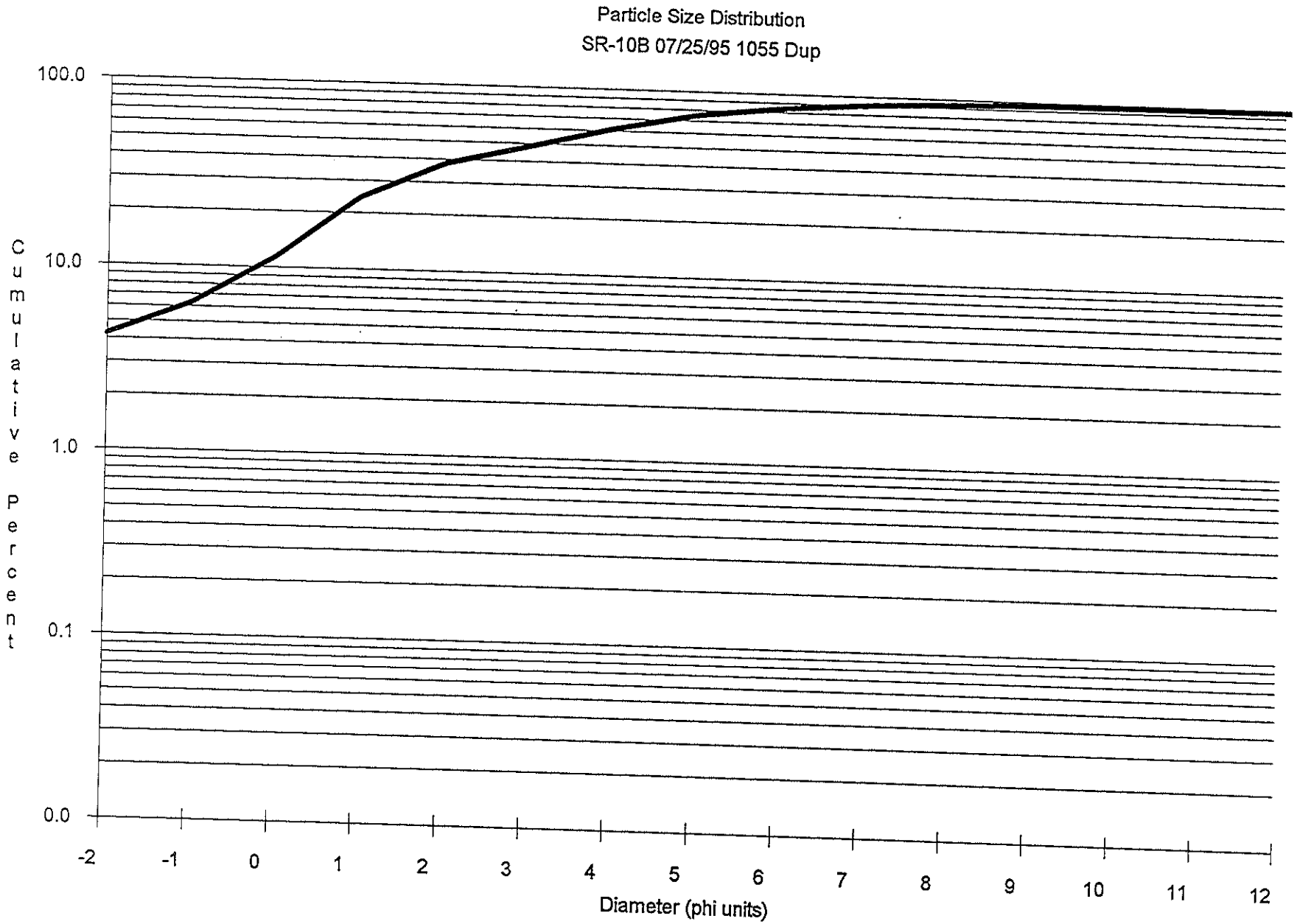

Particle Size Distribution
SR-07C 07/25/95 1125
100.0
10.0
1.0
0.1
0.0
Cumulative Percent
-2
-1
0
1
2
3
4
5
6
7
8
9
10
11
12
Diameter (phi units)

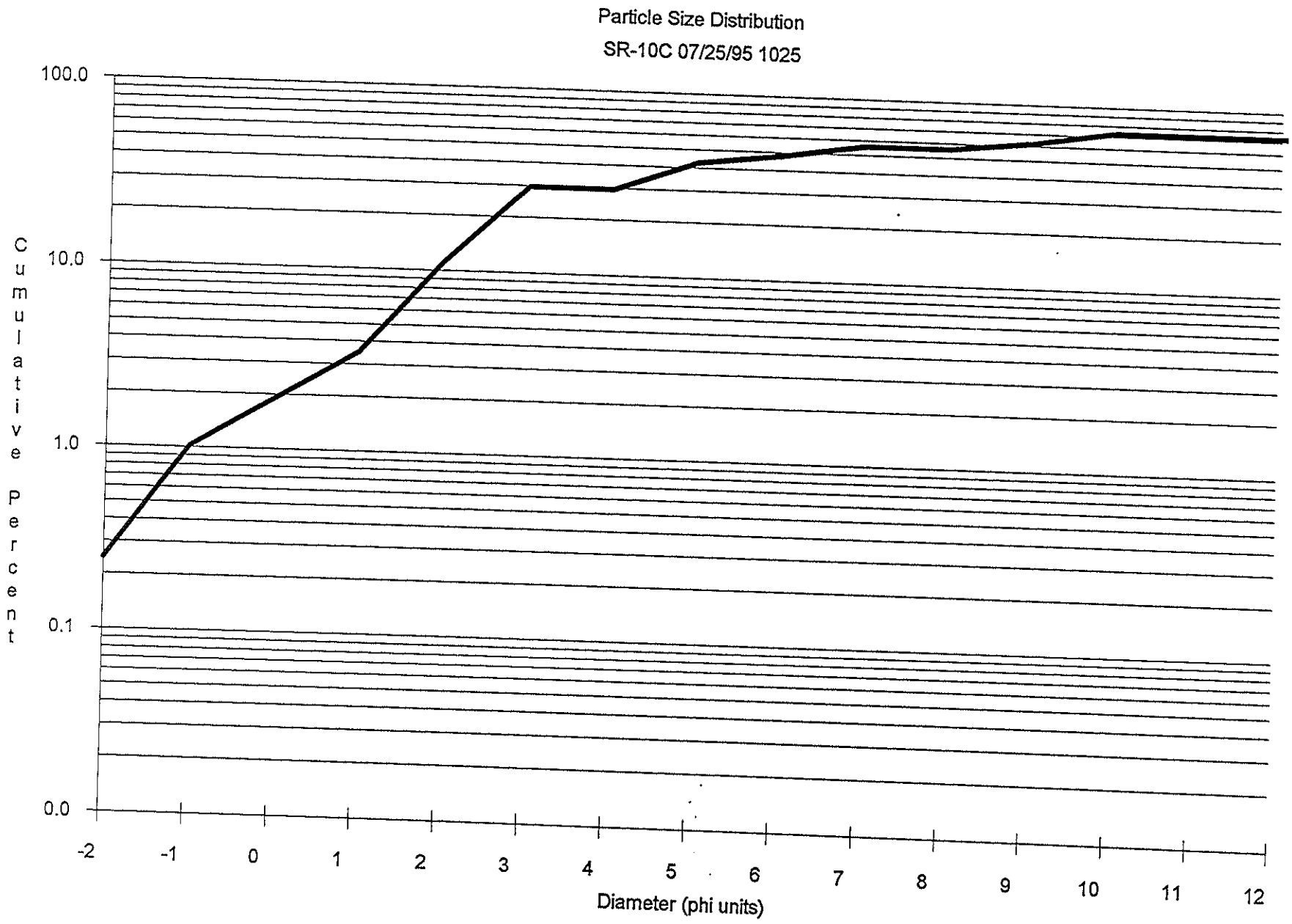

Particle Size Distribution
SR-07D 07/25/95 1300
100.0
10.0
1.0
0.1
0.0
Cumulative Percent
-2
-1
0
1
2
3
4
5
6
7
8
9
10
11
12
Diameter (phi units)

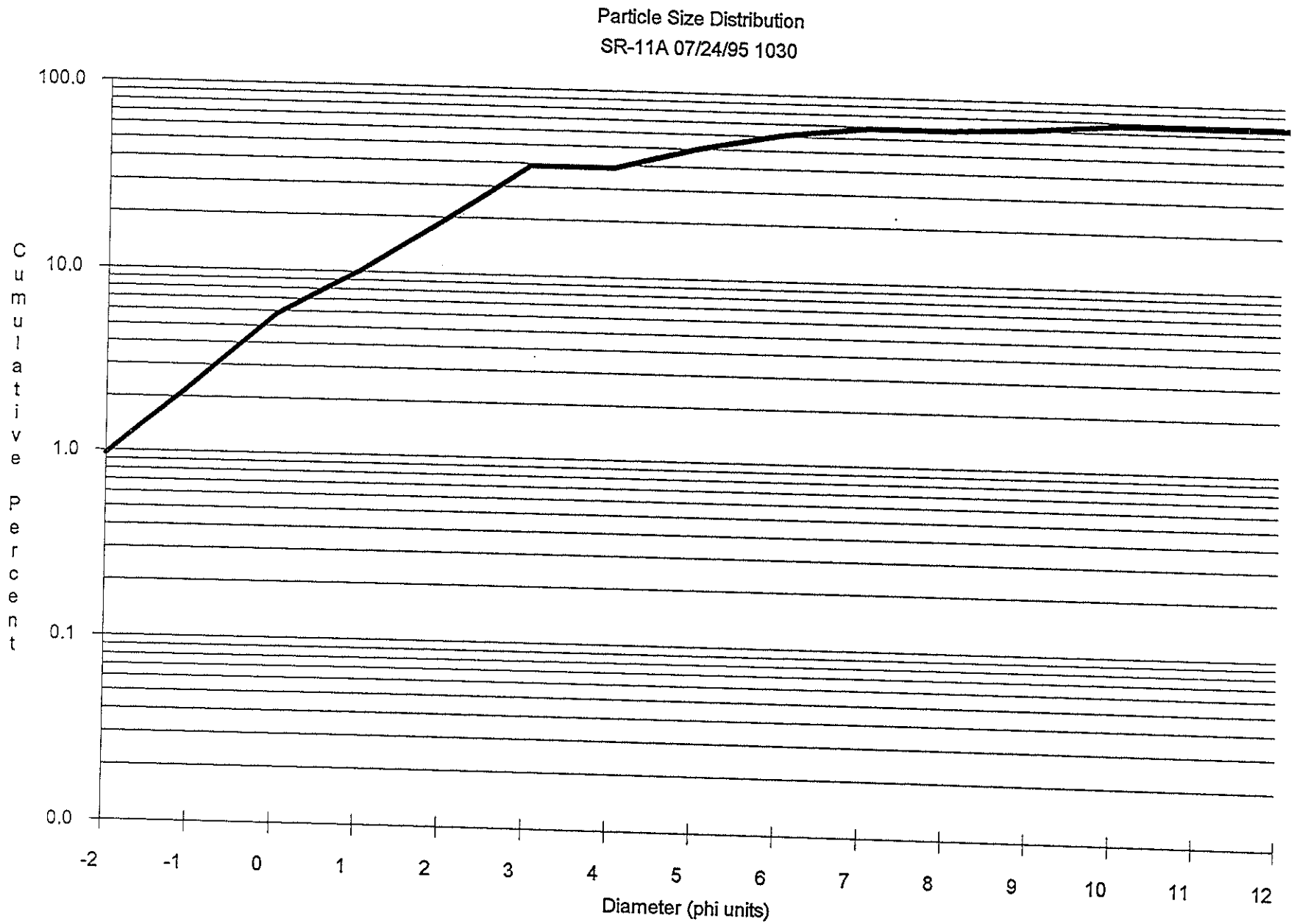
Particle Size Distribution
SR-10A 07/25/95 1015

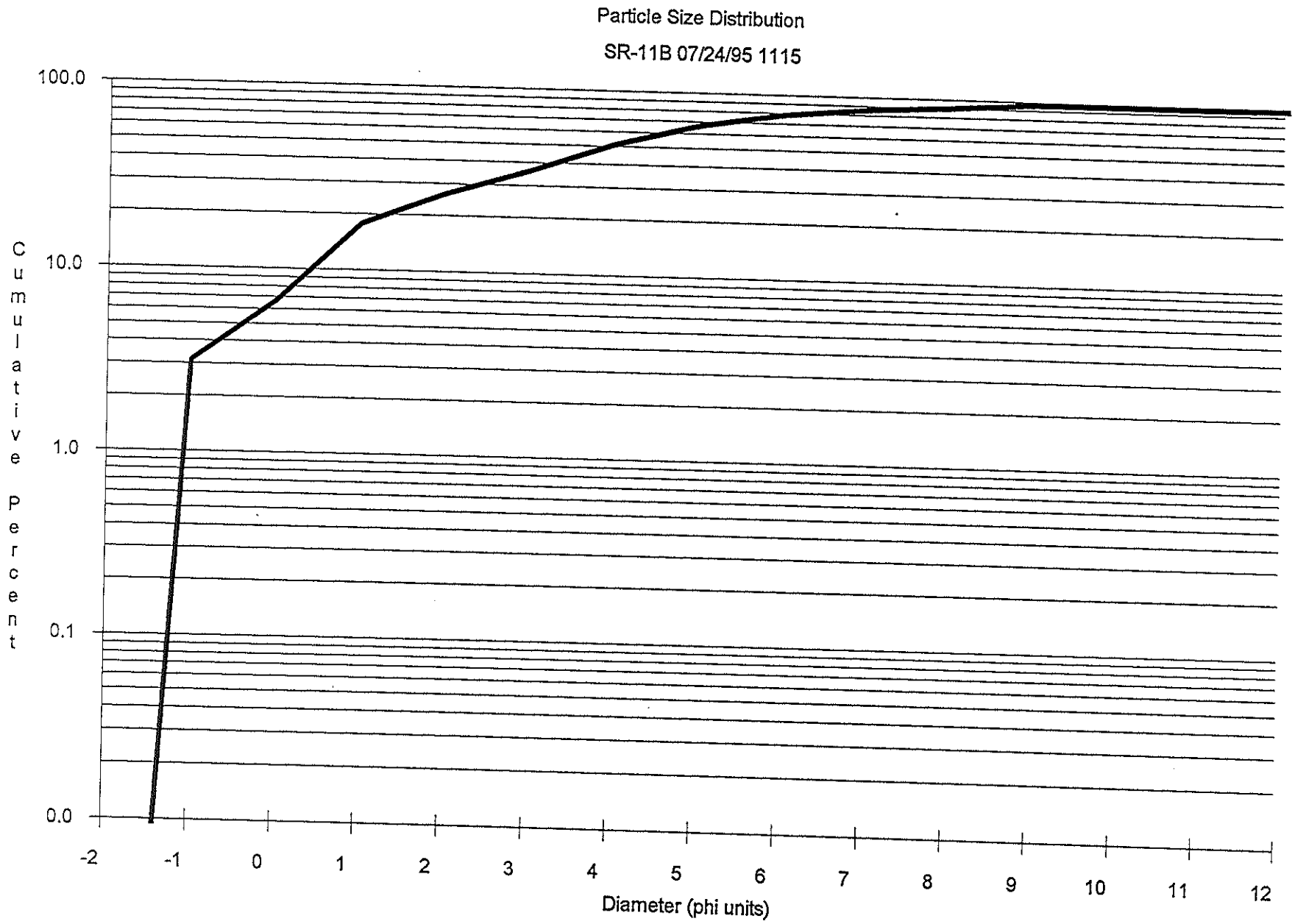


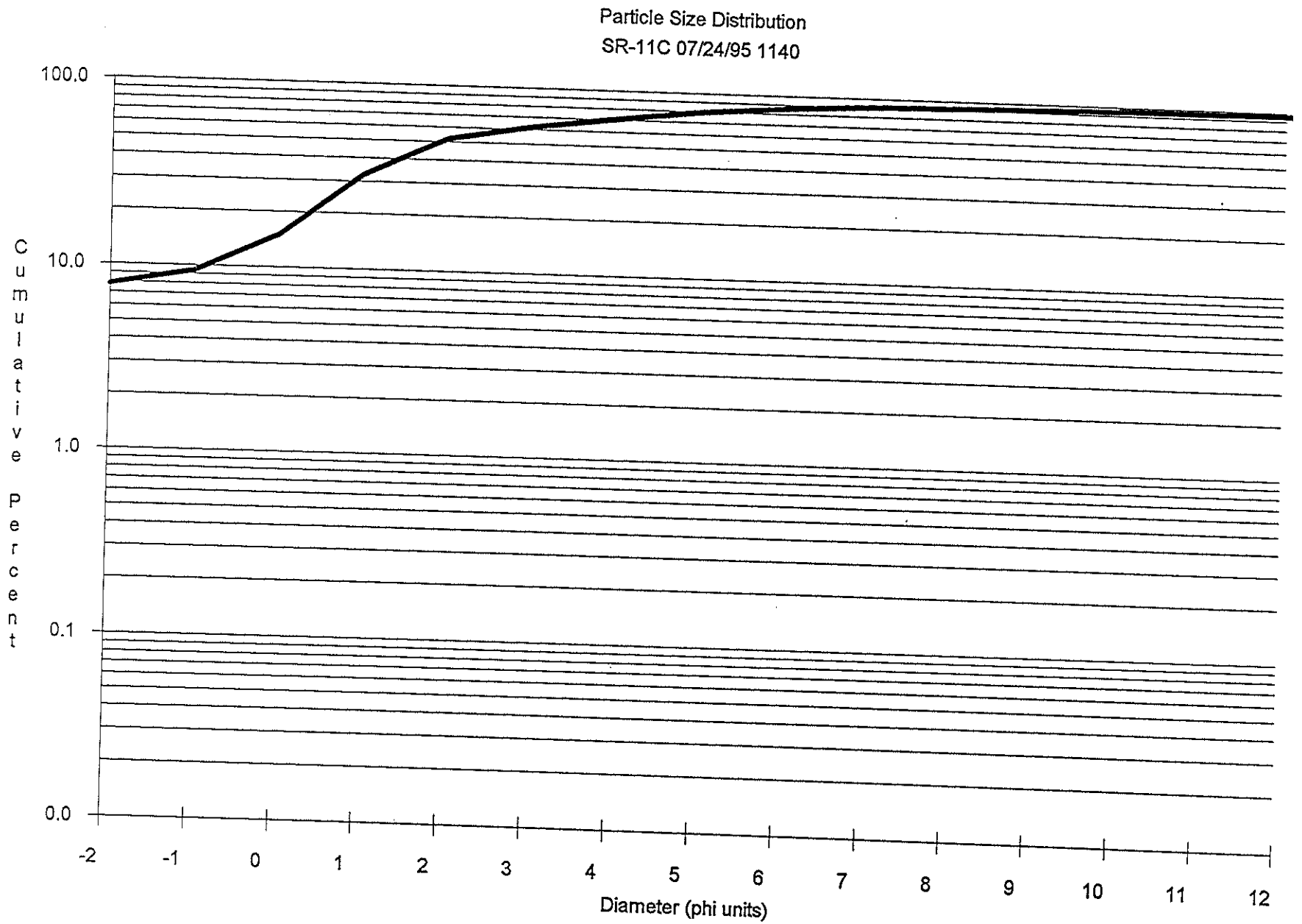

Particle Size Distribution
SR-10B 07/25/95 1055
100.0
10.0
1.0
0.1
0.0
Cumulative Percent
-2
-1
0
1
2
3
4
5
6
7
8
9
10
11
12
Diameter (phi units)

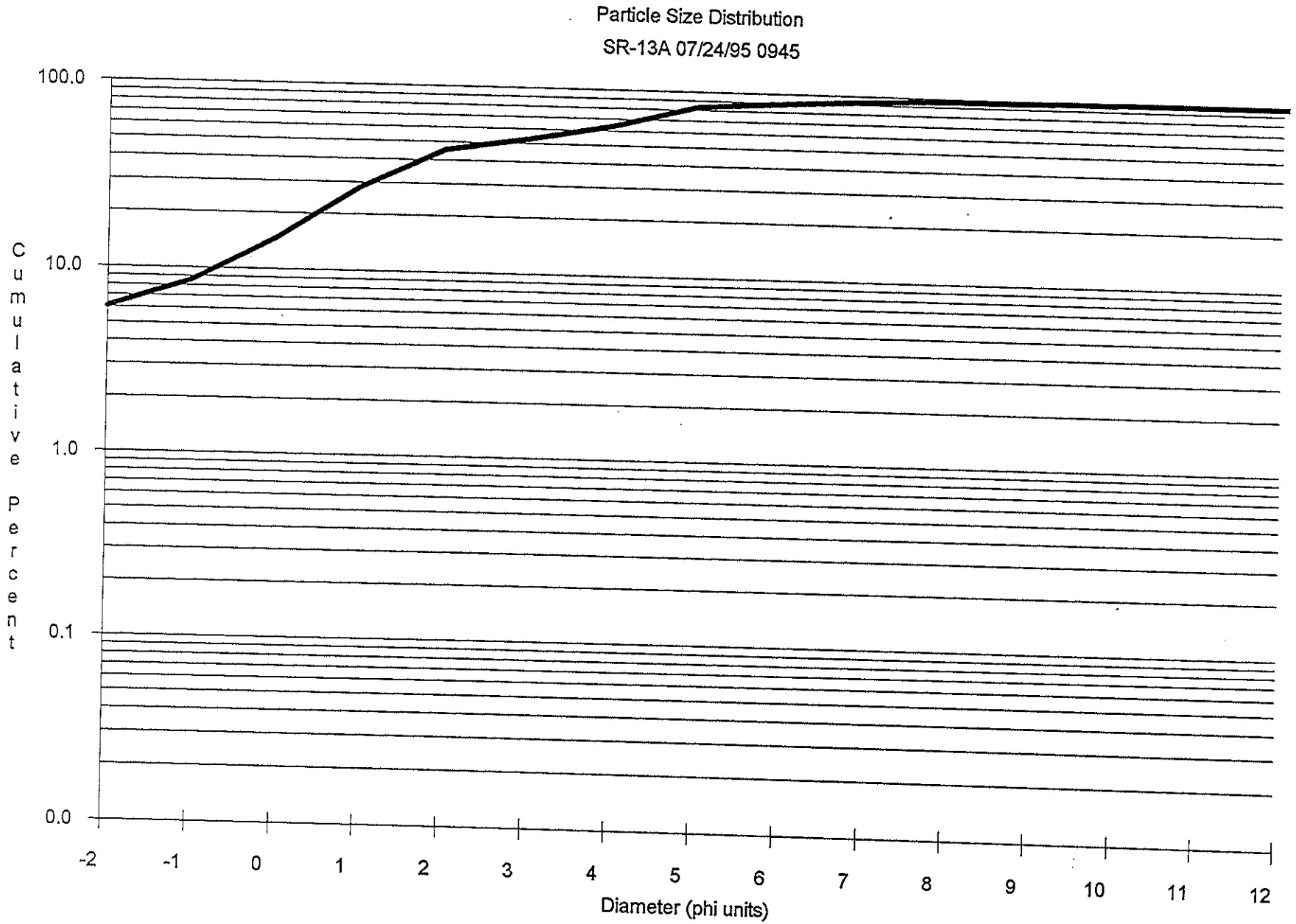

Particle Size Distribution
SR-10B 07/25/95 1055 Dup
100.0
10.0
1.0
0.1
0.0
Cumulative Percent
-2
-1
0
1
2
3
4
5
6
7
8
9
10
11
12
Diameter (phi units)

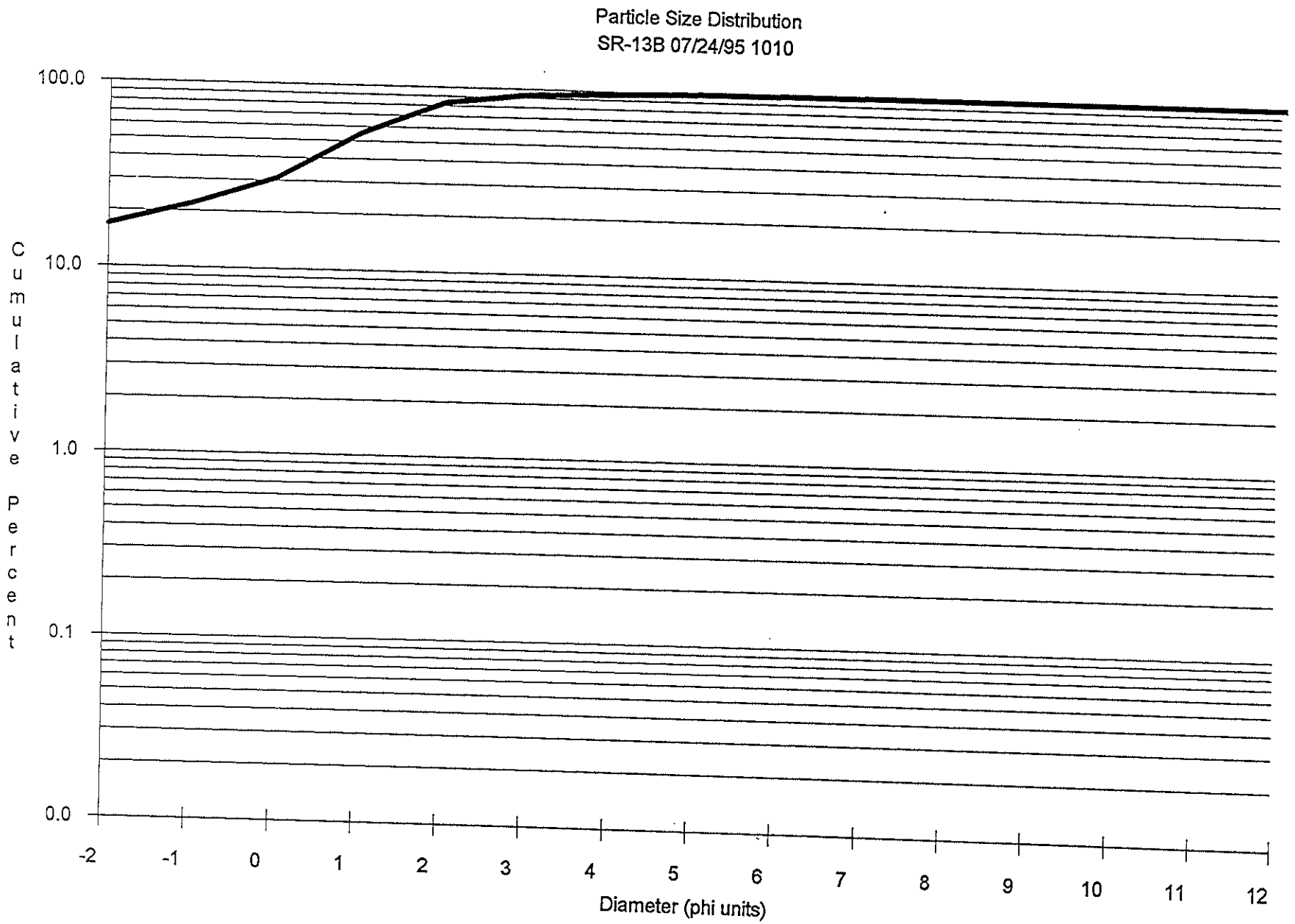

Particle Size Distribution
SR-10C 07/25/95 1025
100.0
10.0
1.0
0.1
0.0
Cumulative Percent
-2
-1
0
1
2
3
4
5
6
7
8
9
10
11
12
Diameter (phi units)

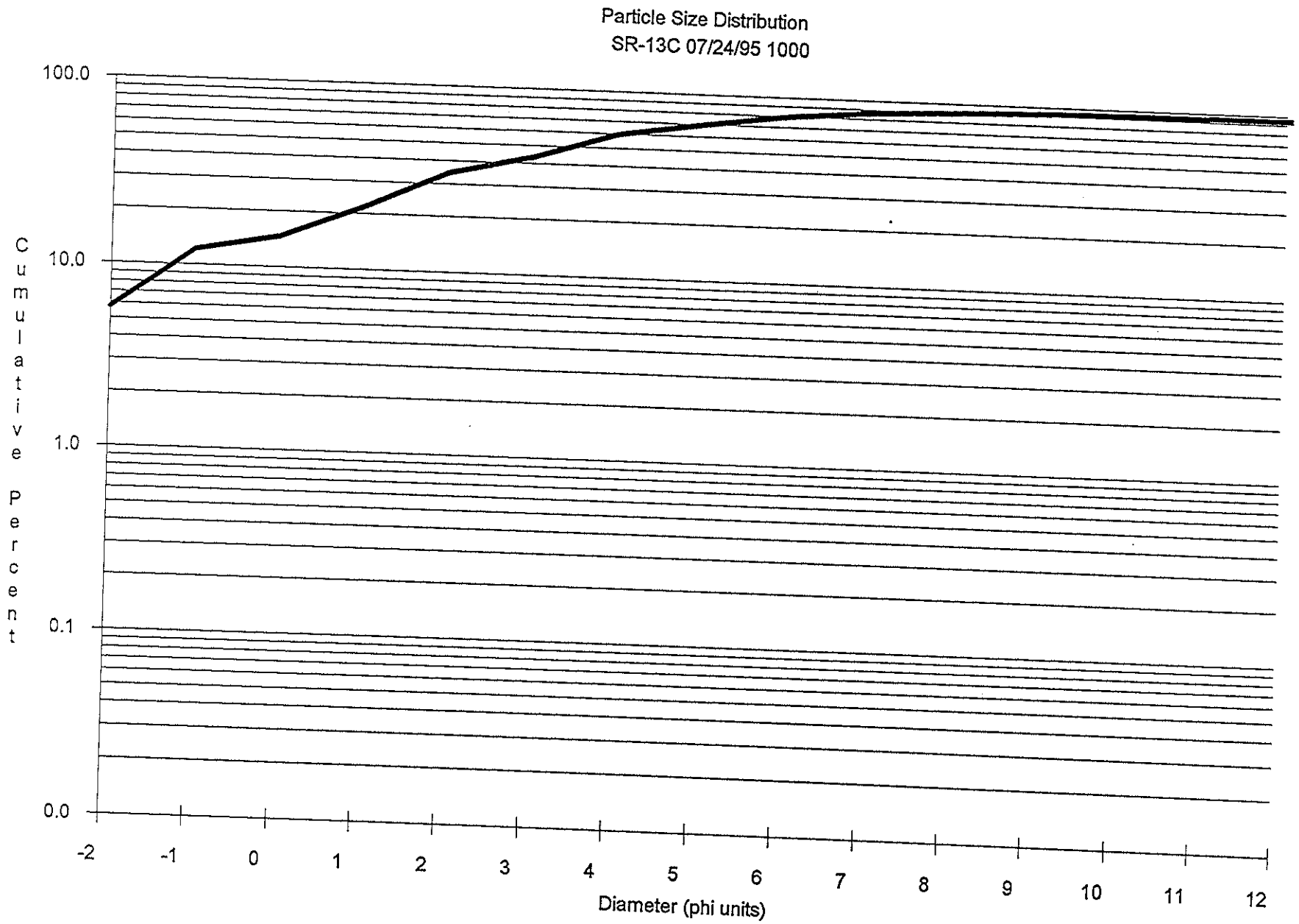

Particle Size Distribution
SR-11A 07/24/95 1030
100.0
10.0
1.0
0.1
0.0
Cumulative Percent
-2
-1
0
1
2
3
4
5
6
7
8
9
10
11
12
Diameter (phi units)


Particle Size Distribution
SR-11B 07/24/95 1115
100.0
10.0
1.0
0.1
0.0
Cumulative Percent
-2
-1
0
1
2
3
4
5
6
7
8
9
10
11
12
Diameter (phi units)


Particle Size Distribution
SR-11C 07/24/95 1140
100.0
10.0
1.0
0.1
0.0
Cumulative Percent
-2
-1
0
1
2
3
4
5
6
7
8
9
10
11
12
Diameter (phi units)


Particle Size Distribution
SR-13A 07/24/95 0945
100.0
10.0
1.0
0.1
0.0
Cumulative Percent
-2
-1
0
1
2
3
4
5
6
7
8
9
10
11
12
Diameter (phi units)


Particle Size Distribution
SR-13B 07/24/95 1010
100.0
10.0
1.0
0.1
0.0
Cumulative Percent
-2
-1
0
1
2
3
4
5
6
7
8
9
10
11
12
Diameter (phi units)


Particle Size Distribution
SR-13C 07/24/95 1000
100.0
10.0
1.0
0.1
0.0
Cumulative Percent
-2
-1
0
1
2
3
4
5
6
7
8
9
10
11
12
Diameter (phi units)

Request 18532

WEYERHAEUSER TECHNOLOGY CENTER
Analytical Laboratories
Tacoma, Washington
REPORT
Everett Supplemental Sediment Sampling

DUPLICATE

Compound	Matrix	Sample Designation	Lab Code	Units	Sample Value	Duplicate Value	RPD
Solids	Soil	SR-01A	50734	wt %	50.8	50.7	0.2
Solids	Soil	SR-10B	50745	wt %	62.5	62.9	0.6
Particle Size							
Sand	Soil	SR-01A	50734	wt %	15.5	13.8	11.6
Silt	Soil	SR-01A	50734	wt %	49.9	50.4	1.0
Clay	Soil	SR-01A	50734	wt %	34.6	35.8	3.4
Sand	Soil	SR-10B	50745	wt %	52.6	57.4	8.7
Silt	Soil	SR-10B	50745	wt %	32.4	32.1	0.9
Clay	Soil	SR-10B	50745	wt %	6.3	6.2	1.6
Soil TOC	Soil	SR-07A	50740	wt %	2.36	2.32	0.02
Soil TOC	Soil	SR-07A	50740	wt %	2.36	2.33	0.01

Approved Marilyn Rask Date 8/22/95

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COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: WEYERHAEUSER COMPANY Contract: EMCON

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: T18532

SOW No.: ILM02.0

EPA Sample No.	Lab Sample ID.
T50734	50734 SR-01A
T50734D	50734D
T50734S	50734S ~~SR-01B~~
T50735	50735 SR-01B
T50736	50736 SR-01C
T50737	50737 SR-05A
T50738	50738 SR-05B
T50739	50739 SR-05C

Were ICP interelement corrections applied? Yes/No YES

Were ICP background corrections applied? Yes/No YES
If yes-were raw data generated before application of background corrections? Yes/No NO

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Mary Beth Lanza Name: Mary Beth Lanza

Date: 08-16-95 Title: Scientist

U.S. EPA - CLP

EPA SAMPLE NO.

1-A

INORGANIC ANALYSIS DATA SHEET

T50734

Lab Name: WEYERHAEUSER COMPANY Contract: EMCON

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: T18532

Matrix (soil/water): SOIL Lab Sample ID: 50734

Level (low/med): LOW Date Received: 07/26/95

% Solids: 50.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	47.2			F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

lor Before: Clarity Before: Texture:

lor After: Clarity After: Artifacts:

omments:

U.S. EPA - CLP

1-B

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

T50735

Lab Name: WEYERHAEUSER COMPANY Contract: EMCON

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: T18532

Matrix (soil/water): SOIL Lab Sample ID: 50735

Level (low/med): LOW Date Received: 07/26/95

% Solids: 59.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	66.5			F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

lor Before: Clarity Before: Texture:

olor After: Clarity After: Artifacts:

omments:

U.S. EPA - CLP

1-C

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

T50736

Lab Name: WEYERHAEUSER COMPANY Contract: EMCON

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: T18532

Matrix (soil/water): SOIL Lab Sample ID: 50736

Level (low/med): LOW Date Received: 07/26/95

% Solids: 46.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	91.8			F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

lor Before: Clarity Before: Texture:

lor After: Clarity After: Artifacts:

mments:

U.S. EPA - CLP

1-D

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

T50737

Lab Name: WEYERHAEUSER COMPANY Contract: EMCON

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: T18532

Matrix (soil/water): SOIL Lab Sample ID: 50737

Level (low/med): LOW Date Received: 07/26/95

% Solids: 52.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	33.9			F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

lor Before: Clarity Before: Texture:

olor After: Clarity After: Artifacts:

omments:

U.S. EPA - CLP

EPA SAMPLE NO.

1-E

INORGANIC ANALYSIS DATA SHEET

T50738

Lab Name: WEYERHAEUSER COMPANY Contract: EMCON

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: T18532

Matrix (soil/water): SOIL Lab Sample ID: 50738

Level (low/med): LOW Date Received: 07/26/95

% Solids: 51.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	84.5			F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

lor Before: Clarity Before: Texture:

lor After: Clarity After: Artifacts:

omments:

U.S. EPA - CLP

EPA SAMPLE NO.

1-F

INORGANIC ANALYSIS DATA SHEET

T50739

Lab Name: WEYERHAEUSER COMPANY Contract: EMCON

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: T18532

Matrix (soil/water): SOIL Lab Sample ID: 50739

Level (low/med): LOW Date Received: 07/26/95

% Solids: 54.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	20.0			F
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium				NR
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead				NR
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver				NR
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

lor Before: Clarity Before: Texture:

lor After: Clarity After: Artifacts:

mments:

U.S. EPA - CLP

2A — A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WEYERHAEUSER COMPANY Contract: EMCON

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: T18532

Initial Calibration Source: SPEX

Continuing Calibration Source: BAKER/IN.VEN

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum									NR
Antimony									NR
Arsenic	50.4	51.85	102.9	35.0	35.80	102.3	34.80	99.4	F
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead									NR
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium									NR
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2A - B

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: WEYERHAEUSER COMPANY Contract: EMCON

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: T18532

Initial Calibration Source:

Continuing Calibration Source: BAKER/IN.VEN

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum									NR
Antimony									NR
Arsenic				35.0	36.50	104.3	35.90	102.6	F
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead									NR
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium									NR
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2B-A

CRDL STANDARD FOR AA AND ICP

Lab Name: WEYERHAEUSER COMPANY Contract: EMCON

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: T18532

AA CRDL Standard Source: BAKER

ICP CRDL Standard Source:

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	Initial True	Initial Found	Initial %R	Final Found	Final %R
Aluminum								
Antimony								
Arsenic	10.0	9.80	98.0					
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium								
Silver								
Sodium								
Thallium								
Vanadium								
Zinc								

3-A
BLANKS

Lab Name: WEYERHAEUSER COMPANY Contract: EMCON

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: T18532

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic	0.8	U	0.8	U	0.8	U	-1.0	B	-0.105	B	F
Barium											NR
Beryllium											NR
Cadmium											NR
Calcium											NR
Chromium											NR
Cobalt											NR
Copper											NR
Iron											NR
Lead											NR
Magnesium											NR
Manganese											NR
Mercury											NR
Nickel											NR
Potassium											NR
Selenium											NR
Silver											NR
Sodium											NR
Thallium											NR
Vanadium											NR
Zinc											NR
Cyanide											NR

3-6

BLANKS

Lab Name: WEYERHAEUSER COMPANY Contract: EMCON

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: T18532

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic			-1.0	B					0.080	U	F
Barium											NR
Beryllium											NR
Cadmium											NR
Calcium											NR
Chromium											NR
Cobalt											NR
Copper											NR
Iron											NR
Lead											NR
Magnesium											NR
Manganese											NR
Mercury											NR
Nickel											NR
Potassium											NR
Selenium											NR
Silver											NR
Sodium											NR
Thallium											NR
Vanadium											NR
Zinc											NR
Cyanide											NR

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5A-A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

T50734S

Lab Name: WEYERHAEUSER COMPANY Contract: EMCON

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: T18532

Matrix (soil/water): SOIL Level (low/med): LOW
% Solids for Sample: 50.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony									NR
Arsenic		53.7001		47.2234		7.48	86.6		F
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead									NR
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium									NR
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

mments:

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6-A
DUPLICATES

EPA SAMPLE NO.

T50734D

Lab Name: WEYERHAEUSER COMPANY Contract: EMCON

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: T18532

Matrix (soil/water): SOIL Level (low/med): LOW

% Solids for Sample: 50.9 % Solids for Duplicate: 50.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum								NR
Antimony								NR
Arsenic	1.8	47.2234		46.0934		2.4		F
Barium								NR
Beryllium								NR
Cadmium								NR
Calcium								NR
Chromium								NR
Cobalt								NR
Copper								NR
Iron								NR
Lead								NR
Magnesium								NR
Manganese								NR
Mercury								NR
Nickel								NR
Potassium								NR
Selenium								NR
Silver								NR
Sodium								NR
Thallium								NR
Vanadium								NR
Zinc								NR
Cyanide								NR

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7-A

LABORATORY CONTROL SAMPLE

Lab Name: WEYERHAEUSER COMPANY Contract: EMCON

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: T18532

Solid LCS Source: SPEX

Aqueous LCS Source:

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum									
Antimony									
Arsenic				4.0	4.0		3.2	4.8	100.0
Barium									
Beryllium									
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Magnesium									
Manganese									
Mercury									
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide									

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7-B

LABORATORY CONTROL SAMPLE

Lab Name: WEYERHAEUSER COMPANY Contract: EMCON

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: T18532

Solid LCS Source: SPEX

Aqueous LCS Source:

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum									
Antimony									
Arsenic				4.0	4.0		3.2	4.8	100.0
Barium									
Beryllium									
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Magnesium									
Manganese									
Mercury									
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide									

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8-A

STANDARD ADDITION RESULTS

Lab Name: WEYERHAEUSER COMPANY Contract: EMCON

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: T18532

Concentration Units: ug/L

EPA Sample No.	An	0 ADD ABS	1 ADD CON	1 ADD ABS	2 ADD CON	2 ADD ABS	3 ADD CON	3 ADD ABS	Final Conc.	r	Q

Reviewed 6/15/95

NOT RSC

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10 — A

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: WEYERHAEUSER COMPANY Contract: EMCON

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: T18532

ICP ID Number: Date: 07/15/95

Flame AA ID Number:

Furnace AA ID Number: PE5100A

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200.0		
Antimony			60.0		
Arsenic	193.76	BZ	10.0	0.8	F
Barium			200.0		
Beryllium			5.0		
Cadmium			5.0		
Calcium			5000.0		
Chromium			10.0		
Cobalt			50.0		
Copper			25.0		
Iron			100.0		
Lead			3.0		
Magnesium			5000.0		
Manganese			15.0		
Mercury			0.2		
Nickel			40.0		
Potassium			5000.0		
Selenium			5.0		
Silver			10.0		
Sodium			5000.0		
Thallium			10.0		
Vanadium			50.0		
Zinc			20.0		

Comments:

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13-A

PREPARATION LOG

Lab Name: WEYERHAEUSER COMPANY Contract: EMCON

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: T18532

Method: F

EPA Sample No.	Preparation Date	Weight (gram)	Volume (ml)
LCSS1	08/01/95	1.00	100
LCSS2	08/04/95	1.00	100
PBS1	08/01/95	1.00	100
PBS2	08/04/95	1.00	100
T50734	08/01/95	1.09	100
T50734D	08/04/95	1.30	100
T50734S	08/04/95	1.05	100
T50735	08/01/95	1.17	100
T50736	08/01/95	1.38	100
T50737	08/01/95	1.28	100
T50738	08/01/95	1.25	100
T50739	08/01/95	1.36	100

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14-A
ANALYSIS RUN LOG

Lab Name: WEYERHAEUSER COMPANY Contract: EMCON
Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: T18532
Instrument ID Number: PE5100A Method: F
Start Date: 08/11/95 End Date: 08/11/95

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1233				X																					
S10	1.00	1237				X																					
35	1.00	1242				X																					
75	1.00	1246				X																					
ICV1	1.00	1250				X																					
CB1	1.00	1255				X																					
CV1	1.00	1259				X																					
CCB1	1.00	1304				X																					
RA1	1.00	1308				X																					
BS1	1.00	1312				X																					
PBS1A	1.00	1317	105.0			X																					
LCSS1	1.00	1321				X																					
CSSA	1.00	1326	87.8			X																					
50734	10.00	1330				X																					
T50734A	10.00	1335	94.0			X																					
50735	20.00	1339				X																					
50735A	20.00	1343	91.0			X																					
CCV2	1.00	1348				X																					
CCB2	1.00	1352				X																					
50736	20.00	1356				X																					
50736A	20.00	1401	94.3			X																					
T50737	10.00	1405				X																					
50737A	10.00	1409	96.3			X																					
50738	20.00	1414				X																					
T50738A	20.00	1418	96.0			X																					
50739	5.00	1422				X																					
50739A	5.00	1426	93.5			X																					
CCV3	1.00	1431				X																					
CCB3	1.00	1435				X																					
S2	1.00	1439				X																					
S2A	1.00	1443	102.5			X																					
LCSS2	1.00	1447				X																					

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14-B

ANALYSIS RUN LOG

Lab Name: WEYERHAEUSER COMPANY
Lab Code: WEYER Case No.: 18532
Instrument ID Number: PE5100A
Start Date: 08/11/95

Contract: EMCON
SAS No.: SDG No.: T18532
Method: F
End Date: 08/11/95

EPA Sample No.	D/F	Time	% R	Analytes																												
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
LCSSA	1.00	1452	90.3			X																					
T50734D	10.00	1456				X																					
T50734DA	10.00	1500	94.0			X																					
T50734S	10.00	1504				X																					
CCV4	1.00	1509				X																					
CCB4	1.00	1513				X																					

Weyerhaeuser

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Federal Way, Washington 98003
Analytical Chemistry Laboratories
Tacoma, Washington 98477
Tel (206) 924 6872
Fax (206) 924 6654

SDG NARRATIVE

Organic Analysis

WEYERHAEUSER (WEYER)
ANALYTICAL AND TESTING SERVICES

Case Number: 18532
SDG Number: 50734
Project: Everett Koppers Sediment Samples/EMCON 40141-037.078

The samples from this SDG were received on 7/26/95. The SDG was composed of sediment samples for analysis of PAHs by EPA 8310. The requested analyses were as follows:

SAMPLE ID	LAB ID	MATRIX	ANALYSIS REQUESTED
SR-07A 7/25/95	50740	Sediment	8310
SR-07B 7/25/95	50741	Sediment	8310
SR-07C 7/25/95	50742	Sediment	8310
SR-07D 7/25/95	50743	Sediment	8310
SR-10A 7/25/95	50744	Sediment	8310
SR-10B 7/25/95	50745	Sediment	8310
SR-10C 7/25/95	50746	Sediment	8310
SR-11A 7/24/95	50747	Sediment	8310
SR-11B 7/24/95	50748	Sediment	8310
SR-11C 7/24/95	50749	Sediment	8310
SR-13A 7/24/95	50750	Sediment	8310
SR-13B 7/24/95	50751	Sediment	8310
SR-13B 7/24/95MS	50751MS	Sediment	8310
SR-13B 7/24/95MSD	50751MSD	Sediment	8310
SR-13C 7/24/95	50752	Sediment	8310
LCS	LCS1	Fortified Blank	8310

Several anomalies existed with this sample set that are listed below. The anomalies are broken up into categories for ease of explanation.

1. PAH-8310

   a) The recoveries of surrogates were low for some samples due to the large dilution factor needed for analysis.

   b) The recovery of most matrix spike compounds could not be determined because the concentration of PAHs in the sample greatly exceeded the concentration spiked.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Richard Bogar
Chromatography Team Leader

8/22/95
Date

Please feel free to contact me with any questions concerning this data report. I can be reached at (206) 924-6521.

Sincerely,

Richard Bogar, Chromatography Team Leader
Weyerhaeuser Analytical & Testing Services

Flag Qualifiers For Organic Analysis Reports

U Indicates that the compound was analyzed for but not detected above the reporting limit. The sample reporting limit corrected for dilution and percent moisture is reported.

J Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds or when the data indicates the presence of a compound but the result is less than the sample quantitation limit but greater than zero.

N Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds, where the identification is based on a mass spectral library search.

P This flag is used for a pesticide/Aroclor target analyte when there is greater than 25% difference for the detected concentrations between the two GC columns. The lower of the two results is reported.

C This flag is used for pesticide results that have been confirmed by GC/MS

B This flag is used when the analyte is detected in the associated blank as well as the sample.

E This flag is used for compounds whose concentrations exceed the calibration range of the instrument.

D This flag identifies all compounds identified in an analysis at a secondary dilution. This flag alerts the data user that any discrepancies between the concentrations reported in the two runs may be due to dilution errors.

A This flag is used for tentatively identified compounds that suspected to be aldol-condensation products.

X This flag is assigned by the computer when the program has been manually adjusted by the operator. It has no significance to the number itself.

1B

HPLC ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SR-07A 7/25/95 1115

Lab Name: WEYERHAEUSER Contract:

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: 18532

Matrix: (soil/water) SOIL Lab Sample ID: 50740

Sample wt/vol: 30.10 (g/mL) g Lab File ID: 50740B

Level: (low/med) LOW Date Received: 07/26/95

% Moisture: 53.93 decanted: (Y/N) N Date Extracted:08/01/95

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/11/95

Injection Volume: 25.0(uL) Dilution Factor: 61.0

Silica Cleanup: (Y/N) Y pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
91-20-3	Naphthalene	98.	
83-32-9	Acenaphthene	140	
86-73-7	Fluorene	97.	
120-12-7	Anthracene	11.	
206-44-0	Fluoranthene	75.	
129-00-0	Pyrene	63.	
56-55-3	Benzo(a)Anthracene	15.	
218-01-9	Chrysene	30.	
205-99-2	Benzo(b)fluoranthene	22.	
207-08-9	Benzo(k)fluoranthene	10.	
50-32-8	Benzo(a)pyrene	2.3	U
53-70-3	Dibenzo(a,h)anthracene	9.4	U
191-24-2	Benzo(g,h,i)perylene	7.5	
193-39-5	Indeno(1,2,3-cd)pyrene	2.4	U

1B

HPLC ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SR-07B 7/25/95 1135

Lab Name: WEYERHAEUSER Contract:

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: 18532

Matrix: (soil/water) SOIL Lab Sample ID: 50741

Sample wt/vol: 30.76 (g/mL) g Lab File ID: 50741B

Level: (low/med) LOW Date Received: 07/26/95

% Moisture: 52.81 decanted: (Y/N) N Date Extracted: 08/01/95

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 08/11/95

Injection Volume: 25.0 (uL) Dilution Factor: 61.0

Silica Cleanup: (Y/N) Y pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
91-20-3	Naphthalene	250	
83-32-9	Acenaphthene	310	
86-73-7	Fluorene	130	
120-12-7	Anthracene	25.	
206-44-0	Fluoranthene	180	
129-00-0	Pyrene	144	
56-55-3	Benzo(a)Anthracene	40.	
218-01-9	Chrysene	65.	
205-99-2	Benzo(b)fluoranthene	64.	
207-08-9	Benzo(k)fluoranthene	23.	
50-32-8	Benzo(a)pyrene	7.3	
53-70-3	Dibenzo(a,h)anthracene	9.6	U
191-24-2	Benzo(g,h,i)perylene	3.8	U
193-39-5	Indeno(1,2,3-cd)pyrene	11.	

1B

HPLC ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SR-07C 7/25/95 1125

Lab Name: WEYERHAEUSER Contract:

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: 18532

Matrix: (soil/water) SOIL Lab Sample ID: 50742

Sample wt/vol: 30.17 (g/mL) g Lab File ID: 50742B

Level: (low/med) LOW Date Received: 07/26/95

% Moisture: 55.44 decanted: (Y/N) N Date Extracted: 08/01/95

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 08/11/95

Injection Volume: 25.0 (uL) Dilution Factor: 61.0

Silica Cleanup: (Y/N) Y pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
91-20-3	Naphthalene	23.	U
83-32-9	Acenaphthene	45.	U
86-73-7	Fluorene	11.	
120-12-7	Anthracene	17.	
206-44-0	Fluoranthene	110	
129-00-0	Pyrene	80.	
56-55-3	Benzo(a)Anthracene	48.	
218-01-9	Chrysene	48.	
205-99-2	Benzo(b)fluoranthene	27.	
207-08-9	Benzo(k)fluoranthene	11.	
50-32-8	Benzo(a)pyrene	2.3	
53-70-3	Dibenzo(a,h)anthracene	9.1	U
191-24-2	Benzo(g,h,i)perylene	5.1	
193-39-5	Indeno(1,2,3-cd)pyrene	2.3	U

1B

HPLC ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SR-07D 7/25/95 1300

Lab Name: WEYERHAEUSER Contract:

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: 18532

Matrix: (soil/water) SOIL Lab Sample ID: 50743

Sample wt/vol: 30.16 (g/mL) g Lab File ID: 50743B

Level: (low/med) LOW Date Received: 07/26/95

% Moisture: 54.85 decanted: (Y/N) N Date Extracted: 08/01/95

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 08/11/95

Injection Volume: 25.0 (uL) Dilution Factor: 61.0

Silica Cleanup: (Y/N) Y pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
91-20-3	Naphthalene	2200	
83-32-9	Acenaphthene	390	
86-73-7	Fluorene	130	
120-12-7	Anthracene	15.	
206-44-0	Fluoranthene	66.	
129-00-0	Pyrene	50.	
56-55-3	Benzo(a)Anthracene	14.	
218-01-9	Chrysene	22.	
205-99-2	Benzo(b)fluoranthene	22.	
207-08-9	Benzo(k)fluoranthene	9.4	
50-32-8	Benzo(a)pyrene	2.4	
53-70-3	Dibenzo(a,h)anthracene	9.2	U
191-24-2	Benzo(g,h,i)perylene	3.7	U
193-39-5	Indeno(1,2,3-cd)pyrene	2.4	U

1B
HPLC ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SR-10A 7/25/95 1015

Lab Name: WEYERHAEUSER Contract:

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: 18532

Matrix: (soil/water) SOIL Lab Sample ID: 50744

Sample wt/vol: 30.37 (g/mL) g Lab File ID: 50744B

Level: (low/med) LOW Date Received: 07/26/95

% Moisture: 55.54 decanted: (Y/N) N Date Extracted: 08/01/95

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 08/11/95

Injection Volume: 25.0 (uL) Dilution Factor: 61.0

Silica Cleanup: (Y/N) Y pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
91-20-3	Naphthalene	23.	U
83-32-9	Acenaphthene	120	
86-73-7	Fluorene	6.3	
120-12-7	Anthracene	23.	
206-44-0	Fluoranthene	180	
129-00-0	Pyrene	140	
56-55-3	Benzo(a)Anthracene	39.	
218-01-9	Chrysene	35.	
205-99-2	Benzo(b)fluoranthene	40.	
207-08-9	Benzo(k)fluoranthene	18.	
50-32-8	Benzo(a)pyrene	3.6	
53-70-3	Dibenzo(a,h)anthracene	9.1	U
191-24-2	Benzo(g,h,i)perylene	3.6	U
193-39-5	Indeno(1,2,3-cd)pyrene	2.3	U

1B

HPLC ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SR-10B 7/25/95 1055

Lab Name: WEYERHAEUSER Contract:

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: 18532

Matrix: (soil/water) SOIL Lab Sample ID: 50745

Sample wt/vol: 30.15 (g/mL) g Lab File ID: 50745B

Level: (low/med) LOW Date Received: 07/26/95

% Moisture: 62.54 decanted: (Y/N) N Date Extracted: 08/01/95

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 08/11/95

Injection Volume: 25.0 (uL) Dilution Factor: 61.0

Silica Cleanup: (Y/N) Y pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
91-20-3	Naphthalene	20.	U
83-32-9	Acenaphthene	320	
86-73-7	Fluorene	32.	
120-12-7	Anthracene	38.	
206-44-0	Fluoranthene	160	
129-00-0	Pyrene	110	
56-55-3	Benzo(a)Anthracene	880	
218-01-9	Chrysene	71.	
205-99-2	Benzo(b)fluoranthene	35.	
207-08-9	Benzo(k)fluoranthene	14.	
50-32-8	Benzo(a)pyrene	3.8	
53-70-3	Dibenzo(a,h)anthracene	8.1	U
191-24-2	Benzo(g,h,i)perylene	3.2	U
193-39-5	Indeno(1,2,3-cd)pyrene	2.1	U

1B
HPLC ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SR-10C 7/25/95 1025

Lab Name: WEYERHAEUSER Contract:

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: 18532

Matrix: (soil/water) SOIL Lab Sample ID: 50746

Sample wt/vol: 30.03 (g/mL) g Lab File ID: 50746B

Level: (low/med) LOW Date Received: 07/26/95

% Moisture: 49.30 decanted: (Y/N) N Date Extracted:08/01/95

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 08/11/95

Injection Volume: 25.0 (uL) Dilution Factor: 61.0

Silica Cleanup: (Y/N) Y pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
91-20-3	Naphthalene	26.	U
83-32-9	Acenaphthene	51.	U
86-73-7	Fluorene	16.	
120-12-7	Anthracene	20.	
206-44-0	Fluoranthene	190	
129-00-0	Pyrene	130	
56-55-3	Benzo(a)Anthracene	36.	
218-01-9	Chrysene	57.	
205-99-2	Benzo(b)fluoranthene	58.	
207-08-9	Benzo(k)fluoranthene	16.	
50-32-8	Benzo(a)pyrene	10.	
53-70-3	Dibenzo(a,h)anthracene	10.	U
191-24-2	Benzo(g,h,i)perylene	4.1	U
193-39-5	Indeno(1,2,3-cd)pyrene	2.6	U

1B

HPLC ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SR-11A 7/24/95 1030

Lab Name: WEYERHAEUSER Contract:

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: 18532

Matrix: (soil/water) SOIL Lab Sample ID: 50747

Sample wt/vol: 30.05 (g/mL) g Lab File ID: 50747B

Level: (low/med) LOW Date Received: 07/26/95

% Moisture: 54.51 decanted: (Y/N) N Date Extracted: 08/01/95

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 08/11/95

Injection Volume: 25.0 (uL) Dilution Factor: 61.0

Silica Cleanup: (Y/N) Y pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
91-20-3	Naphthalene	23.	U
83-32-9	Acenaphthene	46.	U
86-73-7	Fluorene	14.	
120-12-7	Anthracene	36.	
206-44-0	Fluoranthene	300	
129-00-0	Pyrene	250	
56-55-3	Benzo(a)Anthracene	84.	
218-01-9	Chrysene	100	
205-99-2	Benzo(b)fluoranthene	94.	
207-08-9	Benzo(k)fluoranthene	37.	
50-32-8	Benzo(a)pyrene	42.	
53-70-3	Dibenzo(a,h)anthracene	9.3	U
191-24-2	Benzo(g,h,i)perylene	3.7	U
193-39-5	Indeno(1,2,3-cd)pyrene	23.	

1B

HPLC ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SR-11B 7/24/95 1115

Lab Name: WEYERHAEUSER Contract:

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: 18532

Matrix: (soil/water) SOIL Lab Sample ID: 50748

Sample wt/vol: 30.70 (g/mL) g Lab File ID: 50748B

Level: (low/med) LOW Date Received: 07/26/95

% Moisture: 67.73 decanted: (Y/N) N Date Extracted:08/01/95

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/11/95

Injection Volume: 25.0(uL) Dilution Factor: 61.0

Silica Cleanup: (Y/N) Y pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
91-20-3	Naphthalene	19.	U
83-32-9	Acenaphthene	37.	U
86-73-7	Fluorene	5.1	
120-12-7	Anthracene	47.	
206-44-0	Fluoranthene	51.	
129-00-0	Pyrene	65.	
56-55-3	Benzo(a)Anthracene	22.	
218-01-9	Chrysene	24.	
205-99-2	Benzo(b)fluoranthene	23.	
207-08-9	Benzo(k)fluoranthene	12.	
50-32-8	Benzo(a)pyrene	19.	
53-70-3	Dibenzo(a,h)anthracene	7.5	U
191-24-2	Benzo(g,h,i)perylene	3.0	U
193-39-5	Indeno(1,2,3-cd)pyrene	1.9	U

1B
HPLC ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SR-11C 7/24/95 1140

Lab Name: WEYERHAEUSER Contract:

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: 18532

Matrix: (soil/water) SOIL Lab Sample ID: 50749

Sample wt/vol: 30.53 (g/mL) g Lab File ID: 50749B

Level: (low/med) LOW Date Received: 07/26/95

% Moisture: 67.88 decanted: (Y/N) N Date Extracted: 08/01/95

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 08/11/95

Injection Volume: 25.0 (uL) Dilution Factor: 13.0

Silica Cleanup: (Y/N) Y pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
91-20-3	Naphthalene	5.3	
83-32-9	Acenaphthene	7.9	U
86-73-7	Fluorene	4.4	
120-12-7	Anthracene	8.2	
206-44-0	Fluoranthene	85.	
129-00-0	Pyrene	85.	
56-55-3	Benzo(a)Anthracene	23.	
218-01-9	Chrysene	33.	
205-99-2	Benzo(b)fluoranthene	27.	
207-08-9	Benzo(k)fluoranthene	11.	
50-32-8	Benzo(a)pyrene	13.	
53-70-3	Dibenzo(a,h)anthracene	7.5	
191-24-2	Benzo(g,h,i)perylene	0.77	
193-39-5	Indeno(1,2,3-cd)pyrene	11.	

1B
HPLC ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SR-13A 7/24/95 0945

Lab Name: WEYERHAEUSER Contract:

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: 18532

Matrix: (soil/water) SOIL Lab Sample ID: 50750

Sample wt/vol: 30.30 (g/mL) g Lab File ID: 50750B

Level: (low/med) LOW Date Received: 07/26/95

% Moisture: 75.54 decanted: (Y/N) N Date Extracted:08/01/95

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/11/95

Injection Volume: 25.0(uL) Dilution Factor: 13.0

Silica Cleanup: (Y/N) Y pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
91-20-3	Naphthalene	3.6	U
83-32-9	Acenaphthene	7.1	U
86-73-7	Fluorene	4.1	
120-12-7	Anthracene	12.	
206-44-0	Fluoranthene	120	
129-00-0	Pyrene	69.	
56-55-3	Benzo(a)Anthracene	22.	
218-01-9	Chrysene	68.	
205-99-2	Benzo(b)fluoranthene	19.	
207-08-9	Benzo(k)fluoranthene	7.0	
50-32-8	Benzo(a)pyrene	7.8	
53-70-3	Dibenzo(a,h)anthracene	2.1	
191-24-2	Benzo(g,h,i)perylene	0.57	U
193-39-5	Indeno(1,2,3-cd)pyrene	11.	

1B

HPLC ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SR-13B 7/24/95 1010

Lab Name: WEYERHAEUSER Contract:

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: 18532

Matrix: (soil/water) SOIL Lab Sample ID: 50751

Sample wt/vol: 32.02 (g/mL) g Lab File ID: 50751B

Level: (low/med) LOW Date Received: 07/26/95

% Moisture: 84.24 decanted: (Y/N) N Date Extracted: 08/01/95

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 08/10/95

Injection Volume: 25.0 (uL) Dilution Factor: 13.0

Silica Cleanup: (Y/N) Y pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
91-20-3	Naphthalene	3.2	U
83-32-9	Acenaphthene	6.6	
86-73-7	Fluorene	4.3	
120-12-7	Anthracene	2.4	
206-44-0	Fluoranthene	13.	
129-00-0	Pyrene	19.	
56-55-3	Benzo(a)Anthracene	7.9	
218-01-9	Chrysene	13.	
205-99-2	Benzo(b)fluoranthene	7.7	
207-08-9	Benzo(k)fluoranthene	3.4	
50-32-8	Benzo(a)pyrene	1.7	
53-70-3	Dibenzo(a,h)anthracene	1.3	U
191-24-2	Benzo(g,h,i)perylene	0.51	U
193-39-5	Indeno(1,2,3-cd)pyrene	3.0	

1B
HPLC ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SR-13C 7/24/95 1000

Lab Name: WEYERHAEUSER Contract:

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: 18532

Matrix: (soil/water) SOIL Lab Sample ID: 50752

Sample wt/vol: 31.72 (g/mL) g Lab File ID: 50752B

Level: (low/med) LOW Date Received: 07/26/95

% Moisture: 63.84 decanted: (Y/N) N Date Extracted:08/01/95

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/11/95

Injection Volume: 25.0(uL) Dilution Factor: 61.0

Silica Cleanup: (Y/N) Y pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
91-20-3	Naphthalene	20.	U
83-32-9	Acenaphthene	39.	U
86-73-7	Fluorene	8.5	
120-12-7	Anthracene	68.	
206-44-0	Fluoranthene	440	
129-00-0	Pyrene	280	
56-55-3	Benzo(a)Anthracene	130	
218-01-9	Chrysene	250	
205-99-2	Benzo(b)fluoranthene	120	
207-08-9	Benzo(k)fluoranthene	39.	
50-32-8	Benzo(a)pyrene	110	
53-70-3	Dibenzo(a,h)anthracene	28.	
191-24-2	Benzo(g,h,i)perylene	3.2	U
193-39-5	Indeno(1,2,3-cd)pyrene	36.	

1B

HPLC ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PAH_BL3

Lab Name: WEYERHAEUSER Contract:

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: 18532

Matrix: (soil/water) SOIL Lab Sample ID: PAH_BL3

Sample wt/vol: 30 (g/mL) g Lab File ID: PAH_BL3

Level: (low/med) LOW Date Received: 07/26/95

% Moisture: _____ decanted: (Y/N)___ Date Extracted:08/01/95

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/10/95

Injection Volume: 25.0(uL) Dilution Factor: 1

Silica Cleanup: (Y/N) Y pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
91-20-3	Naphthalene	0.21	U
83-32-9	Acenaphthene	0.41	U
86-73-7	Fluorene	0.41	U
120-12-7	Anthracene	0.0082	U
206-44-0	Fluoranthene	0.021	U
129-00-0	Pyrene	0.041	U
56-55-3	Benzo(a)Anthracene	0.021	U
218-01-9	Chrysene	0.021	U
205-99-2	Benzo(b)fluoranthene	0.0081	U
207-08-9	Benzo(k)fluoranthene	0.0080	U
50-32-8	Benzo(a)pyrene	0.021	U
53-70-3	Dibenzo(a,h)anthracene	0.083	U
191-24-2	Benzo(g,h,i)perylene	0.033	U
193-39-5	Indeno(1,2,3-cd)pyrene	0.021	U

2C
WATER HPLC SURROGATE RECOVERY

Lab Name: WEYERHAEUSER Contract:

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: 18532

EPA SAMPLE NO.	S1 #	S2 #	S3 #	S4 #	S5 #	S6 #	S7 #	S8 #	TOT OUT
50751B 13B	94								0
50751MS 13B	108								0
50751MSD 13B	119								0
50740B SR7A	11*								D
50741B SR7B	60								D
50742B SR7C	45								D
50743B SR7D	52								D
50744B 10A	101								D
50745B 10B	52								D
50746B 10C	87								D
50747B 11A	96								D
50748B 11B	108								D
50749B 11C	67								D
50750B 13A	91								0
50752B 13C	35								0
PAH_LCS3	58								D
PAH_BL13	112								0
									0

QC LIMITS

S1 = 2-fluorobiphenyl (NA)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D System Monitoring Compound diluted out

WATER HPLC LABORATORY CONTROL SPIKE RECOVERY

Lab Name: WEYERHAEUSER Contract:

Lab Code: WEYER Case No.: 18208 SAS No.: SDG No.: 18209

Laboratory Control Spike - EPA Sample No.: PAH_LCS3

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC. LIMITS REC.
Naphthalene	3.329	0.00	0.436	13	NA
Acenaphthene	6.613	0.00	1.384	21	NA
Fluorene	0.671	0.00	0.188	28	NA
Anthracene	0.131	0.00	0.040	31	NA
Fluoranthene	0.332	0.00	0.141	42	NA
Pyrene	0.661	0.00	0.447	68	NA
Benzo(a)anthracene	0.330	0.00	0.246	74	NA
Chrysene	0.331	0.00	0.304	92	NA
Benzo(b)fluoranthene	0.129	0.00	0.105	81	NA
Benzo(k)fluoranthene	0.129	0.00	0.112	87	NA
Benzo(a)pyrene	0.331	0.00	0.164	50	NA
Dibenzo(a,h)anthracene	1.326	0.00	1.024	77	NA
Benzo(ghi)perylene	0.532	0.00	0.357	67	NA
Indeno(1,2,3-cd)pyrene	0.339	0.00	0.289	85	NA

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

COMMENTS: _____

WATER HPLC MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: WEYERHAEUSER Contract:

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: 18532

Matrix Spike - EPA Sample No.: 50751

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC. LIMITS REC.
Naphthalene	3.329	0.000	2.093	63	NA
Acenaphthene	6.613	5.551	9.854	65	NA
Fluorene	0.671	3.640	0.689	*	NA
Anthracene	0.131	2.015	0.884	*	NA
Fluoranthene	0.332	10.946	9.581	*	NA
Pyrene	0.661	16.302	10.959	*	NA
Benzo(a)anthracene	0.330	6.630	4.420	*	NA
Chrysene	0.331	10.868	6.760	*	NA
Benzo(b)fluoranthene	0.129	6.513	4.758	*	NA
Benzo(k)fluoranthene	0.129	2.847	2.405	*	NA
Benzo(a)pyrene	0.331	1.443	0.741	*	NA
Dibenzo(a,h)anthracene	1.326	0.471	1.274	61	NA
Benzo(ghi)perylene	0.532	1.560	1.599	*	NA
Indeno(1,2,3-cd)pyrene	0.339	2.509	2.197	*	NA

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Naphthalene	3.329	2.808	84	15	NA	NA
Acenaphthene	6.613	10.920	81	11	NA	NA
Fluorene	0.671	0.663	*	*	NA	NA
Anthracene	0.131	4.017	*	*	NA	NA
Fluoranthene	0.332	9.945	*	*	NA	NA
Pyrene	0.661	9.230	*	*	NA	NA
Benzo(a)anthracene	0.330	4.650	*	*	NA	NA
Chrysene	0.331	10.322	*	*	NA	NA
Benzo(b)fluoranthene	0.129	5.460	*	*	NA	NA
Benzo(k)fluoranthene	0.129	2.405	*	*	NA	NA
Benzo(a)pyrene	0.331	0.559	*	*	NA	NA
Dibenzo(a,h)anthracene	1.326	1.196	55	4	NA	NA
Benzo(ghi)perylene	0.532	0.130	*	*	NA	NA
Indeno(1,2,3-cd)pyrene	0.339	1.560	*	*	NA	NA

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

COMMENTS: The spike level was too low to be observed above sample levels for all but the three indicated compounds. A 13/1 dilution was necessary for 50751B, 50751MS and 50751MSD.

4B
HPLC METHOD BLANK SUMMARY

EPA SAMPLE NO.

PAH_BL3

Lab Name: Weyerhaeuser Analytical Contract:

Lab Code: WEYER Case No.: 18532 SAS No.: SDG No.: 18532

Lab File ID: PAH_BL3 Lab Sample ID: PAH_BL3

Instrument ID: Millenium Sys 1 Date Extracted: 08/01/95

Matrix: (soil/water) SOIL Date Analyzed: 08/10/95

Level: (low/med) LOW Time Analyzed: 0933

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	SR-07A 7/25/95 1115	50740	50740B	08/11/95
02	SR-07B 7/25/95 1135	50741	50741B	08/11/95
03	SR-07C 7/25/95 1125	50742	50742B	08/11/95
04	SR-07D 7/25/95 1300	50743	50743B	08/11/95
05	SR-10A 7/25/95 1015	50744	50744B	08/11/95
06	SR-10B 7/25/95 1055	50745	50745B	08/11/95
07	SR-10C 7/25/95 1025	50746	50746B	08/11/95
08	SR-11A 7/24/95 1030	50747	50747B	08/11/95
09	SR-11B 7/24/95 1115	50748	50748B	08/11/95
10	SR-11C 7/24/95 1140	50749	50749B	08/11/95
11	SR-13A 7/24/95 0945	50750	50750B	08/11/95
12	SR-13B 7/24/95 1010	50752	50752B	08/11/95
13	SR-13C 7/24/95 1000	50751	50751B	08/10/95
14	SR-13B 7/24/95 1010	50751MS	50751MS	08/10/95
15	SR-13B 7/24/95 1010	50751MSD	50751MSD	08/11/95
16		PAH_LCS3	50746B	08/10/95

COMMENTS:

DATA VALIDATION REPORT

WEYERHAEUSER EVERETT
FORMER MILL E/KOPPERS FACILITY
PHASE III SEDIMENT SAMPLES
SERVICE REQUEST 18532

The following report presents a summary of the data validation review of analytical results for 18 sediment samples plus one field duplicate collected from the Snohomish River near the Former Mill E/Koppers Facility. Samples were collected on July 24 and 25, 1995. Samples were analyzed by Weyerhaeuser Analytical and Testing Services of Federal Way, Washington. Sample numbers, dates of collection, and analyses conducted on each sample are shown in Table 2 of the report.

Data Qualifications

The following comments refer to the laboratory performance in meeting the quality control (QC) specifications outlined in the analytical procedures referenced in the *Weyerhaeuser Everett Sediments Work Plan* (EMCON, 1995) and as required under Puget Sound Estuary Program protocols (USEPA, 1986 plus updates). Analytical results were reviewed following procedures presented in *Laboratory Data Validation Functional Guidelines for Evaluating Inorganics and Organics Analyses* (USEPA, 1988a,b) and applying appropriate method QC criteria.

Timeliness

All sample analyses were conducted within holding time limits.

Calibration

Summary forms for inorganics initial and continuing calibrations were evaluated for compliance with QC criteria (USEPA, 1988b). All inorganics calibration results were within QC criteria.

Blank Results

Method blanks were analyzed at the required frequency. No contaminants were reported in method blanks.

Surrogate Recovery

The recovery of the surrogate compound 2-fluorobiphenyl in the polycyclic aromatic hydrocarbon (PAH) analyses ranged from 11 to 119 percent. No QC criteria for Method 8310 surrogate recovery were presented by WATS. Based on recommended QC criteria (USEPA, 1986) of 30-115 percent recovery for 2-fluorobiphenyl in Method 8270, only the surrogate recovery for sample SR-07A was below QC criteria. Sample SR-07A required dilution by a factor of 61, which caused the low recovery. No data qualifiers were assigned to sample results based on surrogate recoveries.

Furnace Atomic Absorption QC

Furnace atomic absorption QC uses duplicate injections and post digestion spikes to monitor precision and accuracy of sample analyses. The summary forms indicated post-digest spike recoveries and duplicate injection results were within QC criteria.

MS/MSD Results

The arsenic MS results were within QC limits. The spike compound concentrations were too low to be observed for all but three compounds in the PAH analyses because the sample required a dilution of 13 to 1. The recoveries for naphthalene, acenaphthene, and dibenzo(a,h)anthracene reported in the PAH MS/MSD analysis ranged from 55 to 84 percent. The relative percent difference (RPD) between MS and MSD recoveries for the PAH spike compounds was 15, 11, and 4 percent for naphthalene, acenaphthene, and dibenzo(a,h)anthracene, respectively.

The spike sample results were judged to be acceptable.

LCS Results

The recoveries for arsenic and PAH spike compounds in the laboratory control sample (LCS) analyses were within QC criteria.

Laboratory Duplicate Analyses

All laboratory duplicate results were within QC criteria (USEPA, 1986, 1988a).

Field Duplicate Results

Samples SR-07A and SR-07D were collected as field duplicate samples and analyzed for salinity, grain size, TOC, and PAHs. Results for compounds that were detected in the field duplicate samples are presented in Table B-1.

The precision of the field duplicate sample analyses, as represented by the RPD between results for detected compounds, was within QC limits for all compounds except naphthalene and acenaphthene. No data qualifiers were assigned.

Identification, Quantitation, Verification, and Reporting Limits

No data transcriptions errors or anomalous results were found during the data validation review. Three PAH compounds included in the sediment management standards criteria (phenanthrene, acenaphthylene, and 2-methylnaphthalene) that were reported with previous sediment sample results were not included with the Method 8310 results.[1] Acenaphthylene and phenanthrene do not fluoresce well and therefore require an ultraviolet detector, which is not available at WATS. Method 8310 does not normally include a 2-methylnaphthalene standard, therefore this compound was not included.

Overall Assessment of Data

Data precision was evaluated by comparison of duplicate and MS/MSD results to data quality objectives. Accuracy of the data was evaluated using MS/MSD, LCS, and blank sample results. The accuracy and precision of the analyses met data quality objectives and the results were judged to be acceptable for the intended use in site characterization. The difference between the field duplicate sample naphthalene and acenaphthene results was greater than 50 percent, indicating heterogeneous distributions of contaminants may be encountered. The usefulness of the data is based on criteria outlined in: *Laboratory Data Validation Functional Guidelines for Evaluating Inorganics and Organics Analyses* (USEPA, 1988a,b).

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[1] None of these compounds are those which exceeded the Department of Ecology's screening criteria for identification of a station cluster of potential concern (i.e., arsenic, acenaphthene, and naphthalene).

The data are judged to be ACCEPTABLE for their intended use. The usefulness of results are modified by assignment of the following data qualifiers to individual compound and sample results:

- U - The material was analyzed for, but was not detected at a concentration greater than the associated value. The associated numerical value is the sample quantitation limit for organics analyses and the sample detection limit for inorganics analyses.

LIST OF REFERENCES

EMCON. 1995. Weyerhaeuser Everett sediments work plan. June 26, 1995.

U. S. Environmental Protection Agency. 1986. Test methods for evaluating solid waste: physical/chemical methods. USEPA, Office of Solid Waste and Emergency Response. EPA 530/SW-846.

U. S. Environmental Protection Agency. 1988a. Laboratory data validation functional guidelines for evaluating inorganics analyses. Prepared for the Hazardous Site Evaluation Division, USEPA. Prepared by the USEPA Data Review Work Group.

U. S. Environmental Protection Agency. 1988b. Laboratory data validation functional guidelines for evaluating organics analyses. Prepared for the Hazardous Site Evaluation Division, USEPA. Prepared by the USEPA Data Review Work Group.

Table B-1

Field Duplicate Results
Phase III Sediment Sampling
Weyerhaeuser Everett
Former Mill E/Koppers Facility

Compound	Concentration (mg/kg)			RPD[a]
	Sample 1	Sample 2	Average	
Samples SR-07A, SR-07D				
Salinity[b]	9.1	9.1	9.1	0
TOC[b]	2.4	2.5	2.45	4.1
Naphthalene	0.098	2.2	1.15	180
Acenaphthene	0.140	0.390	0.265	94
Fluorene	0.097	0.130	0.114	29
Anthracene	0.011	0.015	0.013	31
Fluoranthene	0.075	0.066	0.070	13
Pyrene	0.063	0.050	0.056	23
Benzo(a)anthracene	0.015	0.014	0.014	6.9
Chrysene	0.030	0.022	0.026	31
Benzo(b)fluoranthene	0.022	0.022	0.22	0
Benzo(k)fluoranthene	0.010	0.0094	0.0097	6.2
Benzo(a)pyrene	0.0023 U	0.0024	NA	NA
Benzo(g,h,i)perylene	0.0075	0.0037 U	NA	NA
Sand[b]	23.4	22.1	22.8	5.7
Silt[b]	59.6	64.7	62.2	8.2
Clay[b]	17.1	13.2	15.2	26

NOTE: U =the material was analyzed for, but not detected at, a concentration greater than the associated value. The associated numerical value is the sample quantitation limit for organics analyses.

[a] RPD = relative percent difference.

[b] Salinity is presented in units of parts per thousand; TOC and grain size (sand, silt, and clay) are presented in units of weight percent.

[c] NA indicates not applicable; only one of two samples with detected results.