DRAFT REPORT

Columbia River Basin Contaminant Database:

Data Abstract Report

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OFFICE OF WATER
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WASHINGTON, D.C.

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1.0 INTRODUCTION

The Columbia River Inter-Tribal Fish Commission (CRITFC) entered into a cooperative agreement with the U.S. Environmental Protection Agency (EPA) in 1990 to conduct a fish consumption survey of the Nez Perce, Warm Springs, Umatilla, and Yakima Native American Tribes. This consumption survey, which was released in October 1994 (CRITFC 1994), was the first phase of a broader effort to determine the role of fish consumption as an exposure route for waterborne toxic chemicals among individuals of these tribes. The second phase of this study, which was initiated in August 1994, consists of three discrete tasks: 1) compilation of historical data on chemical contaminants in fish tissue and sediments into a database; 2) design and implementation of a study to collect additional data on chemical contaminant levels in fish being consumed by tribal members, and 3) evaluation and interpretation of the collected data. The third phase of this exposure study, which has not been initiated, will determine blood contaminant levels of tribal members. Collectively, these three components should provide the necessary information for developing an exposure assessment for members of the four CRITFC tribes.

This document was produced as part of task 1 of the second phase of EPA's CRITFC exposure study. The primary focus of task 1 is to compile exiting data (1984 to 1994) on chemical contaminant levels in fish tissue and sediments, in the areas fished by CRITFC member tribes (i.e., the Columbia River basin), into a computerized database. Information provided in this document is intended to facilitate the use and interpretation of the database. Section 2.0 of this document provides information on the technical approach used to create the contaminant database. Section 3.0 provides a brief overview of ongoing, or future, studies that may provide data in the future. The five appendices included with this document contain the following information:

- List of individuals and agencies contacted to obtain data (Appendix A)
- List of identified contaminant data sources for the Columbia River Basin (Appendix B)

- Abstracts for biota contaminant studies that contributed data to the database (Appendix C)
- Abstracts for sediment contaminant studies that contributed data to the database (Appendix D)
- A list of 9-character chemical codes names used in the database (Appendix E)
- An overview of ongoing, or future, studies that may provide data in the future.

2.0 TECHNICAL APPROACH

The compilation of data into the computerized database involved several discrete activities that are listed below:

- Identification of the scope of data to be included in the database
- Selection of the database format
- Identification of potential sources of data
- Selection of data to be entered into the database
- Data entry
- Preparation of data abstracts.

Each of these activities will be discussed in the following sections.

2.1 SCOPE OF DATA TO BE INCLUDED IN THE DATABASE

The contaminant database task was initiated primarily to assist EPA in the development of a study design for collecting additional contaminant data for fish being consumed by CRITFC member tribes. The compiled data were to serve two short-term objectives. First, evaluation of the existing data would allow identification of areas, chemicals, and fish species for which the existing data were thought to be sufficient, or inadequate, to meet the data collection needs of EPA's Phase II CRITFC exposure study. Second, a risk-based screening analysis of the existing data would identify chemicals of potential concern that should be included as analytes for the Phase II study. A longer-term objective was the consolidation of existing data so that this information could be used for other activities being conducted by EPA in the Columbia River basin.

To meet the above objectives, while recognizing the limitations of available resources, it was decided that data collection activities would attempt to compile biota and sediment contaminant data collected within the Columbia River basin during the last ten years (1984 to 1994). The portion of the Columbia River basin that extends into Canada was excluded from data collection activities. While data were collected from contaminant studies that have taken place in Montana, the primary emphasis was the compilation of data in areas fished by CRITFC member tribes. Tribal fishing areas are located in Idaho, Oregon, and Washington. Compilation of data on contaminant levels in biota was limited to aquatic organisms (fish, crustaceans, and molluscs); data for birds and mammals were not entered into the database.

2.2 DATABASE FORMAT

To ensure that the compiled data would meet the needs of a variety of different users, the data are provided in two different formats (database format and spreadsheet format) and in a number of commercial electronic software versions. The two formats present the chemical data in different ways, which affect the ease with which different analyses or data summaries can be performed. The database format presents the information with descriptive and chemical information provided in separate columns (field names). Tables 1 and 2 provide the field names (column headings) and structure for the biota and sediment database formats, respectively. With this type of format the analysis of a single sample for several analytes will occupy several rows in the database. The advantage of the database format is that it reduces the number of columns required in the database, and by using the database querying and reporting capabilities, this format facilitates working with large amounts of data. The spreadsheet format also presents the information with descriptive and chemical information provided in separate columns (field names); however, the data for each chemical analyzed in an individual sample, along with the concentration and data qualifier, are presented in a separate column. Thus, each row of the database presents all of the data for a particular sample. Because the number of different chemicals analyzed for a given sample may be quite large, separate spreadsheets have been created for different chemical groups (e.g., metals, semivolatiles, pesticides, dioxin/furans). This format is more compatible with conventional spreadsheet use and facilitates the use of graphing and statistical tools that are available with conventional electronic spreadsheets.

TABLE 1. SUMMARY OF THE AQUATIC BIOTA CONTAMINANT DATABASE STRUCTURE

Field Name	Description	Field Type
Station_ID	Station number from report	A35
EPARegion	EPA Region (e.g., 10) where sample collected	N
Lat(DMD)	Latitude in degrees-minutes-decimal	N
Lon(DMD)	Longitude in degrees-minutes-decimal	N
Lat(DD)	Latitude in degrees-decimal	N
Lon(DD)	Longitude in degrees-decimal	N
PosDesc	Latitude/longitudes that were not provided in a report were estimated (E=estimated)	A5
State	State where sample was collected	A7
Waterbody	River reach or basin where sample was collected	A27
ScrnBasin	Major river basin identified in the CRITFC study	A45
RMile	River mile of sample location if provided	N
RMileMin	Downstream river mile if River Mile range provided	N
RMileMax	Upstream river mile if River Mile range provided	N
Location	Location name or nearby landmark provided in report	A91
Sponsor	Sponsor(s) of the study	A30
Ref_Source	Authors or personal communication source of original data	A50
Ref_ID	Reference number from Appendix B of the Abstract Report	N
Date	Sampling date if provided	D
Year	Sampling year	N
Month	Sampling month if provided	N
Day	Sampling day if provided	N
DRangeMon	Time range (in months) over which study was conducted	N
Family	Family, Order, or Class of organism analyzed	A50
Genus	Genus of the organism analyzed	A17
Species	Species of the organism analyzed	A14
CommonName	Common name of the organism analyzed	A25
CaptMethod	Collection method employed to collect the sample	A55
Tis_Type	The portion of the organism that was sampled (i.e., fillet)	A17
Comp_Num	The number of organisms in a composite sample	N
Comp_Type	Identifies the type of sample (C=composite, I=individual)	A15
MLgth_(cm)	Length of organism(s) in centimeters--mean length provided for composite samples	N
MWt_(gm)	Weight of organism(s) in centimeters--mean length provided for composite samples	N
MAge_(yr)	Age of organism(s) in years--mean age provided for composite samples	A5
Sex	Sex of organism(s) if provided	A3
PerLipids	Percent lipid content of sample if provided	N
PerMoistur	Percent moisture content of sample if provided	N
Samp_#	Sample number--a temporary sample number was entered if none was provided in the original report	A24
Replicate	Replicate number if field or laboratory replicate reported	A5
AnalMethod	Chemical analytical method if provided	A15
Units	Concentration units for chemical data--ug/Kg throughout	A14
ChemGroup	Chemical group (e.g., Dioxin/furans, Butyltins, Metals, etc.)	A30
CAS_#	Chemical Abstract Service Registry number	A15
Chemical	Chemical name using a 10-character code--A dictionary is provided in Appendix E	A30
Concentrat	The reported concentration or detection limit--concentration reported is on a wet weig	N
Qualifier	The reported qualifier code (e.g., U=not detected)	A9

Field Types:
- N = Numeric
- D = Date
- A7 = Alphanumeric

TABLE 2. SUMMARY OF THE SEDIMENT CONTAMINANT DATABASE STRUCTURE

Field Name	Description	Field Type
Station_ID	Station number from report	A30
EPARegion	EPA Region (e.g., 10) where sample collected	N
Lat(DMD)	Latitude in degrees-minutes-decimal	N
Lon(DMD)	Longitude in degrees-minutes-decimal	N
Lat(DD)	Latitude in degrees-decimal	N
Lon(DD)	Longitude in degrees-decimal	N
PosDesc	Latitude/longitudes that were not provided in a report were estimated (E=estimate	A5
State	State where sample was collected	A7
Waterbody	River reach or basin where sample was collected	A50
RMile	River mile of sample location if provided	N
RMileMin	Downstream river mile if River Mile range provided	N
RMileMax	Upstream river mile if River Mile range provided	N
Location	Location name or nearby landmark provided in report	A75
Sponsor	Sponsor(s) of the study	A15
Ref_Source	Authors or personal communication source of original data	A30
Ref_ID	Reference number from Appendix B of the Abstract Report	N
Date	Sampling date if provided	D
Year	Sampling year	N
Month	Sampling month if provided	N
Day	Sampling day if provided	N
DRangeMon	Time range (in months) over which study was conducted	N
Depth_(ft)	Water depth at sampling location in feet	N
S_Dpth(cm)	Sampling depth from the sediment surface in centimeters	N
Coll_Meth	Method or equipment used to collect the sediment sample	A35
Samp_Portn	Portion of sediment analyzed (e.g., bulk, size fraction $<63\mu m$, etc.)	A35
Samp_Type	Type of sample collected (e.g., C=composite, I=individual grab sample)	A15
Comp_Size	Number of grab samples in a composite sample	N
Grn_Sz_Mn	Mean grain size in millimeters	N
Grn_Sz_Md	Median grain size in millimeters	N
%Gravel	Percent gravel content (dry weight) of sample if provided	N
%Sand	Percent sand content (dry weight) of sample if provided	N
%Silt	Percent silt content (dry weight) of sample if provided	N
%Clay	Percent clay content (dry weight) of sample if provided	N
%Fines	Percent fines (silt+clay) content (dry weight) of sample if provided	N
%TOC	Percent TOC content (dry weight) of sample if provided	N
%Vol_Sol	Percent volatile solids content (dry weight) of sample if provided	N
%Moisture	Percent moisture content of sample if provided	N
%Solids	Percent solids content of sample if provided	N
Samp_#	Sample number--a temporary sample number was entered if none was provided in the original report	A25
Replicate	Replicate number if field or laboratory replicate reported	A5
AnalMethod	Chemical analytical method if provided	A15
Units	Concentration units for chemical data--ug/Kg throughout	A14
ChemGroup	Chemical group (e.g., Dioxin/furans, Butyltins, Metals, etc.)	A50
CAS_#	Chemical Abstract Service Registry number	A50
Chemical	Chemical name using a 10-character code--A dictionary is provided in Appendix E	A30
Concentrat	The reported concentration or detection limit--concentration reported is typically on a dry weight basis	N
Qualifier	The reported qualifier code (e.g., U=not detected)	A9

Field Types:
N = Numeric
D = Date
A7 = Alphanumeric

The database format was provided in dBase IV and Paradox 4.5. For the aquatic biota and sediment data, two different database files were provided for each medium. The first file (Tissue1 and Sedimnt2, respectively) contains the complete chemical name for each chemical reported in the database. The second file (Tissue2 and Sedimnt2, respectively) contains 9-character code names for the chemicals reported in the database. The second file was used as the template to create the separate spreadsheet format files which incorporate the 9-character chemical code name as the column header for each chemical reported in the spreadsheet. The 9-character field names were necessary because of a limitation on the number of characters in the column header of dBase files. The spreadsheet format files were provided in Lotus (.WK1) and Microsoft Excel 4.0 (.XLS) format. An electronic chemical dictionary (in Lotus and Excel format) has also been included. This file provides a key to the 9-character chemical code names.

2.3 IDENTIFICATION OF DATA SOURCES

Personnel of State and Federal environmental agencies, as well as university faculty and staff of private consulting firms were contacted to identify and obtain available biota and sediment contaminant data for the U.S. EPA, Region X, portions of the Columbia River basin (Idaho, Oregon, and Washington). The contacted personnel and their respective organizations are provided in Appendix A. These contacts resulted in the compilation of 121 reports, or collections of laboratory data, containing information on historical and ongoing environmental monitoring and research activities in the Columbia River basin (see Appendix B).

2.4 DATA SELECTION

Specific data sets selected for entry into the contaminant database met the following criteria:

- Data were collected within the Columbia River basin in the states of Idaho, Oregon, Montana, and Washington
- Data were collected from 1984 to the present

- Data were for aquatic organisms or sediments

- Data were reported in the original documents or directly from the laboratory data reports.

Data collected prior to 1984, and data for birds and mammals, were not entered in the database. Also, data summarized in secondary sources were not entered into the database, as it was not possible to verify their accuracy. Data collected within Montana were limited to contaminant data collected in large programs that included results from other locations in the Columbia River basin (i.e., National Contaminant Biomonitoring Program and the National Study of Chemical Residues in Fish).

2.5 DATA ENTRY

Selected data sets were entered into electronic spreadsheets, checked against the original reports for accuracy, and then electronically transferred into a Paradox 4.5 database (DOS version). Information within this database was manipulated to create the database structures described in Section 2.2.

2.6 DATA ABSTRACTS

The Columbia River Basin Contaminant Databases currently contain aquatic biota contaminant data from 21 individual data sources (Table 3) and sediment contaminant data from 31 individual data sources (Table 4). Abstracts for these biota and sediment data sources are provided in Appendix C and D, respectively. These abstracts contain the following information:

- Study sponsor
- Area of study
- Study reference [see Appendix B for the full citation]
- Agency contact name and phone number for additional information
- Species or sediment fraction analyzed
- Types of tissue samples collected (i.e., whole body, fillet, etc.)
- Collection dates

TABLE 3. OVERVIEW OF AQUATIC BIOTA CONTAMINANT DATA FOR THE COLUMBIA RIVER BASIN					
Sponsor	Reference	Study location	# of Samples	% of Total	Years (min-max)
ODEQ	ODEQ 1994	Willamette River basin	126	12.3	1988-1991
USFWS	Schuler 1994	Lower Columbia River	123	12.0	1990-1991
NWPPA	Beak 1989a	Lower Columbia River	120	11.8	1989
Bi-State	Tetra Tech 1993	Lower Columbia River	108	10.6	1991
USGS	Rinella et al. 1992	Yakima River basin	75	7.3	1989-1990
WDOE	Johnson et al. 1991b	Lake Roosevelt	48*	4.7	1990
WDOE	Serdar et al. 1994	Lake Roosevelt	48	4.7	1992-1993
WDOE	Johnson et al. 1986	Yakima River	46	4.5	1985
WDOE	Serdar et al. 1991	Columbia River below Grand Coulee Dam	46*	4.5	1990
ODEQ/NIH	Curtis 1994	Willamette River	40	3.9	1990
USEPA	U.S. EPA 1992	Nationwide including Columbia River basin	37	3.6	1984-1989
Bi-State	Tetra Tech 1994	Lower Columbia River	33	3.2	1993
WDOE	Johnson et al. 1988b	Lake Roosevelt	32	3.1	1986
USFWS	Schmitt et al. 1990	Nationwide including Columbia River basin	31*	3.0	1984
USFWS	Schmitt & Brumbaugh 1990	Nationwide including Columbia River basin	29*	2.8	1984
USEPA	Hornig et al. 1988	Couer d'Alene Lake, ID	27	2.6	1986-1987
USEPA	Davoli 1994	Lower Columbia River	23	2.3	1993
ODEQ	Tetra Tech 1992c	Lower Columbia River-Wauna, OR	15	1.5	1991
ODEQ	Tetra Tech 1992a	Lower Columbia River-St. Helens, OR	13	1.3	1991
WDOE	Johnson et al. 1991a	Lake Roosevelt	10	1.0	1990
WDOE	Johnson 1991	Lake Roosevelt	8*	0.8	1990
TOTAL	21 Data Sources		1021	100.0	1984-1993
* Reported additional analyses for some of the same samples					

TABLE 4. OVERVIEW OF SEDIMENT CONTAMINANT DATA FOR THE COLUMBIA RIVER BASIN					
Sponsor	Reference	Study location	# of Samples	% of Total	Years (min-max)
USGS	Ryder et al. 1992	Yakima River basin	527	44.6	1987
USACOE	Stockton 1991	Lower Columbia-Willamette Rivers	148	12.5	1984-1990
PortlandBES	Dames & Moore 1991	Columbia Slough-Portland, Oregon	79	6.7	1991
ODEQ	ODEQ 1994	Willamette River basin	72	6.1	1988-1991
Bi-State	Tetra Tech 1993	Lower Columbia River	60	5.1	1991
USGS	Rinella et al.	Yakima River basin	54	4.6	1987-1990
USACOE	Siipola 1994	Lower Columbia-Willamette Rivers	33	2.8	1990-1991
USFWS	Schuler 1994	Lower Columbia River	25	2.1	1991
WDOE	Johnson et al. 1988b	Lake Roosevelt	22	1.9	1986
NOAA	NOAA 1991	Columbia River estuary	21	1.8	1986-1989
Bi-State	Tetra Tech 1994	Lower Columbia River	19	1.6	1993
ODEQ	Tetra Tech 1992c	Lower Columbia River-Wauna, Oregon	15	1.3	1991
ODEQ	Tetra Tech 1992a	Lower Columbia River-St. Helens, Oregon	15	1.3	1991
WDOE	Johnson et al. 1986	Yakima River	13	1.1	1985
WDOE	Johnson & Norton 1988	Lower Columbia River	12	1.0	1987
WDOE	Johnson et al. 1991a	Lake Roosevelt	10	0.8	1990
WDOE	Johnson 1991	Lake Roosevelt	8	0.7	1990
USGS	Horowitz and Elrick 1993	Coeur d'Alene Lake, Idaho	7	0.6	1989
ODEQ/NIH	Curtis et al. 1993	Willamette River	6	0.5	1990
JR-Camas	Young 1989	Lower Columbia River-Camas, Washington	5	0.4	1989
USACOE	Britton 1989	Willamette River-U.S. Moorings, Portland	4	0.3	1989
WDOE	Johnson & Heffner 1993	Columbia River-Wallula, Washington	4	0.3	1992
JR-Camas	Young 1988	Lower Columbia River-Camas, Washington	4	0.3	1988
WDOE	Andreasson 1991a	Lower Columbia River-Longview, Washington	3	0.3	1990
WDOE	Heffner 1989	Lower Columbia River-Kalama, Washington	3	0.3	1990
WDOE	Heffner 1991	Lower Columbia River-Longview, Washington	3	0.3	1990
USACOE	USACOE 1991	Lower Columbia-Willamette Rivers	3	0.3	1991
WDOE	Das 1991	Lower Columbia River-Longview, Washington	2	0.2	1990
USEPA	Davoli 1994	Lower Columbia River	2	0.2	1993
WDOE	Johnson et al. 1991c	Lake Roosevelt	2	0.2	1990
WDOE	Zinner 1990	Lower Columbia River-Vancouver, Washington	1	0.1	1990
TOTAL	31 Data Sources		1182	100.0	1984-1993

- Target analytes and analytical methods
- Study objectives
- QA/QC procedures

The 21 tissue data abstracts are provided in Appendix C and the 31 sediment data abstracts are provided in Appendix D. A five to six letter alphanumeric code is provided at the bottom of each abstract. A corresponding code is provided with each reference in Appendix B that provided data contained in the database. The code consists of the first two or three letters of the first (and occasionally the second) authors name, the publication year, a letter if there is more than one publication by that author or group of authors in that year, and the letter "b" for biota (i.e., tissue) abstracts and "s" for sediment abstracts [e.g., Jo88bs for the sediment abstract in Appendix D of the Johnson et al. (1988b in Appendix B) study of metals contamination in Lake Roosevelt].

3.0 OVERVIEW OF ONGOING CONTAMINANT RESEARCH ACTIVITIES

A wide variety of environmental research projects in the Columbia River basin are ongoing or are planned for future implementation. Many of these projects include the collection of chemical contaminant data in aquatic ecosystems. This section provides an overview of the projects that may be collecting data that could be included in the sediment and tissue databases at a future date. This overview is divided according to the state or federal agencies sponsoring the research.

3.1 STATE AGENCIES

An overview of chemical contaminant studies being conducted or planned by the state agencies of Idaho, Oregon, and Washington is provided below.

3.1.1 Idaho

No ongoing or planned contaminant studies conducted or sponsored by either the Idaho Division of Environmental Quality or the Division of Health were identified (see contacts in Appendix A).

3.1.2 Oregon

The Oregon Department of Environmental Quality (ODEQ) has sponsored or conducted a number of biota and sediment contaminant studies in the Columbia River basin. There are two ongoing or planned contaminant studies being sponsored by ODEQ. The Willamette River Toxics Study is an ongoing investigation of aquatic biota and sediments. The initial results of the Willamette River toxics monitoring program have been published by ODEQ (1994). As part of the Lower Columbia River Bi-State Program, ODEQ is also co-sponsoring fish tissue contaminant collection efforts on the lower Columbia River which will be used as part of a human health risk assessment to be completed in 1995.

3.1.3 Washington

The Washington Department of Ecology (Ecology) has sponsored or conducted a number of investigations of contaminant levels in aquatic biota and sediments in the Columbia River basin. Ongoing chemical contaminant studies being sponsored by the Washington Department of Ecology include fish and sediment sampling for evaluation of potential human health and wildlife impacts of PCBs and lead in the Spokane River (Davis, D., 7 July 1994, personal communication), and the Bi-State human health risk assessment project discussed in Section 2.1.2. The Spokane study was planned following a screening survey of PCBs and metals in sediment and bottom fish collected from the Spokane River conducted in 1993 (Johnson et al. 1994). These screening data were not received in time for entry in the database.

3.2 FEDERAL AGENCIES

A number of federal agencies have ongoing investigations of aquatic biota and sediment contamination in the Columbia River basin. These studies are described below for each federal agency responsible for the studies.

3.2.1 National Oceanic and Atmospheric Administration

The National Oceanic and Atmospheric Administration (NOAA) has conducted long-term monitoring of aquatic biota and sediment in the Columbia River estuary as part of their Mussel Watch and National Status & Trends monitoring programs (NOAA 1989; NOAA 1991). The Mussel Watch and National Status & Trend Programs are ongoing and will provide routine monitoring data for pesticides, PCBs, polynuclear aromatic hydrocarbons (PAHs), and butyltin compounds.

3.2.2 U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers (USACOE) sponsors and conducts sampling of sediments for the evaluation of potential environmental effects due to dredging and disposal operations in the Columbia River. Two districts of the USACOE are responsible for maintaining navigation in the Columbia River basin. The Portland District is responsible for navigation in the Willamette River and in the Columbia River from its mouth to its confluence with the Wind River. The Walla Walla District is responsible for navigation in the upper reach of the Columbia River and the Snake River. The Walla Walla District has

sponsored sediment contaminant studies in the Columbia and Snake Rivers (Pinza et al. 1992a,b), but these data were not received in time for inclusion in the database.

Specific navigation projects are monitored on an approximate 5-year schedule. Therefore, the USACOE will continue to be a source of additional sediment contaminant data in the future.

3.2.3 U.S. Department of Energy

The U.S. Department of Energy (USDOE) has sponsored a great deal of contaminant research in the vicinity of the former Hanford plutonium production facility. These studies have primarily focused on radionuclide concentrations in sediment and biota. Historical monitoring data are currently being compiled as part of the Columbia River Comprehensive Impact Assessment (CRCIA), which is part of the *Hanford Federal Facility Agreement and Consent Order*, otherwise known as the Tri-Party Agreement (Eslinger et al. 1994). However, these data have not yet been obtained for entry in the database.

Ongoing efforts primarily focus on routine monitoring conducted as part of the U.S. Department of Energy's *General Environmental Protection Program*. These monitoring data are summarized in an annual report entitled, *Hanford Site Environmental Report*.

3.2.4 U.S. Environmental Protection Agency

The U.S. EPA has conducted a number of aquatic biota and sediment contaminant studies in the Columbia River basin. Ongoing chemical contaminant studies sponsored by U.S. EPA include fish tissue contaminant collection efforts in Lake Roosevelt (Upper Columbia River) and the CRITFC study discussed in Section 1.0. Results from both of these studies will be used to assess the risk to human health from the consumption of fish.

3.2.5 U.S. Fish and Wildlife Service

An ongoing research effort is currently being conducted by the U.S. Fish and Wildlife Service to assess the contaminant levels in aquatic resources of the Columbia River. These studies include sampling of birds, eggs, fish, and sediments in National Wildlife Refuges and other locations along the Columbia River (Schuler 1992; Schuler 1994). Additional chemical contaminant data from this project are expected to be available in the future.

3.2.6 U.S. Geological Survey

Currently, there are a number of ongoing monitoring programs in the Columbia River basin that are part of the U.S. Geological Survey's National Water-Quality Assessment (NAWQA) Program. NAWQA Program studies have begun in the Willamette, Yakima, Central Columbia Plateau, and Upper Snake River, and Northern Rockies Intermontane basins (The Northern Rockies Intermontane basins includes the Clark Fork basin in Montana and Idaho). A brief overview of the ongoing NAWQA Program activities in each of these basins is provided below.

Willamette River - The NAWQA Program for the Willamette River basin has included sampling and analysis of aquatic biota and sediments collected from 29 sites during 1992-94. The study results are not yet available, but they will be published in U.S. Geological Survey reports.

Yakima River - The NAWQA Program for the Yakima River basin has resulted in the publication of a number of studies of contaminant levels in aquatic biota and sediments (e.g., Rinella et al. 1992; Ryder et al. 1992). The NAWQA studies conducted in the Yakima River basin focus primarily on pesticide concentrations in aquatic biota and sediment due to the extensive commercial agricultural activity in the basin. Additional data are expected to be available in the future.

Central Columbia Plateau and Upper Snake River - The NAWQA Programs for both of these regions have not produced any contaminant data that could be included in either the tissue or sediment databases.

Northern Rockies Intermontane Basins - The NAWQA Program for the Northern Rockies Intermontane basins began in 1994, but has been suspended until more funding becomes available, perhaps in 1996 or 1997 (Moreland, J.A., 19 August 1994, personal communication). Contaminants of concern in this basin are primarily trace metals associated with mine tailings in the upper Clark Fork.

A study of Lake Roosevelt has also been conducted by the U.S. Geological Survey. This study, conducted in 1992, included sampling and analysis of trace elements and organic contaminants. However, these results have not been published.

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APPENDIX A

LIST OF CONTACTS

APPENDIX A: LIST OF CONTACTS

State Agencies

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Idaho Division of Health	
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Montana

Montana Department of Fish and Wildlife	
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Montana Department of Health, Water Quality Bureau	(406) 444-2406
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Jim Hill	(406) 444-0481
Montana State Natural Resource Damage Assessment Program	
Mark Kerr	(406) 444-0205

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Tim McFetridge	(503) 378-8240 x 235
Mannette Simpson	(503) 229-5983
Oregon Department of Fish and Wildlife	
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Federal Agencies

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U.S. Army Corps of Engineers	
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APPENDIX B

LIST OF IDENTIFIED CONTAMINANT DATA SOURCES FOR THE COLUMBIA RIVER BASIN

APPENDIX B: LIST OF IDENTIFIED CONTAMINANT DATA SOURCES FOR THE COLUMBIA RIVER BASIN

[1] WDOE — [An91a] Andreasson, J. 1991a. Class II Inspection of Weyerhaeuser, Longview Pulp and Paper Mill, April 16-18, 1990. Washington State Department of Ecology, Environmental Investigations and Laboratory Services Program, Olympia, WA.

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[30] USEPA/ODEQ — Foster, G. 1991d. Four unidentified fish samples collected from Columbia River River Miles 103, 95, and 132. Oregon Department of Environmental Quality, Portland, OR.

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[59] USEPA LTI, Limno-Tech, Inc. 1991. Phase I screening model application for Columbia River dioxins. Prepared for U.S. EPA, Region 10 under subcontract to Tetra Tech, Inc., Fairfax, VA. February 28, 1991.

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[62] WSDH — Mariěn, K., G. Patrick, and H. Ammann. 1991. Health implications of TCDD and TCDF concentrations reported from Lake Roosevelt sport fish. Washington State Department of Health, Environmental Health Programs, Office of Toxic Substances, Olympia, WA.

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APPENDIX C

BIOTA DATA ABSTRACTS

ARE FROM TABLE 2-2 CATALOG REQUIREMENTS

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
BIOTA DATA ABSTRACT

TABLE 2.2

AGENCY SPONSOR: Northwest Pulp & Paper Association (NWPPA) — INVESTIGATON INFO 2.

AREA OF STUY: Columbia River (RM 332 to mouth), lower Snake River — GEOGRAPHIC INFO 8 NAME OF AREA OR REGION

SAMPLING MEDIA: Fillets (coho salmon, chinook salmon, summer steelhead, white sturgeon, carp, and largescale sucker) — ABSTRACT OF DATA AQUISTION 5.1 or 3.

POSITIONING SYSTEM: N/A — GEOG INFO 8

ASSOCIATED SEDIMENT DATA: No

REFERENCE SOURCE: Beak Consultants, Inc. 1989a — DATA SET ID 1 TITLE

REF - ID 1 ID CODE

CONTACT: Northwest Pulp & Paper Association, Bellevue, WA — INVESTIGATOR INFO 2

PHONE: (206) 455-1323 — INVESTIGATOR INFO FAX: N/A 2

SAMPLING PERIOD: August - November 1989 — DATA AQUISITION 5.1

NUMBER OF STATIONS SAMPLED: 6 sites — DATA AQU. 5.1

LOCATIONS OF STATIONS SAMPLED: Site 1 - betweem RM 2-45 (estuary); Site 2 - between RM 125-140 (below Bonneville Dam); Site 3 -between RM 146-153 (above Bonneville Dam); Site 4 - between 280-298 (below McNary Dam); Site 5 - between RM 326-332 (upstream of the Columbia River-Snake River confluence); Site 6 - 1/2 mile upstream of the Columbia-Snake River confluence up to the downstream edge of Ice Harbor Dam (Snake River Mile 1-9). — Abstract 3?

TARGET ANALYTES: 2,3,7,8-TCDD and 2,3,7,8-TCDF. Percent lipid was also reported. — Description of Parameters, (7.1) Objectives + Introductions 7.1, 3-4.

ANALYTICAL TECHNIQUES: EPA Method 8290 using a modified extraction method for biological samples. All data were reported on a wet weight basis. — Description of Parameters 7.1

SAMPLING EQUIPMENT USED: Rod-reel, electrofishing, gill net, set-line and hatchery fish. — Data Aquisition 5.1

SAMPLE HANDLING AND PROCESSING: Samples from individual fish species were combined with other samples of the same species from a site to create one of five composite samples for analysis. The other tissue sample from each fish (not composited) was double-wrapped in aluminum foil and put on dry ice in the field. — Sample Handling 5.1

DATA GAPS: Latitude and longitude of sampling locations was not provided in the report. Latitude and longitude were estimated for entry along with the data provided in the database. — Quality Control/QA 9

3 **ABSTRACT** DATA SET Abstract 3

Beak Consultants, Inc., was contracted by the Northwest Pulp and Paper Association to perform a comprehensive study of dioxin levels in fish in order to assess human health risk implications and to provide a scientific basis for ambient water quality criteria to protect human health (Beak Consultants, Inc. 1989a,b). The study objectives were twofold: 1) to evaluate risk to human health (including potentially sensitive groups such as sport fishermen, Native Americans and Asian-Americans) from consuming freshwater, migratory, and resident fish caught in the Columbia River and 2) to evaluate the transport of dioxin throughout the river. The fish tissue dioxin data and fish consumption data have been used to evaluate the potential health risks of consuming fish from the Columbia River (Keenan et al. 1990; Parsons et al. 1991).

QA/QC EVALUATION - No QA/QC information is provided in these reports (Beak Consultants, Inc. 1989a,b; Keenan et al. 1990; Parsons et al. 1991). The dioxin/furan analyses were performed by California Analytical Laboratory, West Sacramento, CA.

9 QA/QC

DATA USE AND COMPARABILITY - The individual fish species that form a composite sample were collected over a broad range of the river. Therefore, the results should be considered estimates of the average dioxin/furan concentration for a relatively large area of the river. Users of these data should also be cautioned that the latitudes and longitudes provided in the database are pinpoint locations that indicate the general river reach that was sampled. Individual samples that composed the composite sample were collected over a broad area of each river reach.

9 QA/QC

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

11 References **REFERENCES:**

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COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
BIOTA DATA ABSTRACT

AGENCY SPONSOR: Oregon Department of Environmental Quality (ODEQ)/National Institutes of Health (NIH)

AREA OF STUDY: Willamette River

SAMPLING MEDIA: Whole body and fillet (Northern squawfish, cutthroat trout and common carp)

POSITIONING SYSTEM: N/A

ASSOCIATED SEDIMENT DATA: Yes

REFERENCE SOURCE: Curtis 1994

CONTACT: Lawrence R. Curtis, Oregon State University, Corvallis, OR

PHONE: (503) 737-1952 FAX: N/A

SAMPLING PERIOD: July - October 1990

NUMBER OF STATIONS SAMPLED: 6 stations

LOCATIONS OF STATIONS SAMPLED: Middle Fork (RM 314), Harrisburg (RM 250), Halsey (RM 232), Corvallis (RM 206), Salem (RM 116) and Portland (RM 11).

TARGET ANALYTES: 2,3,7,8-TCDD and -TCDF

ANALYTICAL TECHNIQUES: N/A

SAMPLING EQUIPMENT USED: Electrofishing

SAMPLE HANDLING AND PROCESSING: Squawfish and trout weighing less than 100 g were placed in glass jars. Carp and other fish samples were wrapped in aluminum foil and placed on ice for transfer to the laboratory.

DATA GAPS: Latitude and longitude of sampling sites. Latitude and longitude were estimated for entry along with the data provided in the database.

ABSTRACT

This study focused on determining the status and extent of contamination of TCDD and TCDF in the

Willamette River due to industrial and municipal discharges. Sampling sites were selected based upon possible industrial pollution sources. A control site upstream from a bleached Kraft pulp mill discharge (RK 232), a site below a municipal sewage outfall (RK 206), and a site adjacent to an industrial waste dump contaminated with organochlorines (RK 11). Sampling and analysis included both fish and surface sediments. This study also measured the specific tissue content of cytochrome P-450 1A1 as a bioindicator of contamination and assessed fish health by histopathology and clinical chemistry. Two reports (Curtis et al. 1991,1993) describe the project in detail and summarize the data analysis. Fish tissue analytical results for individual samples were provide by Professor Larry Curtis of Oregon State University (Curtis 1994).

QA/QC EVALUATION - Quality assurance/quality control procedures are described in Curtis et al. (1991,1993). These procedures included reagent blank analysis, evaluation of labeled-isotope standard recoveries, and evaluation of detected isotopic ratios of dioxin masses.

DATA USE AND COMPARABILITY - All data entered in the database were reviewed for data entry errors. All detected errors were corrected. Users should be reminded that the sampling design targeted industrial and municipal discharge areas.

REFERENCES:

Curtis, L.R. 15 September 1994. Personal Communication (data sent to Mr. Curtis DeGasperi, Tetra Tech, Redmond, WA). Oregon State University, Corvallis, OR.

Curtis, L.R., H.M. Carpenter, R.M. Donohoe, D.E. Williams, O.R. Hedstrom, M.L. Deinzer, M.A. Beilstein, E. Foster, and R. Gates. 1993. Sensitivity of cytochrome P450-1A1 induction in fish as a biomarker for distribution of TCDD and TCDF in the Willamette River, Oregon. Environ. Sci. Technol. 27:2149-2157.

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COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
BIOTA DATA ABSTRACT

AGENCY SPONSOR: U.S. Environmental Protection Agency (USEPA)

AREA OF STUDY: Columbia River (RM 149-291)

SAMPLING MEDIA: Whole body and/or fillet (walleye, channel catfish, sturgeon, steelhead, crayfish, smallmouth bass, chinook salmon).

ASSOCIATED SEDIMENT DATA: Yes

POSITIONING SYSTEM: N/A

REFERENCE SOURCE: Davoli 1994

CONTACT: Dana Davoli

PHONE: (206) 553-2135 FAX: N/A

SAMPLING PERIOD: August-September 1994

NUMBER OF STATIONS SAMPLED: 6 locations

LOCATIONS OF STATIONS SAMPLED: From Bonneville Dam (RM 146) to McNary (RM 291) Dam

TARGET ANALYTES: Dioxin/furans; pesticides; PCBs; semi-volatiles; PAHs; metals (including Hg and As).

ANALYTICAL TECHNIQUES: Dioxins and furans (EPA Method 1613A); pesticides and PCBs (EPA 8081); semi-volatiles (EPA 8270/GPC); PAHs (EPA 8270); metals (EPA 200.3 and 6010A); Hg (EPA 7471A); As (200.3 and 7060A).

SAMPLING EQUIPMENT USED: Rod and reel, electroshocking, setline and hoop and/or gill net. Bait traps used for crayfish.

SAMPLE HANDLING AND PROCESSING: Samples consist of composite between 3-8 samples and individual fillets. Crayfish will be handled in the same way as fish using baited traps. Crayfish are represented as a composite of 30 organisms, following whole body analysis.

DATA GAPS: Latitudes and longitudes were provided, but it was unclear if the latitudes and longitudes provided were proposed sampling locations, or the actual locations sampled. It was also unclear which samples should be associated with a particular latitude and longitude. Therefore, latitudes and longitudes were estimated for each of the general sample locations for entry in the database along with the analytical data provided.

ABSTRACT

The Columbia River and segments of the Snake and Willamette Rivers are currently water quality limited due to the presence of elevated levels of 2,3,7,8-TCDD. As a result, U.S. EPA Region 10, established a Total Maximum Daily Load (TMDL) of 6 mg of 2,3,7,8-TCDD/day based upon state water quality standards applicable to the Columbia River basin and the volume of water in the Columbia River. The U.S. EPA conducted sampling as part of an effort to add to the data base on contaminant levels in aquatic organisms in the Columbia River (Davoli 1994). The project focused on one or two sampling locations in a specific segment of the river. Criteria for choosing these locations were to: (1) sample at fishing sites, (2) collect organisms that are consumed by Native Americans and others fishing in the Columbia River basin, (3) collect organisms that are good indicators of contaminant levels in the river and of levels of contaminants that may be ingested by aquatic and terrestrial predators.

QA/QC EVALUATION - Internal standards, laboratory duplicates, matrix spikes, and method blanks were used for data evaluation. Preliminary data validation indicates that some of the samples displayed interference with 2,3,7,8-TCDF measurements. Therefore, the analysis for some of the samples of 2,3,7,8-TCDF and total TCDF were rejected (this is preliminary information and completion of the data validation is forthcoming).

DATA USE AND COMPARABILITY - Users of these data should be cautioned that a preliminary data validation performed by the U.S. EPA indicates that some of the data for 2,3,7,8-TCDF should be qualified as unusable. These data have been qualified using an "R" in the database.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Davoli, D. 29 August 1994. Personal Communication (data package sent to Steve Ellis, Tetra Tech, Inc., Redmond, WA). Selected fish tissue contaminant data from the U.S. EPA Columbia River toxic substances study. U.S. Environmental Protection Agency, Region 10, Seattle, WA.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
BIOTA DATA ABSTRACT

AGENCY SPONSOR: U.S. Environmental Protection Agency (U.S. EPA)

AREA OF STUDY: Lake Couer d'Alene

SAMPLING MEDIA: Whole body (kokanee salmon); fillet (chinook and kokanee salmon, cutthroat trout, brown bullhead, yellow perch, Northern pike, black crappie, largemouth bass, rainbow trout); kidney and liver (chinook and kokanee salmon).

ASSOCIATED SEDIMENT DATA: Yes, but these data are reported on a wet weight basis. Therefore, the sediment data were not entered in the database.

POSITIONING SYSTEM: N/A

REFERENCE SOURCE: Hornig et al. 1988

CONTACT: Bill Bogue, U.S. EPA, Region 10, Seattle, WA

PHONE: (206) 553-1676 FAX: N/A

SAMPLING PERIOD: 1986-1987

NUMBER OF STATIONS SAMPLED: 13 stations

LOCATIONS OF STATIONS SAMPLED: Coeur d'Alene Lake, Wolf Creek, Mission Slough, Killarney Lake, Round Lake, South Fork Coeur d'Alene River above Mullan.

TARGET ANALYTES: Metals (including Cd, As, Pb, Hg, Cu, Zn).

ANALYTICAL TECHNIQUES: N/A

SAMPLING EQUIPMENT USED: N/A

SAMPLE HANDLING AND PROCESSING: N/A

DATA GAPS: Latitude and longitude of sampling locations. Latitude and longitude were estimated for entry along with the data provided in the database.

ABSTRACT

The U.S. EPA, Region 10, conducted chemical and biological monitoring during low-flow conditions

from 1972-1986 along the South Fork Coeur d'Alene River in northern Idaho, a stream with a long history of severe metals pollution from mining activities (Hornig et al. 1988). The purpose of the 1986 sampling effort was to provide a general update on the extent and degree of sediment contamination and to perform heavy metal analysis on composites of several species of game fish. The data provided in the database were compiled from Hornig et al. (1988) and data downloaded from STORET. An overview and summary of the sampling conducted by the U.S. EPA in the Coeur d'Alene Basin is provided in Hornig et al. (1988).

QA/QC EVALUATION - Details on QA aspects of these data may be available from Region 10's Water Monitoring and Analysis section.

DATA USE AND COMPARABILITY - Associated sediment data was not entered into the data base because it was given in wet weight. All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Hornig, C.E., D.A. Terpening, and M.W. Bogue. 1988. Coeur d'Alene Basin EPA water quality monitoring, 1976-1986. EPA 910/9-88-216. U.S. Environmental Protection Agency, Region 10, Seattle, WA.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
BIOTA DATA ABSTRACT

AGENCY SPONSOR: Washington Department of Ecology (WDOE)

AREA OF STUDY: Columbia River (Lake Roosevelt, Rufus Woods Lake); Spokane River (Long Lake)

SAMPLING MEDIA: Whole body (largescale sucker)

ASSOCIATED SEDIMENT DATA: Yes

POSITIONING SYSTEM: N/A

REFERENCE SOURCE: Johnson 1991

CONTACT: Art Johnson, WDOE, Olympia, WA

PHONE: (206) 407-6715 FAX: (206) 407-6670

SAMPLING PERIOD: June 1990

NUMBER OF STATIONS SAMPLED: 8 stations

LOCATIONS OF STATIONS SAMPLED: Six sites in Lake Roosevelt between the international border and Grand Coulee Dam, one site each in the Spokane River and Rufus Woods Lake.

TARGET ANALYTES: PCBs and pesticides; other xenobiotic compounds. Only results for PCBs and DDE compounds were reported.

ANALYTICAL TECHNIQUES: Analysis methods are as described in Call et al. (1991).

SAMPLING EQUIPMENT USED: Electroshocking

SAMPLE HANDLING AND PROCESSING: After recording the length and weight of each specimen, they were individually wrapped in aluminum foil, placed in polyethylene bags and stored on ice. The fish were analyzed as composites of five whole fish per sample.

DATA GAPS: Latitude and longitude of sampling locations. Latitude and longitude were estimated for entry along with the data provided in the database.

ABSTRACT

In June 1990, as part of Ecology's investigation of contaminants in Lake Roosevelt, a series of sediment

and bottom fish samples were collected from Lake Roosevelt and vicinity for analysis of PCDDs and PCDFs. The impetus for this survey was the need to better understand the spatial distribution of these compounds as a result of their discharge by the Celgar bleached kraft pulp mill in Castlegar, B.B., approximately 30 river miles above the international boundary. The results of these and other PCDD/PCDF analyses on Lake Roosevelt samples have been reported elsewhere (Johnson et al., 1991a, b,c). This report contains analysis of sediment and bottom fish samples for only PCB and DDE compounds (Johnson 1991).

QA/QC EVALUATION - QA procedures for these analyses were established by the EPA Duluth laboratory (EPA et al. 1990). All data included in the present report passed EPA's quality assurance criteria.

DATA USE AND COMPARABILITY - All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Call, D.J. et al., 1991. Sediment Quality Evaluation in the Lower Fox River in South Green Bay of Lake Michigan. Center for Lake Superior Environmental Studies, University of Wisconsin, Superior, EPA Coop. Agreement No. CR-815232.

Johnson, A. 1991. Results of screen for EPA xenobiotics in sediment and bottom fish from Lake Roosevelt (Columbia River). Memo to Mr. Carl Nuechterlein, Washington Department of Ecology, Olympia, WA. 22 July 1991.

Johnson, A., D. Norton, W. Yake. 1988. An assessment of Metals Contamination in Lake Roosevelt. Washington State Department of Ecology, Olympia, WA.

Johnson, A., D. Serder, and D. Norton. 1991a. Spatial Trends in TCDD/TCDF Concentrations and Bottom Fish Collected in Lake Roosevelt (Columbia River), Washington Department of Ecology, Environmental Investigations and Laboratory Services, Publication No. 91-29.

Johnson, A., D. Serder, and S. Magoon. 1991b. Polychlorinated dioxins and -furans in Lake Roosevelt (Columbia River) sportfish, 1990. Washington State Department of Ecology, Olympia, WA.Pub. No. 91-4.

Johnson, A., D. Serder, and K. Seiders, 1991c. PCDDs/PCDFs in Columbia River suspended particulate matter. Memorandum to C. Nuechterlein and S. Saunders. Washington State Department of Ecology, Olympia, WA.

U.S. EPA et al. 1990. Analytical procedures and quality assurance plan for determination of PCDD/PCDF in fish. EPA Duluth ORD. EPA/600/3-90/022.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
BIOTA DATA ABSTRACT

AGENCY SPONSOR: Washington State Department of Ecology (WDOE)

AREA OF STUDY: Columbia River (Lake Roosevelt, Rufus Woods Lake); Spokane River (Long Lake)

SAMPLING MEDIA: Whole body (largescale sucker)

POSITIONING SYSTEM: N/A

ASSOCIATED SEDIMENT DATA: YES

REFERENCE SOURCE: Johnson et al. 1991a

CONTACT: Art Johnson, WDOE, Olympia, WA

PHONE: (206) 407-6670 FAX: (206) 407-6715

SAMPLING PERIOD: June 1990

NUMBER OF STATIONS SAMPLED: 8 stations

LOCATIONS OF STATIONS SAMPLED: Six stations in Lake Roosevelt, one in the Spokane River (Long Lake) and one in Rufus Woods Lake were sampled for largescale sucker.

TARGET ANALYTES: Fifteen 2,3,7,8-substituted PCDDs and PCDFs. Octachlorodibenzodioxin and octachlorodibenzofuran were not reported.

ANALYTICAL TECHNIQUES: PCDD/PCDF analysis was performed by the U.S. EPA Environmental Research Laboratory in Duluth, MN, following referenced methods.

SAMPLING EQUIPMENT USED: Electroshocking equipment.

SAMPLE HANDLING AND PROCESSING: Total length and weight were recorded. Fish samples were then individually wrapped in aluminum foil, placed in polyethylene bags and stored on ice. The fish were analyzed as composites of five whole fish per sample.

DATA GAPS: Latitude and longitude of sample locations were not provided. Latitude and longitude were estimated for entry along with the data provided in the database.

ABSTRACT

In June 1990, as part of Ecology's investigation of contaminants in Lake Roosevelt, a series of sediment

and bottom fish samples were collected from Lake Roosevelt and vicinity for analysis of PCDDs and PCDFs (Johnson et al. 1991a). Largescale sucker (*Catostomus macrocheilus)* were collected for analysis. The objective of the survey was to evaluate the transport and distribution of PCDD/PCDF compounds throughout the lake. The sediments and bottom fish collected during this effort were also analyzed for additional xenobiotic compounds. These data are reported in Johnson (1991). Other Ecology reports describe results from analysis of Lake Roosevelt sportfish and suspended matter samples for dioxins and furans (Johnson et al. 1991b,c).

QA/QC EVALUATION - QA procedures followed during PCDD/PCDF analysis were established by EPA Duluth Laboratory. All data included in this report passed EPA's quality assurance criteria.

Duplicate samples were submitted to assess the precision of their analysis. Close agreement was reached between duplicates.

DATA USE AND COMPARABILITY - Data used for this report were from the lab data sheets provided in the appendix to the report. Fish and sediment sample analysis results as a function of river miles below the Canadian border (a large pulp and paper mill is located north of the border in Castlegar, BC) were compared for assessment of spatial trends.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Johnson, A. 1991. Results of screen for EPA xenobiotics in sediment and bottom fish from Lake Roosevelt (Columbia River). Memo to Mr. Carl Nuechterlein, Washington Department of Ecology, Olympia, WA. 22 July 1991.

Johnson, A., D. Serder, and D. Norton. 1991a. Spatial trends in TCDD/TCDF concentrations in sediment and bottom fish collected in Lake Roosevelt (Columbia River). Washington Department of Ecology, Environmental Investigations and Laboratory Services, Olympia, WA. Publication No. 91-29.

Johnson, A., D. Serder, and S. Magoon. 1991b. Polychlorinated dioxins and -furans in Lake Roosevelt (Columbia River) sportfish, 1990. Washington State Department of Ecology, Olympia, WA.Pub. No. 91-4.

Johnson, A., D. Serder, and K. Seiders, 1991c. PCDDs/PCDFs in Columbia River suspended particulate matter. Memorandum to C. Nuechterlein and S. Saunders. Washington State Department of Ecology, Olympia, WA.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
BIOTA DATA ABSTRACT

AGENCY SPONSOR: Washington Department of Ecology (WDOE)

AREA OF STUDY: Columbia River (Lake Roosevelt, Rufus Woods Lake); Spokane River (Long Lake)

SAMPLING MEDIA: Muscle (walleye, rainbow trout, lake whitefish, white sturgeon, kokanee salmon and burbot).

ASSOCIATED SEDIMENT DATA: No

POSITIONING SYSTEM: N/A

REFERENCE SOURCE: Johnson et al. 1991b

CONTACT: Art Johnson, WDOE, Olympia, WA

PHONE: (206) 407-6670 FAX: (206) 407-6715

SAMPLING PERIOD: May-October, 1990

NUMBER OF STATIONS SAMPLED: 13 locations in Lake Roosevelt; 3 in Rufus Woods Lake.

LOCATIONS OF STATIONS SAMPLED: Lake Roosevelt: Kettle Falls, Gifford, off Colville River, off Sherman Circle, off Onion Circle, Little Dalles, Northport, Marcus Flats, Marcus Islands, North George, Seven Bays, off Hawk Circle, Sanpoil Arm, Keller Ferry and Spring Canyon. Rufus Woods Lake: Bridgeport St. Park, Little Wenatchee River, and Little Wenatchee River near Inlet.

TARGET ANALYTES: 2,3,7,8-TCDD and -TCDF

ANALYTICAL TECHNIQUES: TCDD/TCDF (EPA Method 8290)

SAMPLING EQUIPMENT USED: Electroshocking, gillnet, hook and line.

SAMPLE HANDLING AND PROCESSING: Fish were wrapped in aluminum foil, placed in polyethylene bags, labeled and stored on ice for shipping to the laboratory.

DATA GAPS: Latitude and longitude of sampling locations. Latitude and longitude were estimated for entry in the database.

ABSTRACT

The impetus for this survey was the detection by Environment Canada and the British Columbia Ministry of Environment, of contaminated lake whitefish and mountain whitefish below Celgar bleached kraft pulp mill in Castlegar, B.C., about 30 river miles upstream of Lake Roosevelt. The contaminants of concern included 2,3,7,8-TCDD and 2,3,7,8-TCDF. The object of this Lake Roosevelt study was to obtain an accurate estimate of mean TCDD and TCDF concentrations in muscle tissue of major sportfish species from popular fishing areas (Johnson et al. 1991). The survey also included analysis of limited fish samples from Rufus Woods Lake, the Columbia River reservoir below Lake Roosevelt, and Long Lake, the lower reach of the Spokane River.

QA/QC EVALUATION - All data were reviewed for qualitative and quantitative accuracy by an independent expert under contract to Ecology. The review included initial and daily continuing calibrations, ion chromatograms, column performance check mixes, calculations of positive values and detection limits, isotopic abundance ratios for internal/surrogate/recovery standards and positive natives, matrix spikes and spike duplicates. The review resulted in reanalysis of revised calculations for approximately 10 percent of the samples.

DATA USE AND COMPARABILITY - The data have undergone review and validation. Preliminary results of this study were reported in Johnson et al. (1990 b,c).

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Johnson, A., D. Serdar, and S. Magoon. 1991. Polychlorinated dioxins and -furans in Lake Roosevelt (Columbia River) sportfish, 1990. Washington State Department of Ecology, Environmental Investigations and Laboratory Services, Olympia, WA.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
BIOTA DATA ABSTRACT

AGENCY SPONSOR: Washington Department of Ecology (WDOE)

AREA OF STUDY: Columbia River (Lake Roosevelt)

SAMPLING MEDIA: Whole body (largescale sucker); muscle tissue (walleye, lake whitefish, sturgeon, yellow perch and rainbow trout).

ASSOCIATED SEDIMENT DATA: Yes

POSITIONING SYSTEM: N/A

REFERENCE SOURCE: Johnson et al. 1988b

CONTACT: Art Johnson, WDOE, Olympia, WA

PHONE: (206) 407-6715 FAX: N/A

SAMPLING PERIOD: September 1986

NUMBER OF STATIONS SAMPLED: 4 stations

LOCATIONS OF STATIONS SAMPLED: Lake Roosevelt (Gifford, Seven Bays, Northport, and Marcus Island).

TARGET ANALYTES: Metals (Zn, Cu, Pb, As, Cd, Hg).

ANALYTICAL TECHNIQUES: Zn (EPA 289.2); Cu (EPA 220.2); Pb (EPA 239.2); As (EPA 206.2); Cd (EPA 213.2) and Hg (in house).

SAMPLING EQUIPMENT USED: Gillnet except for rainbow trout and sturgeon which were taken on hook and line.

SAMPLE HANDLING AND PROCESSING: Fish were put into polyethylene bags and stored on ice for transport to the laboratory.

DATA GAPS: Latitude and longitude of sample locations were not provided. Latitude and longitude were estimated for entry along with the data provided in the database.

ABSTRACT

In response to reports of elevated metals concentrations in fish and other environmental samples from Lake Roosevelt, Ecology conducted a series of field surveys between May and September 1986 to determine the extent and significance of contamination (Johnson et al. 1988). Sediment, water samples and a variety of fish species were used in this assessment. This study was also reported in a journal article (Johnson et al. 1990).

QA/QC EVALUATION - The accuracy and precision of the metals data were assessed by analysis of standard reference materials, laboratory duplicates field replicates and field blanks. Results were in good agreement with certified values.

DATA USE AND COMPARABILITY - The data have undergone review and validation. The locations sampled for sediment trace metals were much more extensive (17 locations) than those sampled for fish tissue (4 locations). Therefore, comparison of sediment and fish tissue contaminant data is limited to those locations that were sampled for each medium.

All data entered in the database were reviewed for data entry errors.All detected errors were corrected.

REFERENCES:

Johnson, A., D. Norton, and B. Yake. 1988 (Revised 1989). An assessment of metals contamination in Lake Roosevelt. Washington Department of Ecology, Toxics Investigations/Ground Water Monitoring Section, Olympia, WA.

Johnson, A., D. Norton, B. Yake, and S. Twiss. 1990. Transboundary metal pollution of the Columbia River (Franklin D. Roosevelt Lake). Bull. Environ. Contam. Toxicol. 45:703-710.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
BIOTA DATA ABSTRACT

AGENCY SPONSOR: Washington State Department of Ecology (WDOE)

AREA OF STUDY: Yakima River

SAMPLING MEDIA: Whole body and muscle (mountain whitefish, largescale sucker, bridgelip sucker, rainbow trout, crayfish, mussel, Spring chinook, Northern squawfish, steelhead, channel catfish, and smallmouth bass).

POSITIONING SYSTEM: N/A

ASSOCIATED SEDIMENT DATA: Yes

REFERENCE SOURCE: Johnson et al. 1986

CONTACT: Art Johnson, WDOE, Olympia, WA

PHONE: (206) 407-6670 FAX: (206) 407-6715

SAMPLING PERIOD: September 1985

NUMBER OF STATIONS SAMPLED: 6 stations

LOCATIONS OF STATIONS SAMPLED: Along the Yakima River between Cle Elum and Kiona, betweem River Mile 180 and 21, respectively.

TARGET ANALYTES: Organochlorine pesticides, Aroclor PCBs, and Hg were the target analytes, but only the frequently detected organochlorine compounds were reported. Mercury was detected in all samples. Therefore, the database contains p,p' and o,p'-DDT, -DDE, and -DDD results. Results for dieldrin, endosulfan, endrin, Aroclor 1260, and mercury are also included. Conventional analyses included percent dry weight and percent lipid.

ANALYTICAL TECHNIQUES: Organochlorine pesticides and PCBs (EPA 608, additional information on analysis is provided in Appendix II of the document); Mercury (EPA 245.2 with modifications).

SAMPLING EQUIPMENT USED: Electroshocking and hand-collection (mussels and crayfish). Salmon and trout were provided by the Yakima Nation from traps and hook and line, respectively.

SAMPLE HANDLING AND PROCESSING: Fish and invertebrate samples were wrapped in aluminum foil, put in plastic bags, placed in coolers containing ice in polyethylene containers, and sent to the laboratory for compositing and processing.

DATA GAPS: Latitude and longitude of sampling locations was not provided in the report. Latitude and longitude were estimated for entry along with the data provided in the database.

ABSTRACT

This study was conducted in 1985 by Ecology's Water Quality Investigations Section in response to the results from the Basic Water Monitoring Program (BWMP) which showed higher levels of DDT and metabolites DDE and DDD in Yakima River fish than elsewhere in Washington State between 1979 and 1984. The study's objective was to evaluate the hazards to human health and aquatic life, identify sources, and determine if contamination was primarily due to recent illegal use or historical applications (Johnson et al. 1986). Fish, water, and bed sediments were analyzed. Biota samples were collected from the Yakima River main stem to assess the distribution and extent of DDT contamination. These data were also summarized and reported in a journal publication (Johnson et al. 1988).

QA/QC EVALUATION - QA/QC included interlaboratory comparisons between the Ecology/EPA Manchester laboratory and California Analytical Laboratories (CAL), analysis of matrix spikes and matrix spike duplicates, duplicate samples, and analysis of standard reference materials. CAL was the contract laboratory responsible for the fish tissue organochlorine analyses. The Ecology/EPA Manchester laboratory was responsible for the sediment organochlorine and mercury analyses and fish tissue mercury analyses. Data provided by CAL were reviewed by the Manchester laboratory.

DATA USE AND COMPARABILITY - All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Johnson, A., D. Norton, and W. Yake. 1986. Occurrence and significance of DDT compounds and other contaminants in fish, water and sediment from the Yakima River Basin. Washington State Department of Ecology, Olympia, WA.

Johnson, A., D. Norton, and B. Yake. 1988. Persistence of DDT in the Yakima River drainage, Washington. Arch. Environ. Contam. Toxicol. 17:289-297.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
BIOTA DATA ABSTRACT

AGENCY SPONSOR: Oregon Department of Environmental Quality (ODEQ)

AREA OF STUDY: Willamette River and tributaries

SAMPLING MEDIA: Whole body, fillets, and liver (carp, squawfish, sucker, largemouth bass, cutthroat trout, crayfish and whitefish).

ASSOCIATED SEDIMENT DATA: Yes

POSITIONING SYSTEM: N/A

REFERENCE SOURCE: ODEQ 1994

CONTACT: Neil Mullane, ODEQ, Portland, OR

PHONE: (503) 229-5284 FAX: (503) 229-6124

SAMPLING PERIOD: 1988-1991

NUMBER OF STATIONS SAMPLED: 21 stations

LOCATIONS OF STATIONS SAMPLED: RM 7, 27, 28, 38, 48, 74, 131, 147, 161 and 176. Tributary samples include: Johnson Creek, Tualatin, Yamhill River, Santiam River, Conser Slough, Mckenzie River and Middle Fork Willamette River.

TARGET ANALYTES: Dioxins/furans; pesticides; PCBs; PAHs; Co-planar PCBs; metals.

ANALYTICAL TECHNIQUES: Dioxins and furans (EPA Method 1613A); PAHs (EPA Method 8270); Metals (EPA 600/4-82-020); PCB and pesticides (EPA Method 8080).

SAMPLING EQUIPMENT USED: Electroshocking

SAMPLE HANDLING AND PROCESSING: Fish were weighed, measured, wrapped in aluminum foil, placed on ice in a cooler and shipped to the laboratory for analysis.

DATA GAPS: Latitude and longitude of sampling locations. Latitude and longitude were estimated for entry in the database.

ABSTRACT

A study investigating the presence and effects of toxic pollutants in the Willamette River and selected

tributaries was conducted by the Oregon Department of Environmental Quality (ODEQ) in cooperation with the U.S. EPA and Oregon State University (OSU) (ODEQ 1994). It stated objectives were to determine if bioaccumulative toxic pollutants were present in the sediment and fish tissue and to determine the possible effects of the pollutants present on the aquatic resources using bioassays and other aquatic life toxicity testing methods. This study was used as a screening survey to add to the existing toxic pollutants data base for the Willamette River. The sampling sites selected were used for previous toxic monitoring and were chosen to represent ambient levels, significant industrial and municipal sources and typical urban non-point source impact.

QA/QC EVALUATION - N/A

DATA USE AND COMPARABILITY - Users of these data should be reminded that the data provided are in the form of summary tables for a number of sampling episodes that have occurred over the course of the program. Some inconsistencies were noted between the data summarized in the ODEQ (1994) report and other sources of this information (e.g. Curtis et al. 1993; Curtis 1994).

REFERENCES:

Oregon Department of Environmental Quality (ODEQ). 1994. Willamette River toxics study - 1988/1991. Department of Environmental Quality, Water Quality Division, Portland, OR.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
BIOTA DATA ABSTRACT

AGENCY SPONSOR: U.S. Geological Survey (National Water Quality Assessment Program)

AREA OF STUDY: Yakima River

SAMPLING MEDIA: Whole body (rainbow trout, mountain whitefish, smallmouth bass, sculpin, chiselmouth, largescale sucker, bridgelip sucker, carp, crayfish).

ASSOCIATED SEDIMENT DATA: Yes

POSITIONING SYSTEM: N/A

REFERENCE SOURCE: Rinella et al. 1992

CONTACT: Frank Rinella, USGS, Portland, OR

PHONE: (503) 231-2292 FAX: N/A

SAMPLING PERIOD: 1989 (May, October, and November), 1990 (October, November)

NUMBER OF STATIONS SAMPLED: 32 stations

LOCATIONS OF STATIONS SAMPLED: Waptus River, Jungle Creek, Teanaway River, Yakima River (Umtanum, Cle Elum, Sunnyside, Kiona, Parker, Granger, Grandview), Umtanum Creek, Little Naches River, Rattlesnake Creek,t Satus Creek (Toppenish, Satus), Naches River, Moxee Drain, North Fork Teanaway River, Taneum Creek, South Fork Manastash, Naneum Creek, American River, South Fork Ahtanum Creek, Ahtanum Creek, Sulphur Creek, SpringCreek, Cherry Creek (Thrall, Wipple Wasteway), Wide Hollow Creek (Union Gap, Ahtanum), Granger Drain, Toppenish Creek.

TARGET ANALYTES: Organochlorine pesticides, total PCBs, and polynuclear aromatic hydrocarbons.

ANALYTICAL TECHNIQUES: Analyses were performed according to guidance provided in Cromartie et al. (1975).

SAMPLING EQUIPMENT USED: Electrofishing (backpack and boat-mounted gear) and kick nets.

SAMPLE HANDLING AND PROCESSING: For whole fish samples, the fish were rinsed with native water, weighed and measured, examined for external anomalies, placed in aluminum foil and then placed in a labeled plastic bag and stored on dry ice for shipment to the laboratory. The same procedure was followed for muscle tissue samples except that the muscle tissue was extracted prior to placing in aluminum foil. Crayfish were rinsed with native water, then deionized water, placed in a glass jar and frozen.

DATA GAPS: None

ABSTRACT

One objective of the report was to provide a compilation of concentrations of organic compounds collected during the Yakima Basin NAWQA study which may be used to determine spatial and temporal trends (Rinella et al. 1992). For this study; water, sediment, molluscs, aquatic plants, fish, and crayfish were collected and analyzed for organochlorine pesticides, total PCBs, and polynuclear aromatic hydrocarbons. In addition, conventional data such as length, weight, age (for fish), and lipid content were determined.

QA/QC EVALUATION - All data were reviewed for accuracy and precision. The review included an evaluation of method blanks, matrix spikes and duplicates, and surrogate recoveries for acceptable method performance.

DATA USE AND COMPARABILITY - The data have undergone review and validation. All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Cromartie, E., W.L. Reichel, L.N. Locke, A.A. Belisle, T.E. Kaiser, T.G. Lamont, B.M. Mulhern, R.M. Prouty, and D.M. Swineford. 1975. Residues of organochlorine pesticides and polychlorinated biphenyls and autopsy data for bald eagles, 1971-1972. Pesticides Monitoring Journal 9:11-14.

Rinella, J.F., S.W. McKenzie, J.K. Crawford, W.T. Foreman, P.M. Gates, G.J. Fuhrer, and M.L. Janet. 1992. Surface-water-quality assessment of the Yakima River Basin, Washington: Pesticide and other trace-organic-compound data for water, sediment, soil, and aquatic biota, 1987-91. U.S. Geological Survey, Portland, OR. Open-File Report 92-644.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
BIOTA DATA ABSTRACT

AGENCY SPONSOR: U.S. Fish and Wildlife Service (USFWS)

AREA OF STUDY: National study (10 stations in the Columbia River basin)

SAMPLING MEDIA: Whole body (largescale sucker, rainbow trout, Northern squawfish, mountain whitefish, smallmouth bass, black crappie, walleye and yellow perch).

ASSOCIATED SEDIMENT DATA: No

POSITIONING SYSTEM: N/A

REFERENCE SOURCE: Schmitt and Brumbaugh 1990

CONTACT: Carol Schuler, USFWS, Portland, OR

PHONE: (503) 231-6179 FAX: N/A

SAMPLING PERIOD: 1984

NUMBER OF STATIONS SAMPLED: 112 total stations; 10 stations in Columbia River Basin.

LOCATIONS OF STATIONS SAMPLED: Columbia River basin stations: Snake River (Hagerman and Lewiston, ID and Ice Harbor Dam, WA); Salmon River (Riggins, ID); Yakima River (Granger, WA); Willamette River (Oregon City, OR); Columbia River (Cascade Locks, OR, Pasco and Grand Coulee, WA); Flathead River (Creston, MT).

TARGET ANALYTES: Metals (As, Cd, Cu, Pb, Hg, Se and Zn). All data are reported on a wet weight basis.

ANALYTICAL TECHNIQUES: A Perkin-Elmer Model 5000 atomic absorption spectrophotometer was used for all metals analyses.

SAMPLING EQUIPMENT USED: Netting, hook-and-line, electrofishing or purchased from local fishermen (Schmitt et al. 1981).

SAMPLE HANDLING AND PROCESSING: Fish were shipped to the laboratory frozen on dry ice and stored in a freezer until prepared for analysis.

DATA GAPS: Latitude and longitude of sampling locations. Latitude and longitude were estimated for the data base.

ABSTRACT

The National Contaminant Biomonitoring Program, maintained by the U.S. Fish and Wildlife Service, documented temporal and geographical trends in concentrations of persistent environmental contaminants that may threaten fish and wildlife. This report represents a collection of 321 composite samples (each composed of three to five whole, adult specimens of a single species) from 112 stations at key points in major rivers throughout the United States and in the Great Lakes that were sampled for whole body fish tissue trace element concentrations (Schmitt and Brumbaugh 1990). There are 10 stations represented that are located within the Columbia River basin. Methods of collecting, shipping, archiving and preparing samples are fully described in Schmitt et al. (1981,1983). The results of the organochlorine chemical residues in freshwater fish are reported in Schmitt et al. (1990).

QA/QC EVALUATION - Quality control samples, analyzed to estimate accuracy and precision of results, included biological reference materials, spiked samples, triplicate determinations and procedural blanks. Concentrations measured for the reference samples (which included U.S. National Bureau of Standards oyster, tuna and liver and an in-house reference fish sample of a stripped bass collected from the Hudson River, NY in 1981) agreed well with reported values; mean concentrations measured were within 10% of certified or recommended ranges for all materials or elements. All results for quality control samples were within limits of acceptance established by the laboratory.

DATA USE AND COMPARABILITY - Data have been extensively reviewed and validated and appear to be of good quality. Actual data is provided from the 1984 sampling effort. Summary tables of data from prior collection efforts (from 1976-1981) is also included. This study, due to its ongoing nature, provides a comprehensive review of contaminant levels of various fish species at these selected sites from 1976-1984.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Schmitt, C.J., J.L. Ludke, and D.F. Walsh. 1981. Organochlorine residues in fish: National Pesticide Monitoring Program, 1970-74. Pesticides Monitoring Journal 14:136-206.

Schmitt, C.J., M.A. Ribick, J.L. Ludke, and T.W. May. 1983. National Pesticide Monitoring Program: Organochlorine residues in freshwater fish, 1976-79. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Resource Publication 152.

Schmitt, C.J. and W.G. Brumbaugh. 1990. National Contaminant Biomonitoring Program: Concentrations of arsenic, cadmium, copper, lead, mercury, selenium, and zinc in U.S. freshwater fish, 1976-1984. Arch. Environ. Contam. Toxicol. 19:731-747.

Schmitt, C.J., J.L. Zajicek, and P.H. Peterman. 1990. National Contaminant Biomonitoring Program: Residues of organochlorine chemicals in U.S. freshwater fish, 1976-1984. Arch. Environ. Contam. Toxicol. 19:748-781.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
BIOTA DATA ABSTRACT

AGENCY SPONSOR: U.S. Fish and Wildlife Service (USFWS)

AREA OF STUDY: National study (10 stations in the Columbia River basin)

SAMPLING MEDIA: Whole body (largescale sucker, rainbow trout, Northern squawfish, mountain whitefish, smallmouth bass, black crappie, walleye and yellow perch).

ASSOCIATED SEDIMENT DATA: No

POSITIONING SYSTEM: N/A

REFERENCE SOURCE: Schmitt et al. 1990

CONTACT: Carol Schuler, USFWS, Portland, OR

PHONE: (503) 231-6179 FAX: N/A

SAMPLING PERIOD: 1984

NUMBER OF STATIONS SAMPLED: 112 total stations; 10 stations in the Columbia River Basin.

LOCATIONS OF STATIONS SAMPLED: Snake River (Hagerman and Lewiston, ID and Ice Harbor Dam, WA); Salmon River (Riggins, ID); Yakima River (Granger, WA); Willamette River (Oregon City, OR); Columbia River (Cascade Locks, OR, Pasco and Grand Coulee, WA); Flathead River (Creston, MT).

TARGET ANALYTES: Organochlorine pesticides. All data are reported on a wet weight basis.

ANALYTICAL TECHNIQUES: Varian 3700 gas chromatograph.

SAMPLING EQUIPMENT USED: Netting, hook-and-line, electrofishing or purchased by local fishermen (Schmitt et al. 1981).

SAMPLE HANDLING AND PROCESSING: Fish were shipped to the laboratory frozen on dry ice and stored in a freezer until prepared for analysis.

DATA GAPS: Latitude and longitude of sampling locations. Latitude and longitude were estimated for the data base.

ABSTRACT

The National Contaminant Biomonitoring Program, maintained by the U.S. Fish and Wildlife Service, documents temporal and geographical trends in concentrations of persistent environmental contaminants that may threaten fish and wildlife. This report represents a collection of 321 composite samples (each composed of three to five whole, adult specimens of a single species) from 112 stations at key points in major rivers throughout the United States and in the Great Lakes that were analysed for organochlorine pesticides and PCBs (Schmitt et al. 1990). There are 10 stations represented that are associated with the Columbia River basin. Methods of collecting, shipping, archiving and preparing samples are fully described in Schmitt et al. (1981,1983). The results of analysis of trace elements in freshwater fish are reported in Schmitt and Brumbaugh (1990).

QA/QC EVALUATION - Method blanks were analyzed with each block of samples. Duplicate samples were used to estimate analytical variability. Concentrations measured for the reference samples (which included an in-house reference composite fish sample of a stripped bass collected from the Hudson River, NY in 1981). The relative SD was between 10-20% for lipid content and all compounds except: compounds that had mean concentrations at or near the generic method LOD, o,p'-DDE (38%), o,p'-DDT (27%) and Aroclor 1254 (23%).

DATA USE AND COMPARABILITY - Data have been extensively reviewed and validated and appear to be of good quality. Actual data is provided from the 1984 sampling effort. Summary tables of data from prior collection efforts (from 1976-1981) is also included. This study, due to its ongoing nature, provides a comprehensive review of contaminant levels of various fish species at these selected sites from 1976-1984.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Schmitt, C.J., J.L. Ludke, and D.F. Walsh. 1981. Organochlorine residues in fish: National Pesticide Monitoring Program, 1970-74. Pesticides Monitoring Journal 14:136-206.

Schmitt, C.J., M.A. Ribick, J.L. Ludke, and T.W. May. 1983. National Pesticide Monitoring Program: Organochlorine residues in freshwater fish, 1976-79. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Resource Publication 152.

Schmitt, C.J. and W.G. Brumbaugh. 1990. National Contaminant Biomonitoring Program: Concentrations of arsenic, cadmium, copper, lead, mercury, selenium, and zinc in U.S. freshwater fish, 1976-1984. Arch. Environ. Contam. Toxicol. 19:731-747.

Schmitt, C.J., J.L. Zajicek, and P.H. Peterman. 1990. National Contaminant Biomonitoring Program: Residues of organochlorine chemicals in U.S. freshwater fish, 1976-1984. Arch. Environ. Contam. Toxicol. 19:748-781.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
BIOTA DATA ABSTRACT

AGENCY SPONSOR: U.S. Fish and Wildlife Service (USFWS)

AREA OF STUDY: Columbia River (Grays Bay to Umatilla)

SAMPLING MEDIA: Whole body (carp, smallmouth bass, Northern squawfish, sucker, whitefish, crayfish, corbicula and macoma clams, corophium amphipod).

ASSOCIATED SEDIMENT DATA: Yes

POSITIONING SYSTEM: N/A

REFERENCE SOURCE: Schuler 1994

CONTACT: Carol Schuler, USFWS, Portland, OR

PHONE: (503) 231-6179 FAX: N/A

SAMPLING PERIOD: May-September 1991

NUMBER OF STATIONS SAMPLED: 8 stations

LOCATIONS OF STATIONS SAMPLED: Baker Bay, Camas, Cathlamet Bay, Lewis and Clark, Longview, Julia Butler, Ridgefield and Umatilla.

TARGET ANALYTES: Dioxins and furans; PCBs; organochlorine pesticides; Hg.

ANALYTICAL TECHNIQUES: Dioxins/furans (EPA Method 1613).

SAMPLING EQUIPMENT USED: N/A

SAMPLE HANDLING AND PROCESSING: N/A

DATA GAPS: Latitude and longitude of sampling locations. Type of analytical techniques used for chemical analyses other than dioxins and furans. Sampling equipment used and sample processing and handling. QA/QC procedures.

ABSTRACT

The Columbia River Estuary is exposed to a variety of contaminants through municipal and industrial permitted discharges, urban and industrial nonpoint pollution, accidental spills of oil and hazardous

materials, agricultural runoff and accelerated population growth. This study intended to provide information needed to determine if hazardous concentrations of organic pollutants are bioaccumulating in fish and wildlife from the Columbia River and its National Wildlife Refuges. Sediment, aquatic invertebrate, fish and bird egg samples were collected for this study. Preliminary study results were reported in Schuler (1992). There was no accompanying report with these data. The data were provided in spreadsheet format by Carol Schuler (1994).

QA/QC EVALUATION - N/A

DATA USE AND COMPARABILITY - No information was provided on analytical methods, QA/QC measures or review and validation of results.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Schuler, C. 1992. Organochlorine contaminants in aquatic resources from the Columbia River. Progress report. Fiscal year 1992. U.S. Department of the Interior, Fish and Wildlife Service, Portland Field Office, Portland, OR.

Schuler, C. 8 September 1994. Personal Communication (data sent to Ms. Kimberly Stark, Tetra Tech, Redmond, WA). U.S. Fish and Wildlife Service, Portland, OR.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
BIOTA DATA ABSTRACT

AGENCY SPONSOR: Washington Department of Ecology (WDOE)

AREA OF STUDY: Columbia River (Rufus Woods Lake to Columbia River mouth)

SAMPLING MEDIA: Muscle tissue (walleye, lake and mountain whitefish, rainbow trout, smallmouth and largemouth bass, channel catfish, carp, white sturgeon and chinook salmon).

ASSOCIATED SEDIMENT DATA: No

POSITIONING SYSTEM: N/A

REFERENCE SOURCE: Serdar et al. 1991

CONTACT: Dave Serdar, WDOE, Olympia, WA

PHONE: (206) 407-6772 FAX: (206) 407-6715

SAMPLING PERIOD: May - November 1990

NUMBER OF STATIONS SAMPLED: 8 stations

LOCATIONS OF STATIONS SAMPLED: Rufus Woods Lake, Rock Island Reservoir, Priest Rapids Reservoir, Lake Wallula, Lake Wenatchee, Leavenworth Hatchery, Priest Rapids Hatchery, Columbia River mouth,

TARGET ANALYTES: Dioxins and furans.

ANALYTICAL TECHNIQUES: Dioxins and furans (EPA Method 8290 with modifications).

SAMPLING EQUIPMENT USED: Electroshocking, gillnet or hook-and-line

SAMPLE HANDLING AND PROCESSING: Fish were marked with the location, species, length, weight and any other observations on a sample tag. The fish was then double wrapped with the tag in aluminum foil and placed in a ziplock bag. Samples were kept on ice while in the field and subsequently frozen for later analysis.

DATA GAPS: Latitude and longitude of sampling locations. Latitude and longitude were estimated for the data base.

ABSTRACT

The upper and lower reaches of the Columbia River have been well studied for TCDD/TCDF contamination if fish, a void in data exists for the middle reaches. Ecology responded by undertaking a survey of TCDD/TCDF in sportfish from just above Chief Joseph Dam (Rufus Woods Lake) to McNary Dam (Lake Wallula) during May to November, 1990 (Serdar et al. 1991). Sportfish samples were also collected from the mouth of the Columbia River. The objective of this survey was to obtain an accurate estimate of mean TCDD and TCDF concentrations in muscle tissue of major sportfish species from popular harvest areas. A total of 187 individual fish were collected resulting in a total of 46 composite tissue samples analyzed for dioxins and furans.

QA/QC EVALUATION - Data was reviewed and evaluated by an independent laboratory under contract from Ecology. Duplicate split samples were used for analytical precision. Reviewers evaluated ion chromatograms, initial and daily continuing calibrations, column performance check mixes, calculations of positive natives, matrix spikes and spike duplicates and percent lipid calculations. All data reported have been deemed acceptable for use according to the quality assurance requirements of Method 8290.

DATA USE AND COMPARABILITY - The data have undergone review and validation. Users of these data should be reminded that muscle tissue was used for analysis rather than whole fillets.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Serdar, D., A. Johnson, and S. Magoon. 1991. Polychlorinated dioxins and -furans in Columbia River sportfish: Chief Joseph Dam to McNary Dam. Washington State Department of Ecology, Olympia, WA.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
BIOTA DATA ABSTRACT

AGENCY SPONSOR: Washington Department of Ecology (WDOE)

AREA OF STUDY: Lake Roosevelt

SAMPLING MEDIA: Muscle tissue and eggs (lake whitefish); whole body (largescale sucker)

ASSOCIATED SEDIMENT DATA: Yes

POSITIONING SYSTEM: N/A

REFERENCE SOURCE: Serdar et al. 1994

CONTACT: Dave Serdar, WDOE, Olympia, WA

PHONE: (206) 407-6772 FAX: (206) 407-6715

SAMPLING PERIOD: October 1992 and 1993

NUMBER OF STATIONS SAMPLED: 4 stations

LOCATIONS OF STATIONS SAMPLED: Off Colville River, off Sherman Creek, Northport Bridge, and off Sheep Creek.

TARGET ANALYTES: 2,3,7,8-TCDD and -TCDF; cadmium; copper; lead; mercury; and zinc.

ANALYTICAL TECHNIQUES: TCDD/TCDF (EPA Method 8290), cadmium (EPA Method 3051/213.2 modified), copper (EPA Method 3051/6010), lead (EPA Method 3051/239.2 modified), mercury (EPA Method 245.1 modified), and zinc (EPA Method 3051/6010).

SAMPLING EQUIPMENT USED: Gillnet (lake whitefish) and electroshocking (largescale suckers).

SAMPLE HANDLING AND PROCESSING: Lake whitefish samples were placed on ice until muscle and egg samples were resected. Largescale suckers were homogenized using a Hobart meat grinder. Additional information regarding sample handling and processing was not provided.

DATA GAPS: Latitude and longitude of sampling locations was not provided. Latitude and longitude were estimated for the data base.

ABSTRACT

During 1992 and 1993, the Washington Department of Ecology evaluated TCDD,TCDF, and trace metal concentrations in suspended sediments and fish tissues collected from four locations in Lake Roosevelt. The main objective of the study was to provide temporal trends in concentrations of these pollutants in Lake Roosevelt. The study was based on previous Ecology studies of dioxins/furans and metals that determined the extent and degree of contamination in Lake Roosevelt through 1990. The report included new 1992 and 1993 data and discussed previously reported 1990 data (Johnson et al. 1991). An interim report (Serdar et al. 1993) provided a preliminary summary of the 1992 data.

QA/QC EVALUATION - All TCDD and TCDF data met EPA Method 8290 guidelines for continuing calibration, internal standard recoveries, and isotopic abundance ratios. All metals data met EPA guidelines for instrument calibration and procedural blanks. Several matrix spike recoveries for various metals were outside acceptable QC limits. The data reviewer determined that sample nonhomogeneity may have accounted for the poor spike recoveries. Two standard reference materials were analyzed for metals to assess analytical accuracy.

DATA USE AND COMPARABILITY - Data are of good quality and have undergone extensive review and validation. Fish sample results were compared to previous results obtained in 1990 and 1992 for the assessment of temporal trends.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Johnson, A.D., D. Serdar, and S. Magoon. 1991. Polychlorinated dioxins and -furans in Lake Roosevelt (Columbia River) sportfish, 1990. Washington Department of Ecology, Olympia, WA. Publication No. 91-4.

Serdar, D., A. Johnson, and K. Seiders. 1993. Interim report on monitoring contaminant trends in Lake Roosevelt. Washington Department of Ecology, Olympia, WA.

Serdar, D., B. Yake, J. Cubbage. 1994. Contaminant trends in Lake Roosevelt. Draft report. Washington State Department of Ecology, Olympia, WA.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
BIOTA DATA ABSTRACT

AGENCY SPONSOR: City of St. Helens

AREA OF STUDY: Columbia River (St. Helens)

SAMPLING MEDIA: Crayfish (whole body)

ASSOCIATED SEDIMENT DATA: Yes

POSITIONING SYSTEM: Trimble Navigation GPS

REFERENCE SOURCE: Tetra Tech 1992a

CONTACT: Steve Ellis, Tetra Tech, Inc., Redmond, WA

PHONE: (206) 883-1912 FAX: (206) 881-6997

SAMPLING PERIOD: August 21-31, 1991

NUMBER OF STATIONS SAMPLED: 5 stations where sediments were also collected.

LOCATIONS OF STATIONS SAMPLED: Multnomah Channel, Fishtrap Shoal, St. Helens Marina, Warrior Rock, and Columbia City

TARGET ANALYTES: Seventeen dioxin and furan congeners. The average lipid content and weight for composite samples were reported as well as individual crayfish weights. Data are presented as wet weight and lipid-normalized values.

ANALYTICAL TECHNIQUES: Dioxins and furans (EPA Method 8290). Lipid content was determined by gravimetric methodology utilizing the sample extract.

SAMPLING EQUIPMENT USED: Baited wire mesh crayfish traps.

SAMPLE HANDLING AND PROCESSING: Samples were wrapped in aluminum foil, placed in labeled plastic bags, and stored on dry ice for shipping to the laboratory.

DATA GAPS: none

ABSTRACT

Monitoring of sediment and crayfish (*Pacifastacus leniusculus*) was conducted in order to satisfy

monitoring requirements set forth in the City of St. Helens National Discharge Elimination System (NPDES) Permit (Tetra Tech 1992a). Samples were collected to evaluate the accumulation of dioxins and furans in sediment and crayfish. Sediment and crayfish sampling primarily focused on locations downriver from the location of the outfall pipe. Whole body composite crayfish samples were analyzed with one exception. Only one crayfish was obtained from the St. Helens Marina site.

Crayfish samples were collected using baited commercially-obtained wire mesh crayfish traps. The traps were attached to marked buoys and deployed at the five sampling sites using a small boat. Sampling station latitude and longitude were recorded from geographic coordinates provided by a Trimble Navigation Global Positioning System receiver.

QA/QC EVALUATION - Data were reviewed by Dr. William Luksemburg of Alta Analytical Laboratory. The review included all ion chromatograms, initial and continuing calibrations, column performance check mixes, calculations of positive values and detection limits, ion abundance ratios for internal/surrogate/recovery standards and positive natives, matrix spikes and duplicates, and calculation of lipid content. No data were qualified based upon review of QA/QC data. Method blank, laboratory control sample, internal standard, and detection limit data were included in the report.

DATA USE AND COMPARABILITY - Crayfish tissue data have undergone review and the majority of the data are of acceptable quality. Comparisons between sediment and crayfish tissue contaminant data collected for this study are possible as the sampling locations for crayfish correspond to sediment sampling sites.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Tetra Tech. 1992. City of St. Helens discharge monitoring report: Accumulation of dioxins and furans in sediment and biota. Prepared for City of St. Helens, St. Helens, OR. Tetra Tech, Inc., Bellevue, WA.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
BIOTA DATA ABSTRACT

AGENCY SPONSOR: James River Corporation

AREA OF STUDY: Columbia River (Wauna)

SAMPLING MEDIA: Crayfish (whole body)

ASSOCIATED SEDIMENT DATA: Yes

POSITIONING SYSTEM: Trimble Navigation GPS

REFERENCE SOURCE: Tetra Tech 1992c

CONTACT: Steve Ellis, Tetra Tech, Inc., Redmond, WA

PHONE: (206) 883-1912 FAX: (206) 881-6997

SAMPLING PERIOD: August 25-31, 1991

NUMBER OF STATIONS SAMPLED: 5 stations where sediments were also collected.

LOCATIONS OF STATIONS SAMPLED: Wallace Island, Westport Slough, Bradwood, Clifton Channel, and downriver from James River Wauna Mill.

TARGET ANALYTES: Seventeen dioxin and furan congeners. The average lipid content and weight for composite samples were reported as well as individual crayfish weights. All data are reported on a wet weight basis.

ANALYTICAL TECHNIQUES: Dioxins and furans (EPA Method 8290). Lipid content was determined by gravimetric methodology utilizing the sample extract.

SAMPLING EQUIPMENT USED: Baited wire mesh crayfish traps.

SAMPLE HANDLING AND PROCESSING: Samples were wrapped in aluminum foil, placed in labeled plastic bags, and stored on dry ice for shipping to the laboratory.

DATA GAPS: none

ABSTRACT

Monitoring of sediment and crayfish (*Pacifastacus leniusculus*) was conducted in order to satisfy

monitoring requirements set forth in the James River Wauna Mill's National Discharge Elimination System (NPDES) Permit (Tetra Tech 1992). Samples were collected to evaluate the accumulation of dioxins and furans in sediment and crayfish. Sediment and crayfish sampling primarily focused on locations downriver of the mill. Whole body composite samples of crayfish were targeted for analysis.

Crayfish samples were collected using baited commercially-obtained wire mesh crayfish traps. The traps were attached to marked buoys and deployed at the five sampling sites using a small boat. Sampling station latitude and longitude were recorded from geographic coordinates provided by a Trimble Navigation Global Positioning System receiver.

QA/QC EVALUATION - Data were reviewed by Dr. William Luksemburg of Alta Analytical Laboratory. The review included all ion chromatograms, initial and continuing calibrations, column performance check mixes, calculations of positive values and detection limits, ion abundance ratios for internal/surrogate/recovery standards and positive natives, matrix spikes and duplicates, and calculation of lipid content. No data were qualified based upon review of QA/QC data. Method blank, laboratory control sample, internal standard, and detection limit data were included in the report.

DATA USE AND COMPARABILITY - The crayfish tissue data have undergone review and validation. Comparisons between sediment and crayfish tissue contaminant data collected for this study are possible as the sampling locations for crayfish correspond to sediment sampling sites.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Tetra Tech. 1992. James River Wauna Mill discharge monitoring report: Accumulation of dioxins and furans in sediment and biota. Prepared for James River Corporation, Wauna, OR. Tetra Tech, Inc., Bellevue, WA.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
BIOTA DATA ABSTRACT

AGENCY SPONSOR: Lower Columbia River Bi-State Program (Bi-State)

AREA OF STUDY: Lower Columbia River (Bonneville Dam to mouth)

SAMPLING MEDIA: Whole body (peamouth, carp, largescale sucker, crayfish), skinless fillet (white sturgeon).

ASSOCIATED SEDIMENT DATA: Yes

POSITIONING SYSTEM: Magnavox MX 2000 GPS Navigator System

REFERENCE SOURCE: Tetra Tech 1993

CONTACT: Steve Ellis, Tetra Tech, Inc., Redmond, WA

PHONE: (206) 883-1912 FAX: (206) 881-6997

SAMPLING PERIOD: August-September 1991

NUMBER OF STATIONS SAMPLED: 19 stations where sediments were also collected; 8 general areas throughout the river where white sturgeon were captured by commercial fisherman.

LOCATIONS OF STATIONS SAMPLED: Mainstem and backwater areas of the lower Columbia River—River Mile 0 to 147, the mouth of the Columbia River to Bonneville Dam.

TARGET ANALYTES: Seventeen dioxin and furan congeners, 7 PCB Aroclors, 11 metals and trace elements (Sb, As, Ba, Cd, Cu, Pb, Hg, Ni, Se, Ag, Zn), 49 semi-volatile organic compounds including 8 phenolic compounds and 15 polynuclear aromatic hydrocarbons, and 28 pesticides. Sample lipid content and the average weight and fork length of fish (average weight only for crayfish) were also reported. All data are reported on a wet weight basis.

ANALYTICAL TECHNIQUES: Dioxins and furans (EPA Method 1613 with modifications); PCB Aroclors (EPA Method 8080); metals and trace elements [Ag, Ni, Cu, Ba, Sb, and Zn by ICP (EPA 6010), Pb by ICP/MS (EPA 200.8), As and Se by GFAA (EPA 7060 and 7740), and Hg by CVAA (EPA 245.2); SVOCs (EPA 8270); and pesticides and PCBs (EPA 8080).

SAMPLING EQUIPMENT USED: Most fish collected from an aluminum boat using electrofishing equipment. Peamouth collected from Youngs Bay collected using a gillnet. Sturgeon samples received from commercial sturgeon fisherman at dock. Crayfish collected using baited minnow traps.

SAMPLE HANDLING AND PROCESSING: Fish and crayfish samples were labeled and frozen in the field and delivered to the laboratory for compositing and processing. Sample chain-of-custody procedures were followed.

DATA GAPS: none

ABSTRACT

Tetra Tech, Inc., was contracted by the Lower Columbia River Bi-State Program to conduct a reconnaissance level survey of water, sediment, and biota (fish and crayfish) contaminant levels in these media of the lower Columbia River below Bonneville Dam (Tetra Tech 1993). Sediment and biota sampling focused on locations in the mainstem and backwater areas of the lower river. Five species were targeted for sampling and analysis: whole body composite samples of crayfish (*Pacifastacus leniusculus*), carp (*Cyprinus carpio*), largescale sucker (*Catostomus macrocheilus*), and peamouth (*Mylocheilus caurinus*). Individual skinless fillets of white sturgeon (*Acipenser transmontanus*) were also targeted for analysis.

Biota sampling was conducted primarily with an electrofishing boat, although the peamouth collected in Youngs Bay were captured using a gillnet. White sturgeon were purchased fresh from commercial fisherman. Fish and crayfish sampling station latitude and longitude were recorded from geographic coordinates provided by a Trimble Transpak II Global Positioning System receiver. The GPS locational information was not corrected for the U.S. Department of Defense's Selective Availability, and therefore the GPS latitudes and longitudes provided are accurate to approximately ±100 m. The locations where white sturgeon were captured were approximated based on information provided by the fisherman.

QA/QC EVALUATION - The tissue analysis data submitted by the laboratories were reviewed and validated by Tetra Tech using guidance provided in the Quality Assurance/Quality Control (QA/QC) Plan developed for this project and guidance provided by the U.S. EPA. A data validation report was prepared as part of the final report and is bound separately as Volume 2: Appendix A, Data Validation Reports. The QA/QC procedures included sampling and analysis of field and laboratory replicates and matrix spike/matrix spike duplicate (MS/MSD) analyses on a minimum of 5 percent of the samples that were collected. Some data were qualified based on review of laboratory replicate and MS/MSD results, and additional calibration instrument calibration and performance data provided by the laboratories.

DATA USE AND COMPARABILITY - The biota tissue data have undergone review and validation. Data not meeting project guidelines for laboratory precision or accuracy have been qualified where appropriate. Although comparison between sediment and fish tissue contaminant data collected in this program is possible, the sampling area for fish at a particular station was generally greater than the area designated as the sediment sampling station. Because a relatively large area was sampled to collect the required number of fish at each station, the latitude and longitude provided for a particular fish sampling station is a simple representation of the location that was sampled. Furthermore, with the exception of crayfish, it is not know to what extent the fish species collected reside in the vicinity of the sampling station. The original data may be found in Volume 3: Data Tables. Appendices B, C, D, &E. of Tetra Tech (1993).

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Tetra Tech. 1993. Reconnaissance Survey of the lower Columbia River. Task 6: Reconnaissance report. Volumes 1, 2, and 3. Prepared for Columbia River Bi-State Program. Tetra Tech, Inc., Redmond, WA.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
BIOTA DATA ABSTRACT

AGENCY SPONSOR: Lower Columbia River Bi-State Program (Bi-State)

AREA OF STUDY: Lower Columbia River (Bonneville Dam to mouth)

SAMPLING MEDIA: Whole body (largescale sucker, carp, crayfish)

POSITIONING SYSTEM: Magnavox MX 2000 GPS Navigator System

ASSOCIATED SEDIMENT DATA: Yes

REFERENCE SOURCE: Tetra Tech 1994

CONTACT: Steve Ellis, Tetra Tech, Inc., Redmond, WA

PHONE: (206) 883-1912 FAX: (206) 881-6997

SAMPLING PERIOD: July-August 1993

NUMBER OF STATIONS SAMPLED: 15 stations

LOCATIONS OF STATIONS SAMPLED: Backwater areas of the lower Columbia River—River Mile 14 to 141, Youngs Bay to Skamania Landing.

TARGET ANALYTES: Seventeen dioxin and furan congeners, 7 PCB Aroclors, 16 metals and trace elements (Sb, As, Ba, Cd, Cr, Cu, Pb, Hg, Ni, Se, Ag, Zn), 59 semi-volatile organic compounds (SVOCs) including 11 phenolic compounds and 17 polynuclear aromatic hydrocarbons (PAHs), 26 pesticides, 6 PCB Aroclors, 3 butyltin compounds including tributyltin, and 8 long-lived radionuclides. Conventional analyses included lipid content and average length/weight data for the composite samples. All chemical data are reported on a dry weight basis.

ANALYTICAL TECHNIQUES: Dioxins and furans (EPA Method 1613 with modifications); PCB Aroclors (EPA Method 8080); metals and trace elements [Ag, Ba, Cu, Ni, and Zn by ICP (EPA Method 200.7); Sb (EPA 204.2), As (EPA 206.2), Cd (EPA 213.2), Cr (EPA 218.2), Pb (EPA 239.2), and Se (EPA 270.2) by GFAA; Hg (EPA 245.2) by CVAA)]; SVOCs (EPA 8270) with SIM for PAH analysis; pesticides and PCBs (EPA 8080); butyltins (GC/MS with SIM); radionuclides by alpha spectroscopy and gamma counting.

SAMPLING EQUIPMENT USED: Electroshocking equipment for the collection of fish and baited traps for the collection of crayfish, Magnavox MX 2000 Global Positioning System (GPS)

SAMPLE HANDLING AND PROCESSING: Tissue samples consisted of a homogenized composites of 2-5 largescale sucker and 8-21 crayfish collected from each station, although no largescale sucker or crayfish could be collected at Station 15 at Skamania Landing and no crayfish could be collected from Station 1 in Youngs Bay. Carp were collected from these two stations to

provide composite tissue samples for analysis. Three field replicate composite samples were collected from Station 13 in Camas Slough to evaluate field variablility of the tissue analyses. Samples were shipped on ice to laboratory. Sample chain-of-custody proceedures were followed.

DATA GAPS: none

ABSTRACT

Tetra Tech, Inc., was contracted by the Lower Columbia River Bi-State Program to conduct a supplemental reconnaissance survey of sediment and biota (fish and crayfish) contaminant levels in backwater areas of the lower Columbia River (Tetra Tech 1994). These samples were intended to expand the data base of the original reconnaissance survey reported in Tetra Tech (1993). Station latitude and longitude were recorded from geographic coordinates provided by a Magnavox MX 2000 Global Positioning System (GPS) Navigator System receiver. The GPS locational information was not corrected for the U.S. Department of Defense's Selective Availability, and therefore the GPS latitudes and longitudes provided are accurate to approximately ± 100 m.

QA/QC EVALUATION - The tissue data submitted by the laboratories were reviewed and validated by Tetra Tech using guidance provided in the Quality Assurance/Quality Control (QA/QC) Plan developed for this project and guidance provided by the U.S. EPA. A data validation report was prepared as part of the final report and is bound separately as Volume 2: Appendix A, Data Validation Reports. The QA/QC procedures included sampling and analysis of field and laboratory replicates and matrix spike/matrix spike duplicate (MS/MSD) analyses on a minimum of 5 percent of the samples that were collected. Some data were qualified based on review of laboratory replicate and MS/MSD results, and instrument calibration and performance data provided by the laboratories.

DATA USE AND COMPARABILITY - The tissue data are of good quality and have undergone review and validation. The field replicated data allow for statistical comparisons. Data not meeting project guidlines for laboratory precision or accuracy have been qualified where appropriate. Although comparison between sediment and fish tissue contaminant data collected in this program is possible, the sampling area for fish at a particular station was generally greater than the area designated as the sediment sampling station. Furthermore, with the exception of crayfish, it is not known to what extent the fish species collected reside in the vicinity of the sampling station. The original data may be found in Volume 3: Data Tables - Appendices B, C, D, & E of Tetra Tech (1994).

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Tetra Tech. 1993. Reconnaissance Survey of the lower Columbia River. Task 6: Reconnaissance report. Volumes 1, 2, and 3. Prepared for Columbia River Bi-State Program. Tetra Tech, Inc., Redmond, WA.

Tetra Tech. 1994. Draft report. Lower Columbia River Backwater Reconnaissance Survey. Volumes 1, 2, and 3. Prepared for Lower Columbia River Bi-State Committee. Tetra Tech, Inc., Redmond, WA.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
BIOTA DATA ABSTRACT

AGENCY SPONSOR: U.S. Environmental Protection Agency (USEPA)

AREA OF STUDY: National study (23 locations in the Columbia River basin)

SAMPLING MEDIA: Whole body (largescale sucker, carp, crayfish, white sturgeon, soft shell clams, bridgelip sucker); Fillet (sucker, smallmouth bass, squawfish, whitefish, white sturgeon).

ASSOCIATED SEDIMENT DATA: No

POSITIONING SYSTEM: N/A

REFERENCE SOURCE: U.S. EPA 1992

CONTACT: Elizabeth Southerland, Office of Science and Technology, Washington, D.C.

PHONE: (202) 260-3966 FAX: N/A

SAMPLING PERIOD: 1987

NUMBER OF STATIONS SAMPLED: 388 stations throughout the U.S.; Approximately 24 locations in the Columbia River basin.

LOCATIONS OF STATIONS SAMPLED: Snake River, Willamette River, Columbia River, Tulatin River and Yakima River.

TARGET ANALYTES: Dioxins and furans; PCBs; pesticides; metals; organics; mercury.

ANALYTICAL TECHNIQUES: Dioxins and furans (EPA 600/3-90/022); xenobiotics (EPA 600/3-90/023); Mercury (EPA 1989a).

SAMPLING EQUIPMENT USED: N/A

SAMPLE HANDLING AND PROCESSING: Fish were individually wrapped in aluminum foil, labeled, dry-iced and shipped to the laboratory. Two composite samples (of three-five adult fish) from each site were used for analysis, when possible.

DATA GAPS: none

ABSTRACT

This study, commonly referred to as the National Bioaccumulation Study (NBS), was a one-time screening investigation to determine the prevalence of selected bioaccumulative pollutants in fish and to identify correlations with sources of these pollutants. This study, initiated as a follow-up study to the National Dioxin Study, targeted sites near producers of dioxins including: pulp and paper mills, refineries using catalytic reforming process, Superfund sites, former wood preserving operations, publicly owned treatment works (POTWs) and agricultural and urban areas. A total of 388 sites were selected for sampling around the United States and approximately 24 sites in the Pacific North West / Columbia River Basin area. Some samples collected from the National Dioxin Study were reanalyzed as part of this study to obtain information on concentrations of pollutants other than 2,3,7,8 TCDD and have been added into the data base. This results of this study were originally published as U.S. EPA (1991).

QA/QC EVALUATION - Specific laboratory QA procedures were established. If dioxin values were below 40 percent recovery, they were flagged with a QR designation in the data base. General guidance for data quality including QA/QC requirements was provided in the Work/Quality Assurance Project Plan. Appendix A-2 contains the Analytical Procedures and Quality Assurance Plan for the Determination of PCDD/PCDF in Fish and the Analytical Procedures and Quality Assurance Plan for the Determination of Xenobiotic Chemical Contaminants in Fish.

DATA USE AND COMPARABILITY - User of these data should be reminded that the sampling areas targeted for sampling were those areas suspected to be contaminated with dioxins and furans. Therefore, these data may not be indicative of ambient levels throughout the U.S.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

U.S. Environmental Protection Agency (U.S. EPA). 1992. National study of chemical residues in fish. Volumes I and II. EPA 823-R-92-008a,b. Office of Science and Technology, U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (U.S. EPA). 1991. Bioaccumulation of selected pollutants in fish - A National Study. Volumes I and II. EPA 506/6-90/001a,b. Assessment and Watershed Protection Division, Office of Water Regulations and Standards, U.S. Environmental Protection Agency, Washington, D.C.

APPENDIX D

SEDIMENT DATA ABSTRACTS

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: Washington State Department of Ecology (WDOE)

AREA OF STUDY: Lower Columbia River-Longview

SAMPLING MEDIA: Surface sediment (top 2 cm)

POSITIONING SYSTEM: N/A

ASSOCIATED TISSUE DATA: No

REFERENCE SOURCE: Andreasson 1991a

CONTACT: Jeanne Andreasson, WDOE, Olympia, WA

PHONE: (206) 407-6000 FAX: N/A

SAMPLING PERIOD: April 1990

NUMBER OF STATIONS SAMPLED: 3 stations

LOCATIONS OF STATIONS SAMPLED: The sampling locations were near the Weyerhaeuser's pulp and paper mill's waste treatment plant outfall. Samples were collected next to the 54" diffuser outfall pipe, approximately 300 ft downstream from the diffuser and approximately 4500 ft upriver (for background).

TARGET ANALYTES: Dioxin/furans; volatile and semivolatile compounds; metals (Sb, As, Be, Cd, Cr, Cu, Pb, Hg, Ni, Se, Ag, Ti, and Zn); organochlorine pesticides and PCBs. Conventional analyses included TOC and grain size.

ANALYTICAL TECHNIQUES: Dioxin/furans (EPA 8290); VOAs (EPA 8240), BNAs (EPA 8270), metals (EPA 7041, 7060, 6010, 7131, 7421, 7740, 7841), pesticides/PCBs (EPA 8080). All results were reported on a dry weight basis.

SAMPLING EQUIPMENT USED: 0.1 m^2 van Veen grab sampler

SAMPLE HANDLING AND PROCESSING: Individual sample grabs were placed on ice and delivered to the laboratory.

DATA GAPS: Latitude and longitude were not provided. Latitude and longitude were estimated for entry along with the data provided in the database.

ABSTRACT

The objectives of the Weyerhaeuser, Longview Pulp and Paper Mill's Class II Inspection were to verify effluent compliance with NPDES permit (NPDES Permit No. WA-000012-4), characterize priority and non-priority pollutants in industrial in-plant waters, treatment effluent and in sediments near the 001/002 outfall, determine the removal efficiency achieved with secondary treatment of industrial streams, evaluate any toxicity in the 001/002 effluent and sediments using several bioassays and to characterize any priority pollutants in the Radakovitch landfill leachate or in the R-W Paper plant drainage into Longview Ditch #3 (Andreasson 1991). The inspection also reviewed lab procedures at the mill to determine adherence to accepted protocols and advance state-of-the-art compliance inspections by contributing to ongoing developmental efforts with centrifugation. Sediment samples were taken near the point of effluent discharge, at a point 300 ft downstream from the discharge, and at a point 4500 ft upstream from the point of discharge.

QA/QC EVALUATION - Laboratory procedures which were followed are described by Kirchmer (1988) and Huntamer and Smith (1988). Matrix spike, matrix spike duplicate, and internal standard recoveries were performed.

DATA USE AND COMPARABILITY - Users of these data should be reminded that they were collected in the vicinity of a potential source of industrial pollutants.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Andreasson, J. 1991. Class II Inspection of Weyerhaeuser, Longview Pulp and Paper Mill, April 16-18, 1990. Washington State Department of Ecology, Environmental Investigations and Laboratory Services Program, Olympia, WA.

Huntamer and Smith. 1988. Ecology Lab Users Manual, Washington State Department of Ecology, Olympia, WA.

Kirchmer, C. 1988. Quality Assurance Manual, Manchester Laboratory, Washington State Department of Ecology, Manchester, WA.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: U.S. Army Corps of Engineers, Portland District (USACOE)

AREA OF STUDY: Willamette River-U.S. Moorings in Portland Harbor

SAMPLING MEDIA: Sediment samples (top 4 to 6.5 ft)

POSITIONING SYSTEM: N/A

ASSOCIATED TISSUE DATA: No

REFERENCE SOURCE: Britton 1989

CONTACT: Mark Siipola, USACOE, Portland, OR

PHONE: (503) 326-6463 FAX: N/A

SAMPLING PERIOD: October 1991

NUMBER OF STATIONS SAMPLED: 3 stations

LOCATIONS OF STATIONS SAMPLED: Fifteen feet out from the berthing dock of the dredger Essayons at RM 6.2 of the Willamette River.

TARGET ANALYTES: Dioxins/furans; metals (Ag, As, Cd, Cr, Cu, Pb, Hg, Ni and Zn); phthalates; pesticides; PCBs; PAHs; and phenols. Conventional analyses included TOC and grain size.

ANALYTICAL TECHNIQUES: Dioxin/furan (EPA 8290); metals (EPA 3050), PAH, phthalates and phenols (EPA 8270); TOC (Standard Methods 502); pesticides and PCBs (EPA 8080). All results were reported on a dry weight basis.

SAMPLING EQUIPMENT USED: N/A

SAMPLE HANDLING AND PROCESSING: N/A

DATA GAPS: Latitude and longitude were not provided. Latitude and longitude were estimated for entry along with the data provided in the database.

ABSTRACT

At the request of CENPP-OP, a sediment evaluation was conducted on sediments at the U.S. Moorings,

Willamette River mile 6.2 in order to evaluate dredging by the Essayons to increase depth. Previous studies suggested that sediments dredged from the U.S. Moorings should not be placed in unconfined in-water sites due to high levels of heavy metals, pesticides, PCBs and PAHs. Three samples were taken 15 feet out from the berthing dock and ranged from 4-6.5 feet in length. A sample composite was created using sub-samples of the sediment collected from stations M-1, M-2, and M-3 which was analyzed for dioxins and furans. This sample was renamed M-4 for entry in the database.

QA/QC EVALUATION - Surrogates were added to the sediments analyzed for organic compounds. Recoveries ranged from 62-121 percent. A reference sample was analyzed for metals and the certified concentrations were in good agreement with the analytical results.

DATA USE AND COMPARABILITY - Because PAH compounds were present at relatively high concentrations, the sediment extracts were diluted before quantification causing the detection limits to increase by a factor of five. Users of these data should be reminded that they were collected in the vicinity of potentially high levels of pollutants.

Only surface sediment analytical results have been entered in the database. The dioxin/furan analyses were performed on a composite of surface sediments collected from three locations.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Britton, J. 1989. Results of 1989 U.S. Moorings sediment quality evaluation. U.S. Army Corps of Engineers, Portland District, Portland, OR.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: Oregon Department of Environmental Quality (ODEQ)/National Institutes of Health (NIH)

AREA OF STUDY: Willamette River-mainstem and Middle Fork

SAMPLING MEDIA: Surface sediment

POSITIONING SYSTEM: N/A

ASSOCIATED TISSUE DATA: Yes

REFERENCE SOURCE: Curtis et al. 1993

CONTACT: Lawrence R. Curtis, Oregon State University, Corvallis, OR

PHONE: (503) 737-1952 FAX: N/A

SAMPLING PERIOD: August 1990

NUMBER OF STATIONS SAMPLED: 6 stations

LOCATIONS OF STATIONS SAMPLED: Middle Fork (RK 314), Harrisburg (RK 250), Halsey (RK 232), Corvallis (RK 206), Salem (RK 116) and Portland (RK 11).

TARGET ANALYTES: 2,3,7,8-TCDD and -TCDF

ANALYTICAL TECHNIQUES: Described in Curtis et al. (1993). All results were reported on a dry weight basis.

SAMPLING EQUIPMENT USED: Stainless-steel Eckman dredge (0.23m^2)

SAMPLE HANDLING AND PROCESSING: Each sediment sample consisted of a composite of three to five grab samples. Three composite samples were collected from each location. Subsamples were stored in glass jars at 4 °C.

DATA GAPS: Latitude and longitude of sampling sites. Latitude and longitude were estimated for entry along with the data provided in the database.

ABSTRACT

This study focused on determining the status and extent of contamination of TCDD and TCDF in the Willamette River due to industrial discharges. Sampling sites were selected based upon possible industrial pollution sources. A control site upstream from a bleached-kraft pulp mill discharge (RK 232), a site below a municipal sewage outfall (RK 206), and a site adjacent to an industrtial waste dump contaminated with organochlorines (RK 11). Sampling and analysis included both fish and surface sediments. This study also included measurement of the specific tissue content of cytochrome P-450 1A1 as a bioindicator of contamination and assessed fish health by histopathology and clinical chemistry. Curtis et al. (1993,1991) contain provide summaries of these additional data.

QA/QC EVALUATION - A description of quality control/quality assurance procedures is provided in Curtis et al. (1993,1991).

DATA USE AND COMPARABILITY - The mean concentration of TCDD and TCDF in the three composite samples collected from each station have been entered in the database as provided in Curtis et al. (1993). Users of these data should be reminded that the sampling design targeted industrial and municipal discharge areas.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Curtis, L.R., H.M. Carpenter, R.M. Donohoe, D.E. Williams, O.R. Hedstrom, M.L. Deinzer, M.A. Beilstein, E. Foster, and R. Gates. 1993. Sensitivity of cytochrome P450-1A1 induction in fish as a biomarker for distribution of TCDD and TCDF in the Willamette River, Oregon. Environ. Sci. Technol. 27:2149-2157.

Curtis, L.R., H.M. Carpenter, R.R. Donahoe, M.L. Deinzer, M.A. Beilstein, D.E. Williams, and O.R. Hedstrom. 1991. Phase I final report (draft). Toxicity and longitudinal distribution of persistent organochlorines in the Willamette River. Prepared for Oregon Department of Environmental Quality, Portland, OR. Oregon State University, Fisheries and Wildlife, Corvallis, OR.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: City of Portland, Bureau of Environmental Services (PortlandBES)

AREA OF STUDY: Willamette River-Columbia Slough

SAMPLING MEDIA: Surface sediment (top 5 cm)

POSITIONING SYSTEM: Station locations were plotted on field copies of aerial photos and located using any identifying features not visible on maps or aerial photos and estimating distance from left/right bank.

ASSOCIATED TISSUE DATA: No

REFERENCE SOURCE: Dames and Moore 1991

CONTACT: Portland Bureau of Environmental Services, Portland, OR

PHONE: (505) 796-7740 FAX: N/A

SAMPLING PERIOD: June 1991

NUMBER OF STATIONS SAMPLED: 15 locations

LOCATIONS OF STATIONS SAMPLED: The Slough was divided into 15 locations. Sampling locations were selected in consultation with the City of Portland Bureau of Environmental Services staff and Multnomah County Drainage District No. 1 staff based upon four criteria: (1) proximity to suspected sources of sediment contamination such as CSOs, permitted discharges, stormwater outfalls, etc., (2) stations which had been previously sampled, (3) coverage of a wide area of the Slough and (4) access.

TARGET ANALYTES: 2,3,7,8-TCDD; volatile and semi-volatile organic compounds; PCBs; pesticides; and metals. Conventional analyses included TOC, grain size, and percent moisture.

ANALYTICAL TECHNIQUES: 2,3,7,8-TCDD (EPA 8290); volatile organics (EPA 8240); semi-volatile organics (EPA 8270), PCBs/chlorinated pesticides (EPA 8080); metals (EPA 6000/7000 series). All data entered in the database were reported in dry weight. Some data were reported on a wet weight basis, but these results were not entered in the database.

SAMPLING EQUIPMENT USED: 0.055 m^2 stainless-steel van Veen grab (Lower and Upper Slough), 0.025 m^2 stainless steel Ekman Dredge or by hand (Upper Slough).

SAMPLE HANDLING AND PROCESSING: Jars were filled, wrapped in bubble pack, bagged and sealed, placed in a cooler and shipped to the laboratory for analysis.

DATA GAPS: Latitude and longitude of sampling locations. Latitude and longitude were estimated for entry along with the data provided in the database.

ABSTRACT

The Columbia Slough, an important recreational resource for the people of Portland, runs east to west just north of Portland and extends for more than 18 miles. Several characterization studies have detected elevated levels of contaminants in both sediments and in some fish and invertebrates. This Phase I study intended to provide reconnaissance-level information on the slough sediments through more extensive sampling thereby increasing the existing data base on slough sediments and providing additional analytical tests and sediment bioassays. For the purposes of this report the upstream boundary of the slough is Fairview Lake at NE 201st, a distance more than 18 miles from the mouth of the Slough.

QA/QC EVALUATION - The analytical field screening methodologies were conducted in accordance with the Field Screening Methods Catalog, September, 1988, EPA/540/2-88/005. QA/QC samples were analyzed during each type of analysis. Daily method blank, matrix spike, and replicates were also analyzed.

DATA USE AND COMPARABILITY - The sediment data have undergone review and validation. Data tables are included as Appendix C of Dames & Moore (1991).

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Dames & Moore. 1991. Columbia Slough sediment analysis and remediation project. Phase I report. Volume 1. Prepared for City of Portland, Bureau of Environmental Services. Dames & Moore, Portland, OR.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: Washington State Department of Ecology (WDOE)

AREA OF STUDY: Lower Columbia River-Lonview

SAMPLING MEDIA: Surface sediment (top 2-3 cm)

POSITIONING SYSTEM: N/A

ASSOCIATED TISSUE DATA: No

REFERENCE SOURCE: Das 1991

CONTACT: Tapas Das, WDOE, Olympia, WA

PHONE: (206) 407-6000 FAX: N/A

SAMPLING PERIOD: May 1991

NUMBER OF STATIONS SAMPLED: 3 stations

LOCATIONS OF STATIONS SAMPLED: Samples were collected 30 ft downstream from the Longview Fibre diffuser, 65 ft from the 310 ft long diffuser section, and 300 ft downstream of the diffuser.

TARGET ANALYTES: Dioxin and furans; volatile and semivolatile compounds; metals (Sb, As, Be, Cd, Cr, Cu, Pb, Hg, Ni, Se, Ag, Ti, and Zn); organochlorine pesticides and PCBs. Conventional analyses included TOC and grain size.

ANALYTICAL TECHNIQUES: Dioxins/furans (EPA 8290); metals (EPA 200), pesticides/PCBs (EPA 8080). All results were reported on a dry weight basis.

SAMPLING EQUIPMENT USED: 0.1 m^2 van Veer grab sampler

SAMPLE HANDLING AND PROCESSING: All samples consisted of 3-5 grab samples. Composite samples were placed on ice and delivered to the laboratory.

DATA GAPS: Latitude and longitude were not provided. Latitude and longitude were estimated for entry along with the data provided in the database.

ABSTRACT

The objectives of the Longview Fibre Company's Class II Inspection was to evaluate compliance with the NPDES permit (NPDES Permit No. WA-000007-8), determine the process wastewater secondary treatment removal efficiency, chemically characterize all effluents for priority pollutants and other pollutants of concern, and evaluate the biological toxicity of Longview Fibre's 001 effluent and outfall sediments with bioassays. The inspection also reviewed sampling methods and lab procedures to determine adherence to accepted protocols and advance state-of-the-art compliance inspections by contributing to ongoing developmental efforts with centrifugation.

QA/QC EVALUATION - Laboratory procedures which were followed are described by Kirchmer (1988) and Huntamer and Smith (1988). Matrix spikes, matrix duplicates, and relative percent differences of replicates were within QC limits.

DATA USE AND COMPARABILITY - Users of these data should be reminded that they were collected in the vicinity of a potential source of industrial pollutants.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Das, T. 1991. Longview Fibre Company Class II Inspection. Washington State Department of Ecology, Environmental Investigations and Laboratory Services Program, Olympia, WA.

Huntamer and Smith. 1988. Ecology Lab Users Manual, Washington State Department of Ecology, Olympia, WA.

Kirchmer, C. 1988. Quality Assurance Manual. Manchester Laboratory, Washington State Department of Ecology, Manchester, WA.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: U.S. Environmental Protection Agency (USEPA)

AREA OF STUDY: Columbia River - RM 146-149 above Bonneville Dam

SAMPLING MEDIA: Surface sediment

ASSOCIATED TISSUE DATA: Yes

POSITIONING SYSTEM: Used physical landmarks (eg., dams) and river miles for sampling locations.

REFERENCE SOURCE: Davoli 1994

CONTACT: Dana Davoli, U.S. EPA, Seattle, WA

PHONE: (206) 553-2135 FAX: N/A

SAMPLING PERIOD: August-September 1994

NUMBER OF STATIONS SAMPLED: 2 stations

LOCATIONS OF STATIONS SAMPLED: RM 146-149 (in the area of crayfish sampling)

TARGET ANALYTES: Dioxin/furans; pesticides; PCBs; semi-volatiles including PAHs; metals (including Hg and As).

ANALYTICAL TECHNIQUES: Dioxins and furans (EPA Method 1613A); pesticides and PCBs (EPA 8081); semi-volatiles (EPA 8270/GPC); PAHs (EPA 8270); metals (EPA 200.3 and 6010A); Hg (EPA 7471A); As (200.3 and 7060A). Results are reported on a dry weight basis.

SAMPLING EQUIPMENT USED: N/A

SAMPLE HANDLING AND PROCESSING: Samples consist of a composite of five grabs per station.

DATA GAPS: None

ABSTRACT

The Columbia River and segments of the Snake and Willamette Rivers are currently water quality limited due to the presence of elevated levels of 2,3,7,8 - TCDD. As a result, U.S. EPA Region 10 established a Total Maximum Daily Load (TMDL) of 6 mg of 2,3,7,8-TCDD/day based upon state water quality

standards applicable to the Columbia River basin and the volume of water in the Columbia River. This project is part of an effort to add to the data base on contaminant levels in aquatic organisms in the Columbia River. The project focused on one or two sampling locations in a limited segment of the river. Criteria for choosing these locations were: (1) sampling at fishing sites has been limited, (2) collecting organisms that are consumed by Native Americans and others fishing in the Columbia River basin, (3) collecting organisms that are of good indicators of contaminant levels in the river and of levels of contaminants that may be ingested by aquatic and terrestrial predators. Sediment samples were taken between RM 146-149 and consisted of five grabs per station.

QA/QC EVALUATION - Internal standards, laboratory duplicates, matrix spikes, and method blanks were used for data evaluation.

DATA USE AND COMPARABILITY - All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Davoli, D. 29 August 1994. Personal Communication (data package sent to Steve Ellis, Tetra Tech, Inc., Redmond, WA). Selected fish tissue contaminant data from the U.S. EPA Columbia River toxic substances study. U.S. Environmental Protection Agency, Region 10, Seattle, WA.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: U.S. Geological Survey (USGS) / U.S. Army Corps of Engineers (USACOE)

AREA OF STUDY: Willamette River-RM 1.0 to 11.3

SAMPLING MEDIA: Sediment (top 10 cm to 1 meter depth)

POSITIONING SYSTEM: N/A

ASSOCIATED TISSUE DATA: Yes

REFERENCE SOURCE: Fuhrer 1989

CONTACT: N/A

PHONE: N/A FAX: N/A

SAMPLING PERIOD: October 1983

NUMBER OF STATIONS SAMPLED: 10 stations

LOCATIONS OF STATIONS SAMPLED: Willamette River RM 4.3 to 11.3

TARGET ANALYTES: Metals (Ba, Be, Fe, Mn, Cd, TL, Zn, As, Se, Cr, Cu, Pb, Ni, Ag and Hg); semi-volatile organic compounds; organochlorine pesticides and PCBs. Analyses included conventional variables including TOC and grain size.

ANALYTICAL TECHNIQUES: Metals [as described by Fishman and Friedman (1985)]; organics [as described by Wershaw et al. (1983)].

SAMPLING EQUIPMENT USED: Gravity core sampler or ponar grab sampler

SAMPLE HANDLING AND PROCESSING: Sediment samples were placed in butyrate acetate core liners, stored at 4 °C. At least two core samples were taken from each site. Sediment samples were seived prior to analysis. Therefore, the results provided indicate the concentration of the reported constituents for a particular sediment size fraction. The sediment size fractions analyzed are indicated in the database.

DATA GAPS: none

ABSTRACT

In October of 1983, the USGS, in cooperation with the USACOE, collected bottom-material and water samples from Portland Harbor to determine concentrations of trace metals and organic compounds in elutriate-test filtrate and bottom material (Fuhrer 1989). These data were combined with data from earlier harbor studies and were evaluated relative to chemical concentrations in local soils, spatial location within the harbor, and U.S. EPA criteria for water quality. The objectives of the report were to: (1) describe concentrations and spatial distribution of selected chemicals associated with Portland Harbor bottom material, (2) compare estimated PCB loading from suspended sediment in Portland Harbor to PCB loading from flow-land disposal and (3) describe the short term release of chemicals that occurs when dredge-site bottom material from the Portland Harbor is mixed with disposal-site native water from the Columbia River (elutriation testing).

QA/QC EVALUATION - No discussion of QA/QC procedures was provided in the report.

DATA USE AND COMPARABILITY - Users of these data should be cautioned that the results provided are for specific grain size fractions. These fractions include the sediment grains that are less than 2 mm, 63 microns, and 2 microns in diameter.

Data entered into the database includes all data from this study and data from additional studies that are also summarized in the report. Users of these data are referred to Fuhrer (1989) for additional information on the sources of these data.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Fishman, M.J. and L.C. Friedman. 1985. Methods for the determination of inorganic substances in water and fluvial sediments: USGS, Techniques of Water-Resources Investigations, Book 5, Chapter Al.

Fuhrer, G.J. 1989. Quality of bottom material and elutriates in the Lower Willamette River, Portland Harbor, Oregon. U.S. Geological Survey, Portland, OR. Water-Resources Investigation Report 89-4005. Prepared in cooperation with the U.S. Army Corps of Engineers.

Wershaw, R.L., M.J. Fishman, R.R. Grabbe and L.E. Lowe. 1983. Methods for the determination of organic substances in water and fluvial sediments: USGS, Techniques of Water-Resources Investigations, Book 5, Chapter A3.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: Washington State Department of Ecology (WDOE)

AREA OF STUDY: Lower Columbia River-Kalama

SAMPLING MEDIA: Surface sediment (top 2 cm)

POSITIONING SYSTEM: Stations were located and mapped by taking manual cross-bearings using prominent natural physical or manmade structures.

ASSOCIATED TISSUE DATA: No

REFERENCE SOURCE: Heffner 1989

CONTACT: Marc Heffner, WDOE, Olympia, WA

PHONE: (206) 407-6773 FAX: (206) 407-6715

SAMPLING PERIOD: May 1988

NUMBER OF STATIONS SAMPLED: 3 stations

LOCATIONS OF STATIONS SAMPLED: Station-1 (upstream)- 100 yards upstream of the Kalama Chemical dock off a log storage area; Station-2 (outfall)- downstream of the Kalama Chemical diffuser; Station-3 (downstream) - approximately 100 yards downstream of the Kalama Chemical dock.

TARGET ANALYTES: Metals (Sb, As, Be, Cd, Cr, Cu, Pb, Hg, Ni, Se, Ag, Tl, and Zn); volatile and semi-volatile organic compounds; organochlorine pesticides and Aroclor PCBs. Coventional analyses such as grain size, total solids, and TOC were also reported.

ANALYTICAL TECHNIQUES: Volatile organic compounds (EPA 8240); semi-volatile organic compounds (EPA 8270); metals (EPA 200); pesticides/PCBs (EPA 8080). All results are reported on dry weight basis.

SAMPLING EQUIPMENT USED: 0.1 m^2 van Veen grab sampler.

SAMPLE HANDLING AND PROCESSING: The top 2 cm of sediment from each of two grab samples collected from a station were composited for analysis. A bottle for analysis of volatile organics was filled directly from the sampler; one-half from each of the two grabs. The samples were stored on ice and shipped to the laboratory for analysis.

DATA GAPS: none

ABSTRACT

The study was a Class II Inspection of Kalama Chemical, Inc., an organic chemical manufacturer discharging both noncontact cooling water and treated process wastewater through a common outfall line into the Columbia River (NPDES Permit No. WA-000028-1) (Heffner 1989). The objectives of the Kalama Chemical Class II Inspection was to assess NPDES permit limit compliance with independent sample collection and laboratory analysis, determine sample and analytical accuracy (by dividing sample analysis between two laboratories), and to characterize discharge and receiving water sediment toxicity with conventional parameter analysis, priority pollutant scans, and bioassays. The sediment pollutant data are provided in the Appenix to the report, including the latitude and longitude of the sediment sampling locations (Heffner 1989).

QA/QC EVALUATION - QA/QC information provided was limited to the results of method blank analyses. Methylene chloride was detected in the sediment samples and in the method blank.

DATA USE AND COMPARABILITY - Users of these data should be reminded that they were collected in the vicinity of a potential source of industrial pollutants.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Heffner, M. 1989. Kalama Chemical, Inc. Class II Inspection, May 1988. Washington State Department of Ecology, Environmental Investigations and Laboratory Services Program, Olympia, WA.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: Washington State Department of Ecology (WDOE)

AREA OF STUDY: Lower Columbia River-Longview

SAMPLING MEDIA: Surface sediment (top 2 cm)

POSITIONING SYSTEM: Stations were located and mapped by taking manual cross-bearings using prominent natural physical or manmade structures.

ASSOCIATED TISSUE DATA: No

REFERENCE SOURCE: Heffner 1991

CONTACT: Marc Heffner, WDOE, Olympia, WA

PHONE: (206) 407-6773 FAX: (206) 407-6715

SAMPLING PERIOD: February 1990

NUMBER OF STATIONS SAMPLED: 3 stations

LOCATIONS OF STATIONS SAMPLED: The sampling locations were near the Reynolds Metals Company aluminum smelter's five point discharges. An upstream station located approximately 500 yards upstream of the primary outfall, a stations 10 yards downstream of the outfall diffuser, and a station 300 feet downstream of the diffuser at the edge of the dilution zone.

TARGET ANALYTES: Metals (Sb, As, Be, Cd, Cr, Cu, Pb, Hg, Ni, Se, Ag, Tl, Zn, Al); volatile and semi-volatile organic compounds; organochlorine pesticides and PCBs. Results were also provided for fluoride, cyanide, TOC, grain size, and percent solids.

ANALYTICAL TECHNIQUES: Volatiles (EPA 8240); semi-volatiles (EPA 8270); metals (EPA 200); pesticides/PCBs (EPA 8080). All results are reported on a dry weight basis.

SAMPLING EQUIPMENT USED: 0.1 m^2 van Veen grab sampler.

SAMPLE HANDLING AND PROCESSING: Samples were removed from the upper 2 cm of each grab sample and composited for analysis. Volatile samples were collected from the first grab sample collected from each station. Samples were immediately stored on ice at 4° C for transport to the laboratory.

DATA GAPS: Latitude and longitude were not provided. Latitude and longitude were estimated for entry along with the data provided in the database.

ABSTRACT

The objectives of the Reynolds Metals Company's aluminum smelter Class II Inspection was to verify effluent compliance with NPDES permits (NPDES Permit No. WA-00008-6 and Order 89-3), characterize priority pollutants in the 002 discharge stream and in sediments near the outfall, and evaluate the effluent and sediments for toxicity using a series of bioassays (Heffner 1991). The inspection also reviewed lab procedures at the mill to determine adherence to accepted protocols and advance state-of-the-art compliance inspections by contributing to ongoing developmental efforts with centrifugation. Samples of sediments were taken at locations upstream and downstream from the facility and downstream immediately in the vicinity of the outfall diffuser.

QA/QC EVALUATION - QA/QC information provided was limited to the results of transport blank analyses. Methylene chloride, acetone, and bis(2-ethylhexyl)phthalate were detected in the sediment samples and in the transport blank.

DATA USE AND COMPARABILITY - Users of these data should be reminded that they were collected in the vicinity of a potential source of industrial pollutants.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Heffner, M. 1991. Reynolds Metal Company Class II Inspection, February 1990. Washington State Department of Ecology, Environmental Investigations and Laboratory Services Program, Olympia, WA.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: U.S. Geological Survey (USGS)

AREA OF STUDY: Lake Couer d'Alene

SAMPLING MEDIA: Surface sediment (top 2 cm)

POSITIONING SYSTEM: Stations were located and mapped by taking manual cross-bearings using prominent natural physical or manmade structures, or both.

ASSOCIATED TISSUE DATA: No

REFERENCE SOURCE: Horowitz and Elrick 1993

CONTACT: Arthur J. Horowitz

PHONE: (404) 903-9100 FAX: N/A

SAMPLING PERIOD: August 1989

NUMBER OF STATIONS SAMPLED: Greater than 150 locations were sampled. However, unsummarized data were provided for only seven stations in Lake Coeur d'Alene. These stations were identified as stations with elevated metals content.

LOCATIONS OF STATIONS SAMPLED: Lake Coeur d'Alene near Independence Pt. (CDA32), Wolf Lodge Bay (CDA22A), Black Rock Bay (CDA93), Windy Bay (CDA100), Harlow Pt. (CDA119), Harrison (CDA128), and Conkling Point (CDA155).

TARGET ANALYTES: Trace and major elements including: Ag, Al, As, Cd, Co, Cr, Cu, Fe, Hg, Ni, Mn, Pb, Sb, Se, Ti and Zn. Sediment TOC content was also determined.

ANALYTICAL TECHNIQUES: Sediments were ground to < 100 mesh and digested with strong acid (HF-$HClO_4$-aqua regia) at 200° C. All metals were analyzed by flame AAS except for As, Sb, and Se which were determined by hydride generation AAS and mercury which was determined using the cold vapor technique. Bulk sediments and specific grain size fractions were analyzed. Only the bulk sediment analyses were entered in the database.

SAMPLING EQUIPMENT USED: Stainless-steel Ekmann grab sampler.

SAMPLE HANDLING AND PROCESSING: Subsamples were removed from the upper 2 cm of sediment in each grab and immediately stored on ice at 4° C.

DATA GAPS: Latitude and longitude were not provided. Latitude and longitude were estimated for entry along with the data provided in the database.

ABSTRACT

The purpose of the USGS study was to determine the trace element concentrations, partitioning, and distribution in the sediment column and to relate them to mining, and mining related discharge operations that have occurred in the Coeur d'Alene (CDA) district since the 1880's. Surface bed sediment samples were collected from Lake Coeur d'Alene, ID in August 1989 and bulk surface sediment chemistry data for the most metal-enriched locations were provided in Table III and have been entered in the database (Horowitz and Elrick 1993). Additional data provided on the metal content of individual grain size fractions were also provided in Table III, but these data have not been entered in the database. The results of analysis of subsurface sediment samples have also been reported (Horowitz et al. 1993), but these data have not been entered in the database.

QA/QC EVALUATION - Precision and bias for the chemical analyses were monitored by replicate analyses of selected samples and by the concomitant digestion and analysis of NIST reference sediment and USGS rock and soil standards. Precision was usually better than ± 10 percent; no bias was detected.

DATA USE AND COMPARABILITY - When comparing these data to other similar sediment trace metal data sets, the user should remember that these results are for the stations identified as those with the highest metal content.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Horowitz, A.J. and K.A. Elrick. 1993. Effect of mining and related activities on the sediment trace element geochemistry of Lake Coeur d'Alene, Idaho, USA. Part I. Surface sediments. Hydrological Processes 7:403-423.

Horowitz, A.J., K.A. Elrick, J.A. Robbins, and R.B. Cook. 1993. The effect of mining and related activities on the sediment-trace element geochemistry of Lake Coeur d'Alene, Idaho. Part II: Subsurface sediments. U.S. Geological Survey, Atlanta, GA. Open-File Report 93-656.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: Washington Department of Ecology (WDOE)

AREA OF STUDY: Columbia River (Lake Roosevelt, Rufus Woods Lake) and Long Lake (Spokane River)

SAMPLING MEDIA: Surface sediment (top 2 cm)

ASSOCIATED TISSUE DATA: Yes

POSITIONING SYSTEM: N/A

REFERENCE SOURCE: Johnson 1991

CONTACT: Art Johnson, WDOE, Olympia, WA

PHONE: (206) 407-6715 FAX: (206) 407-6670

SAMPLING PERIOD: June 1990

NUMBER OF STATIONS SAMPLED: 8 stations

LOCATIONS OF STATIONS SAMPLED: Six sites in Lake Roosevelt between the international border and Grand Coulee Dam, one site each in the Spokane River and Rufus Woods Lake.

TARGET ANALYTES: Dioxin and furans; PCBs and pesticides; additional organic compounds; mercury.

ANALYTICAL TECHNIQUES: Analysis methods are as described in Call et al. (1991). All data are reported on a dry weight basis.

SAMPLING EQUIPMENT USED: 0.1 m^2 van Veen grab sampler

SAMPLE HANDLING AND PROCESSING: Sample containers were 8 oz. amber glass with teflon lid-liners. Samples were stored on ice in the field prior to shipping to the laboratory.

DATA GAPS: None

ABSTRACT

In June 1990, as part of Ecology's investigation of contaminants in Lake Roosevelt, a series of sediment

and bottom fish samples were collected from Lake Roosevelt and vicinity for analysis of PCDDs and PCDFs. The impetus for this survey was the need to better understand the spatial distribution of these compounds as a result of their discharge by the Celgar bleached kraft pulp mill in Castlegar, BC, approximately 30 river miles above the international boundary. The results of these and other PCDD/PCDF analyses on Lake Roosevelt samples have been reported elsewhere (Johnson et al. 1991a,b). The report that serves as the source of the additional analytical data contains results of analysis of sediment and bottom fish samples for 44 additional xenobiotic compounds (Johnson 1991).

QA/QC EVALUATION - QA procedures for these analyses were established by the EPA Duluth laboratory (U.S. EPA 1990). All data included in the present report passed EPA's quality assurance criteria.

DATA USE AND COMPARABILITY - All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Call, D.J. et al., 1991. Sediment Quality Evaluation in the Lower Fox River in South Green Bay of Lake Michigan. Center for Lake Superior Environmental Studies, University of Wisconsin, Superior, EPA Coop. Agreement No. CR-815232.

Johnson, A. 1991. Results of screen for EPA xenobiotics in sediment and bottom fish from Lake Roosevelt (Columbia River). Memo to Mr. Carl Nuechterlein, Washington Department of Ecology, Olympia, WA. 22 July 1991.

Johnson, A., D. Serder, and D. Norton. 1991a. Spatial Trends in TCDD/TCDF Concentrations and Bottom Fish Collected in Lake Roosevelt (Columbia River), Washington Department of Ecology, Environmental Investigations and Laboratory Services, Publication No. 91-29.

Johnson, A., D. Serder, and S. Magoon. 1991b. Polychlorinated dioxins and -furans in Lake Roosevelt (Columbia River) sportfish, 1990. Washington State Department of Ecology, Olympia, WA.Pub. No. 91-4.

U.S. EPA. 1990. Analytical procedures and quality assurance plan for determination of PCDD/PCDF in fish. EPA Duluth ORD. EPA/600/3-90/022.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: Washington Department of Ecology (WDOE)

AREA OF STUDY: Columbia River-Lake Wallula

SAMPLING MEDIA: Surface sediment (top 2 cm)

POSITIONING SYSTEM: N/A

ASSOCIATED TISSUE DATA: No

REFERENCE SOURCE: Johnson and Heffner 1993

CONTACT: Art Johnson, WDOE, Olympia, WA

PHONE: (206) 407-6715

FAX: (206) 407-6670

SAMPLING PERIOD: April 1992

NUMBER OF STATIONS SAMPLED: 4 stations

LOCATIONS OF STATIONS SAMPLED: Lake Wallula area: Badger Island, Old Outfall, Port Kelley and Hat Rock.

TARGET ANALYTES: Dioxins and furans; metals; PCBs; organochlorine pesticides; volatiles; semi-volatiles.

ANALYTICAL TECHNIQUES: Volatiles (EPA Method 8240); OC pesticides (EPA Method 8080); semi-volatiles (EPA Method 8270); Dioxins and furans (EPA Method 8290); Priority metals (EPA Method 200); Cr (EPA Method 7195); CN (ALPHA 45000-CN). All data are reported on a dry weight basis.

SAMPLING EQUIPMENT USED: Stainless steel Ponar grab sampler

SAMPLE HANDLING AND PROCESSING: Sediment samples consisted of a homogenized composite of 3 grab samples. Samples were shipped on ice to laboratory. Sample chain-of-custody procedures were followed.

DATA GAPS: none

ABSTRACT

The Department of Ecology (WDOE) conducted a Class II Inspection of the Boise Cascade Corp. bleached kraft pulp and paper mill at Wallula, WA during April of 1992. The mill is located on the east shore of the Columbia River (Lake Wallula) about 15 miles southeast of Pasco. It discharges an average of 30 million gallons per day of secondary treated effluent and non-contact cooling water to the Columbia via a mid-channel diffuser at RM 316 (NPDES permit No. WA 000369-7). The primary objectives of this inspection were to: verify compliance with NPDES permit limits, assess potential for the effluent to cause aquatic toxicity, evaluate efficiency of wastewater treatment, obtain data on dioxins and other toxics in bleach plant effluents and in sludges and to survey the Columbia River sediment quality above and below the mill.

QA/QC EVALUATION - Written QA reviews were prepared by the Manchester Laboratory for all laboratory data contained in this report. QA measures included an assessment of sample holding times, instrument calibration, method blanks, spike and surrogate recoveries and precision data. All chemical data are considered acceptable for use with the qualifiers provided.

DATA USE AND COMPARABILITY - Data not meeting project guidelines for laboratory precision or accuracy have been qualified where appropriate.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Johnson, A. and M. Heffner. 1993. Class II inspection of the Boise Cascade Pulp & Paper Mill, Wallula, Washington - April 1992. Washington State Department of Ecology, Environmental Investigations and Laboratory Services Program, Olympia, WA.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: Washington Department of Ecology

AREA OF STUDY: Lower Columbia River-Ilwaco to Vancouver

SAMPLING MEDIA: Surface sediment (top 2 cm)

POSITIONING SYSTEM: Targeted five ports along the lower Columbia River.

ASSOCIATED TISSUE DATA: No

REFERENCE SOURCE: Johnson and Norton 1988

CONTACT: Art Johnson, WDOE, Olympia, WA

PHONE: (206) 407-6715 FAX: (206) 407-6670

SAMPLING PERIOD: September 22-24, 1987

NUMBER OF STATIONS SAMPLED: 10 locations

LOCATIONS OF STATIONS SAMPLED: Reed Island, Camas Slough, Vancouver lower turning basin, Vancouver below VANALCO, Kalama Chemical pier, below Longview Fibre, Longview below Weyco, Longview below Reynolds, Coal Creek Slough, and Ilwaco boat basin.

TARGET ANALYTES: Seventeen metals, volatile and semi-volatile organics, organochlorine pesticides and PCBs, cyanide, resin acids, grain size, and total organic carbon.

ANALYTICAL TECHNIQUES: Metals and cyanide were analyzed by methods described in EPA (1979). Volatile and semi-volatile organics, pesticides, and PCBs were analyzed by methods described in EPA (1984). Resin acids, total organic carbon, and grain size were analyzed according to methodology described in NCASI (1986), APHA (1985), and Holme and McIntyre (1971), respectively. All results are reported on a dry weight basis.

SAMPLING EQUIPMENT USED: 0.1 m^2 van Veen grab sampler.

SAMPLE HANDLING AND PROCESSING: Each sediment sample consisted of a composite of two to three grab samples. Surface sediment samples (top 2 cm) were transferred to stainless steel beakers and homogenized by stirring with stainless steel spoons. Samples for volatile organic analysis were placed in 40 ml glass vials with no head space prior to homogenizing. All samples were stored on ice.

DATA GAPS: Latitude and longitude of sampling locations were not provided. Latitude and longitude were estimated for entry along with the data provided in the database.

ABSTRACT

At the request of the Ecology Southwest Regional Office, the Toxics Investigations/Ground Water Monitoring Section conducted a reconnaissance survey of sediment quality at five ports along the lower Columbia River. Objectives of the survey were to characterize the occurrence of toxic chemicals in the sediments and assess the potential for sediment toxicity. Two acute bioassays were performed to assess sediment toxicity, *Hyalella azteca* and *Daphnia pulex*. The results of the bioassays are described in Johnson and Norton (1988).

QA/QC EVALUATION - Quality assurance followed standard Manchester laboratory practice described by Huntamer (1986). Method blanks, matrix spikes, duplicates, and surrogate compound spikes (for organic analyses) were included in the quality assurance program. All data met EPA Contract Laboratory Program criteria with the following exceptions: The fourteen day holding time for volatile organics analysis was exceeded by seven days and the results for antimony and a resin acid (neoabietic acid) are suspect.

DATA USE AND COMPARABILITY - Users of these data should bear in mind that the sediments were collected in the vicinity of potential pollutant sources. Results for antimony and neoabietic acid are suspect.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

American Public Health Association (APHA). 1985. Standards methods for the examination of water and wastewater, 16th ed. Washington, D.C.

Holme, N.A. and A.D. McIntyre. 1971. Methods for the study of marine benthos. IBP Handbook No. 16.

Huntamer, D. 1986. Department of Ecology, Laboratory User's Manual. Manchester Environmental Laboratory, Manchester, WA.

Johnson, A. and D. Norton. 1988. Screening survey for chemical contaminants and toxicity in sediments at five lower Columbia River ports September 22-24, 1987. Washington Department of Ecology, Toxics Investigations/Ground Water Monitoring Section, Olympia, WA.

National Council for Air and Stream Improvement (NCASI). 1986. Procedures for the analysis of resin and fatty acids in pulp mill effluents. Tech. Bull. 501. New York, NY.

U.S. EPA. 1979. Methods for chemical analysis of water and wastes.

U.S. EPA. 1984. Guidelines establishing test procedures for the analysis of pollutants under the Clean Water Act: Final rule and final interim rule and proposed rule. Federal Register 40 (209) 1-210.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: Washington State Department of Ecology (WDOE)

AREA OF STUDY: Columbia River (Lake Roosevelt, Rufus Woods Lake) and Long Lake (Spokane River)

SAMPLING MEDIA: Surface sediment (top 2 cm)

POSITIONING SYSTEM: N/A

ASSOCIATED TISSUE DATA: Yes

REFERENCE SOURCE: Johnson et al. 1991a

CONTACT: Art Johnson, WDOE, Olympia, WA

PHONE: (206) 407-6670 FAX: (206) 407-6715

SAMPLING PERIOD: June 1990

NUMBER OF STATIONS SAMPLED: 8 stations

LOCATIONS OF STATIONS SAMPLED: Six stations in Lake Roosevelt, one in the Spokane River (Long Lake) and one in Rufus Woods Lake.

TARGET ANALYTES: Fifteen 2,3,7,8-substituted PCDDs and PCDFs. Octachlorodibenzodioxin and octachlorodibenzofuran were not reported. Conventional analyses included sediment grain size and total organic carbon content.

ANALYTICAL TECHNIQUES: PCDD/PCDF analysis followed methods described in EPA (1990) and EPA et al. (1990) and was performed by the EPA Environmental Research Laboratory in Duluth, MN. All data are reported on a dry weight basis.

SAMPLING EQUIPMENT USED: 0.1 m^2 stainless-steel van Veen grab sampler.

SAMPLE HANDLING AND PROCESSING: Each sediment sample consisted of a composite of three grab samples. Surface sediment samples (top 2 cm) were transferred to stainless-steel beakers and homogenized by stirring with stainless-steel spoons. Samples were stored on ice in the field.

DATA GAPS: none

ABSTRACT

In June 1990, as part of Ecology's investigation of contaminants in Lake Roosevelt, a series of sediment and bottom fish samples were collected from Lake Roosevelt and vicinity for analysis of PCDDs and

PCDFs (Johnson et al. 1991a). The objective of the survey was to evaluate the transport and distribution of these compounds throughout the lake. The sediments and bottom fish collected during this effort were also analyzed for additional xenobiotic compounds. These data are reported in Johnson (1991). Other Ecology reports describe results from analysis of Lake Roosevelt sportfish and suspended matter samples for dioxins and furans (Johnson et al. 1991b,c).

QA/QC EVALUATION - QA procedures followed during PCDD/PCDF analysis were established by EPA Duluth Laboratory (U.S. EPA 1990; U.S. EPA et al. 1990). All data included in this report passed EPA's quality assurance criteria.

Duplicate samples were submitted to assess the precision of the analysis. Close agreement was reached between duplicate sample analyses.

DATA USE AND COMPARABILITY - Data used for this report were from the lab data sheets provided in the appendix of the report. Fish and sediment sample analysis results as a function of river miles below the Canadian border (a large pulp and paper mill is located north of the border in Castlegar, BC) were compared for assessment of spatial trends.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Johnson, A. 1991. Results of screen for EPA xenobiotics in sediment and bottom fish from Lake Roosevelt (Columbia River). Memo to Mr. Carl Nuechterlein, Washington Department of Ecology, Olympia, WA. 22 July 1991.

Johnson, A., D. Norton, and W. Yake. 1988. An assessment of metals contamination in Lake Roosevelt. Washington State Department of Ecology, Olympia, WA.

Johnson, A., D. Serder, and D. Norton. 1991a. Spatial trends in TCDD/TCDF concentrations in sediment and bottom fish collected in Lake Roosevelt (Columbia River). Washington Department of Ecology, Environmental Investigations and Laboratory Services, Olympia, WA. Publication No. 91-29.

Johnson, A., D. Serder, and S. Magoon. 1991b. Polychlorinated dioxins and -furans in Lake Roosevelt (Columbia River) sportfish, 1990. Washington State Department of Ecology, Olympia, WA.Pub. No. 91-4.

Johnson, A., D. Serder, and K. Seiders, 1991c. PCDDs/PCDFs in Columbia River suspended particulate matter. Memorandum to C. Nuechterlein and S. Saunders. Washington State Department of Ecology, Olympia, WA.

U.S. EPA. 1990. Analytical procedures and quality assurance plan for determination of PCDD/PCDF in fish. EPA/600/3-90/022. U.S. EPA, Office of Research and Development, Duluth, MN.

U.S. EPA/New York Deptartment of Environmental Conservation/New York Deptartment of Health/Occidental Chemical Corp. 1990. Analytical procedures and quality assurance plan for the determination of 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (2,3,7,8-TCDD) in fish, water and sediment. Vol. III. In: Lake Ontario TCDD Bioaccumulation Study - Final Report.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: Washington Department of Ecology (WDOE)

AREA OF STUDY: Columbia River-U.S./Canadian border

SAMPLING MEDIA: Suspended particulate matter; (depth ranged from 1-4 feet)

POSITIONING SYSTEM: N/A

ASSOCIATED TISSUE DATA: No

REFERENCE SOURCE: Johnson et al. 1991c

CONTACT: Art Johnson, WDOE, Olympia, WA

PHONE: (206) 407-6715 FAX: (206) 407-6670

SAMPLING PERIOD: October 1990

NUMBER OF STATIONS SAMPLED: 1 station

LOCATIONS OF STATIONS SAMPLED: Northport

TARGET ANALYTES: 17 congeners of dioxins and furans.

ANALYTICAL TECHNIQUES: Dioxins and furans (EPA Method 8290). Data are reported in dry weight.

SAMPLING EQUIPMENT USED: Two SediSamp System II continuous centrifuges (model 101IL).

SAMPLE HANDLING AND PROCESSING: The centrifuges were operated simultaneously over a period of approximately 57 hours starting at 2315 hour on October 9 and ending at 0836 on October 12th. Flow rate was 1.2 gallons/minute with a total of 4.082 gallons of water passing through the centrifuge.

DATA GAPS: none

ABSTRACT

The Department of Ecology (WDOE) conducted a sampling of suspended particulate matter (SPM) from the Columbia River at Northport as part of an investigation into the impact on Lake Roosevelt of

discharges from the Celgar bleached kraft pulp mill in Castlegar, B.C (Johnson et al. 1991). The objectives of this study were to make the first determination of PCDD/PCDF concentrations in Columbia River water, obtain a preliminary estimate of loads to Lake Roosevelt and provide data to the Water Quality Program and EPA to assist in refinement of the Columbia River total maximum daily load for 2,3,7,8-TCDD. The field work was conducted with an extensive Environment Canada study of water quality in the border reach of the Columbia River which included SPM samples for PCDDs/PCDFs.

QA/QC EVALUATION - QA measures included matrix spikes and centrifuge blanks.

DATA USE AND COMPARABILITY - Users of these data should be aware that they are from only one sampling area.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Johnson, A., D. Serdar, and K. Seiders. 1991. PCDDs/PCDFs in Columbia River suspended particulate matter. Memorandum to C. Neuchterlein and S. Saunders. Washington State Department of Ecology, Olympia, WA.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: Washington Department of Ecology (WDOE)

AREA OF STUDY: Columbia River (Lake Roosevelt, Canadian Border-Lower Arrow Lake)

SAMPLING MEDIA: Surface sediments (top 2-4 cm)

ASSOCIATED TISSUE DATA: Yes

POSITIONING SYSTEM: N/A

REFERENCE SOURCE: Johnson et al. 1988b

CONTACT: Art Johnson, WDOE, Olympia, WA

PHONE: (206) 407-6715 FAX: N/A

SAMPLING PERIOD: August 1986

NUMBER OF STATIONS SAMPLED: 17 stations

LOCATIONS OF STATIONS SAMPLED: Lake Roosevelt area: collected as a series of grabs in a longitudinal transect from the international border to Grand Coulee Dam; collected at the mouths of the Colville, Kettle, Spokane and Sanpoil Rivers.

TARGET ANALYTES: Metals (Zn, Cu, Pb, As, Cd, Hg).

ANALYTICAL TECHNIQUES: Zn (EPA 289.2); Cu (EPA 220.2); Pb (EPA 239.2); As (EPA 206.2); Cd (EPA 213.2) and Hg (in-house). All data are reported on a dry weight basis.

SAMPLING EQUIPMENT USED: Van Veen grab sampler or Emery pipe dredge.

SAMPLE HANDLING AND PROCESSING: Sample containers were glass jars with teflon lids and were stored on ice prior to shipping to the laboratory.

DATA GAPS: none

ABSTRACT

In response to reports of elevated metals concentrations in fish and other environmental samples from Lake Roosevelt, Ecology conducted a series of field surveys between May and September 1986 to

determine the extent and significance of contamination (Johnson et al. 1988). Sediment, water samples and a variety of fish species were used in this assessment. These data were also summarized in a journal article (Johnson et al. 1990).

QA/QC EVALUATION - The accuracy and precision of the metals data were assessed by analysis of standard reference materials, laboratory duplicates field replicates and field blanks. Results were in good agreement with certified values.

DATA USE AND COMPARABILITY - The data appear to be of good quality and have undergone and have undergone review and validation.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Johnson, A., D. Norton, and B. Yake. 1988 (Revised 1989). An assessment of metals contamination in Lake Roosevelt. Washington Department of Ecology, Toxics Investigations/Ground Water Monitoring Section, Olympia, WA.

Johnson, A., D. Norton, B. Yake, and S. Twiss. 1990. Transboundary metal pollution of the Columbia River (Franklin D. Roosevelt Lake). Bull. Environ. Contam. Toxicol. 45:703-710.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: Washington State Department of Ecology (WDOE)

AREA OF STUDY: Yakima River-RM 18 to 183

SAMPLING MEDIA: Surface sediment (top 2 cm)

POSITIONING SYSTEM: N/A

ASSOCIATED TISSUE DATA: Yes

REFERENCE SOURCE: Johnson et al. 1986

CONTACT: Art Johnson, WDOE, Olympia, WA

PHONE: (206) 407-6715 FAX: (206) 407-6670

SAMPLING PERIOD: September 1985

NUMBER OF STATIONS SAMPLED: 13 stations

LOCATIONS OF STATIONS SAMPLED: Along the Yakima River between Horn Rapids Dam and Cle *Elum - River Miles 18.0 to 183.1, respectively.*

TARGET ANALYTES: Organochlorine pesticides, Aroclor PCBs, and Hg were the target analytes, but only the frequently detected organochlorine compounds were reported. Mercury was detected in all samples. Therefore, the database contains only p,p'-DDT, -DDE, -DDD and o,p'-DDT results. Results for dieldrin, endosulfan, aldrin, total PCBs, and mercury are also included. Conventional analyses included sediment grain size, percent dry weight and total organic carbon content.

ANALYTICAL TECHNIQUES: Organochlorine pesticides and PCBs (EPA 608, additional information on analysis is provided in Appendix II of the document); Mercury (EPA 245.2 with modifications). All results are reported on dry weight basis.

SAMPLING EQUIPMENT USED: Stainless-steel Ponar grab used in slow-moving water; Stainless-steel Emery pipe dredge in fast water.

SAMPLE HANDLING AND PROCESSING: Each sediment sample was homogenized by stirring with stainless-steel spoons, stored in containers, immediately placed on ice, and shipped to the laboratory.

DATA GAPS: Latitude and longitude of sampling locations was not provided in the report. Latitude and longitude were estimated for entry along with the data provided in the database.

ABSTRACT

This study was conducted in 1985 by Ecology's Water Quality Investigations Section in response to results from the Basic Water Monitoring Program (BWMP) which showed higher levels of DDT and metabolites DDE and DDD in Yakima River fish than elsewhere in Washington State between 1979 and 1984. The study's objective was to evaluate the hazards to human health and aquatic life, identify sources and determine if contamination was primarily due to recent illegal use or historical applications (Johnson et al. 1986). Fish, water, and bed sediments were analyzed. Sediment samples were collected from the Yakima main stem and from tributaries considered to have greatest potential for DDT contamination. These data were also summarized and reported in a journal publication (Johnson et al. 1988).

QA/QC EVALUATION - QA/QC included interlaboratory comparisons between the Ecology/EPA Manchester laboratory and California Analytical Laboratories (CAL), analysis of matrix spikes and matrix spike duplicates, duplicate samples, and analysis of standard reference materials. CAL was the contract laboratory responsible for the fish tissue organochlorine analyses. The Ecology/EPA Manchester laboratory was responsible for the sediment organochlorine and mercury analyses and fish tissue mercury analyses. Data provided by CAL were reviewed by the Manchester laboratory.

DATA USE AND COMPARABILITY - In general, sediment samples were collected in the vicinity of suspected sources of DDT. All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Johnson, A., D. Norton, and W. Yake. 1986. Occurrence and significance of DDT compounds and other contaminants in fish, water and sediment from the Yakima River Basin. Washington State Department of Ecology, Olympia, WA.

Johnson, A., D. Norton, and B. Yake. 1988. Persistence of DDT in the Yakima River drainage, Washington. Arch. Environ. Contam. Toxicol. 17:289-297.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: National Oceanic and Atmospheric Administration (NOAA)

AREA OF STUDY: Lower Columbia River - Youngs Bay and river mouth

SAMPLING MEDIA: Surface sediment

POSITIONING SYSTEM: N/A

ASSOCIATED TISSUE DATA: No

REFERENCE SOURCE: NOAA 1991

CONTACT: Tom O'Connell, NS&T Program, NOAA, Rockville, MD

PHONE: (301) 713-3028 FAX: N/A

SAMPLING PERIOD: 1986-1989

NUMBER OF STATIONS SAMPLED: 3 locations.

LOCATIONS OF STATIONS SAMPLED: Lower Columbia River (Youngs Bay, North and South Jetty).

TARGET ANALYTES: Metals (Ag, As, Cd, Cr, Cu, Hg, Pb, Sn, Zn); low and high molecular weight PAHs; pesticides and PCBs.

ANALYTICAL TECHNIQUES: Organic analysis as described in MacLeod et al, 1985 and Wade et al., 1988. Metals analyzed by atomic absorption or X-ray fluorescence. All data are reported on a dry weight basis.

SAMPLING EQUIPMENT USED: A specially constructed box corer or a standard Smith-MacIntyre bottom grab.

SAMPLE HANDLING AND PROCESSING: Three grabs or cores were obtained at each of three stations at a site. Three composite samples were then made from each station for the various analyses.

DATA GAPS: none

ABSTRACT

NOAA's National Status and Trends Program has analyzed samples of surface sediments collected at almost 300 coastal and estuary sites throughout the United States since 1984 (NOAA 1991). These locations have also been sampled to determine contaminant levels in biota as part of NOAA's Mussel Watch program (NOAA 1989). However, the tissue data have not been entered in the database because the tissue contaminant data were reported on a dry weight basis.

The program's objectives include defining the geographical distribution of contaminant concentrations in tissues of marine organisms and in sediments and documenting biological responses to contamination. Because this objective was to quantify contamination over general areas, sites were selected so that they were not in close proximity to major sources of contamination. Sites in the Columbia River Basin include the North and South Jetty and Youngs Bay.

QA/QC EVALUATION - QA measures include: interlaboratory comparisons of analytical results, periodic QA workshops, development of Standard Reference Materials and Interim Reference Materials for marine sediments and tissues and use of a standardized data base for QA data and information.

DATA USE AND COMPARABILITY - All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

MacLeod, W.D., Jr., D.W. Brown, A.S. Friedman, D.G. Burrows, O. Maynes, R. Pearce, C.A. Wigren and R.G. Bogar. 1985. Standard analytical procedures of the NOAA National Analytical Facility, 1985-1986: Extractable toxic organic compounds, 2nd edition. NOAA Technical Memorandum NMFS F/NWC-92.

National Oceanic and Atmospheric Administration (NOAA). 1991. National Status and Trends Program for marine environmental quality. Progress Report: Second summary of data on chemical contaminants in sediments from the National Status and Trends Program. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, Office of Oceanography and Marine Assessment, Rockville, MD. NOAA Technical Memorandum NOS OMA 59.

National Oceanic and Atmospheric Administration (NOAA). 1989. National Status and Trends Program for marine environmental quality. Progress Report: A summary of data on tissue contamination from the first three years (1986-1988) of the Mussel Watch Project. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, Office of Oceanography and Marine Assessment, Rockville, MD. NOAA Technical Memorandum NOS OMA 49.

Wade, T.L., E.L. Atlas, J.M. Brooks, M.C. Kennicutt II, R.G. Fox, J. Sericano, B. Garcia-Romero and D. Defreitas. 1988. NOAA Gulf of Mexico Status and Trends Program: Trace Organic Contaminant Distribution in Sediments and Oysters. Estuaries 11:171-179.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: Oregon Department of Environmental Quality (ODEQ)

AREA OF STUDY: Willamette River and tributaries

SAMPLING MEDIA: Surface sediment

ASSOCIATED TISSUE DATA: Yes

POSITIONING SYSTEM: N/A

REFERENCE SOURCE: ODEQ 1994

CONTACT: Neil Mullane, ODEQ, Portland, OR

PHONE: (503) 229-5284 FAX: (503) 229-6124

SAMPLING PERIOD: 1988-1991

NUMBER OF STATIONS SAMPLED: Approximately 26 locations

LOCATIONS OF STATIONS SAMPLED: Willamette River (RMs 6, 7, 8, 14, 16, 18, 27, 38, 47, 48, 52, 74, 131, 145, 147 and 161). Tributary samples include: Columbia Slough, Johnson Creek, Clackamas River, Tualatin River, Fanno Creek, Beaverton Creek, Yamhill River, South Yamhill River, Conser Slough, Amazon Creek Drainage, McKenzie River, and the Middle Fork of the Willamette River.

TARGET ANALYTES: Dioxins and furans; pesticides; PCBs; PAHs; Co-planar PCBs; metals.

ANALYTICAL TECHNIQUES: Dioxins and furans (EPA Method 1613A); PAHs (EPA Method 8270); Metals (EPA 600/4-82-020); PCBs and pesticides (EPA Method 8080). All data entered in the database were reported on a wet weight basis. Limited data for dioxin and furan monitoring at wood treatment facilities was reported on a dry weight basis in other sources.

SAMPLING EQUIPMENT USED: Stainless steel Eckman dredge

SAMPLE HANDLING AND PROCESSING: There were three to five grabs taken per sampling location. Grabs were placed in a stainless steel bucket, homogenized, placed in a sample jar and put on ice for shipping to the laboratory.

DATA GAPS: Latitude and longitude of sampling locations. Latitude and longitude were estimated for entry in the database. Exact sampling dates were also unavailable for some analytical results. Data are reported on a wet weight basis. No percent solids or moisture data were provided which would allow conversion of the data to a dry weight reporting basis; units that are more consistent with data reported from other sediment contaminant studies.

ABSTRACT

A study investigating the presence and effects of toxic pollutants in the Willamette River and selected tributaries was conducted by the Oregon Department of Environmental Quality (ODEQ) in cooperation with the U.S. EPA and Oregon State University (OSU). The studies stated objectives were to determine if bioaccumulative toxic pollutants were present in sediment and fish tissue and to determine the possible effects of the pollutants present on the aquatic resources using bioassays and other aquatic life toxicity testing methods. This study was used as a screening survey to add to the existing toxic pollutant data base for the Willamette River. The sampling sites selected were sampled in previous toxic monitoring programs and were chosen to represent ambient levels, significant industrial and municipal sources, and typical urban non-point source impacts.

The report prepared by ODEQ (1994) is a compilation and summary of data collected as part of their Toxic Monitoring Program.

QA/QC EVALUATION - N/A

DATA USE AND COMPARABILITY - Users of these data should be reminded that the data were reported on a wet weight basis. All other data in the existing database is reported on a dry weight basis. Caution should be exercised when comparing the ODEQ sediment contaminant data to other data sets. Users of these data should also be reminded that the data provided are in the form of summary tables for a number of sampling episodes that have occurred over the course of the program. Some inconsistencies were noted between the data summarized in the ODEQ (1994) report and other sources of this information (e.g. Curtis et al. 1993). For example, the dioxin and furan data for the Woodtreater Study are reported by ODEQ (1994) on a wet weight basis, but another report that includes these data (Tetra Tech 1992) provides the same results, but reported on a dry weight basis. The dioxin and furan data for the Woodtreater Study were entered as they were reported in Tetra Tech (1992).

REFERENCES:

Curtis, L.R., H.M. Carpenter, R.M. Donohoe, D.E. Williams, O.R. Hedstrom, M.L. Deinzer, M.A. Beilstein, E. Foster, and R. Gates. 1993. Sensitivity of cytochrome P450-1A1 induction in fish as a biomarker for distribution of TCDD and TCDF in the Willamette River, Oregon. Environ. Sci. Technol. 27:2149-2157.

Tetra Tech. 1992. Columbia River chlorinated dioxins/furans ambient water quality assessment report. Prepared for U.S. EPA, Region 10, Water Monitoring and Analysis Section. Tetra Tech, Inc., Bellevue, WA.

Oregon Department of Environmental Quality (ODEQ). 1994. Willamette River toxics study - 1988/1991. Department of Environmental Quality, Water Quality Division, Portland, OR.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

no lat long

AGENCY SPONSOR: U.S. Geological Survey (National Water Quality Assessment Program)

AREA OF STUDY: Yakima River Basin

SAMPLING MEDIA: Bed-sediment (top 0.5 inch)

POSITIONING SYSTEM: N/A

ASSOCIATED TISSUE DATA: YES

REFERENCE SOURCE: Rinella et al. 1992

CONTACT: Frank Rinella, USGS, Portland, OR

PHONE: (503) 231-2292 FAX: N/A

SAMPLING PERIOD: August-November 1987, August-September 1988, 1989 (May, July, November), October-November 1990.

NUMBER OF STATIONS SAMPLED: 58 stations

LOCATIONS OF STATIONS SAMPLED: Waptus River, Cle Elum River, Jungle Creek, North Fork Teanaway River, Teanaway River, Taneum Creek, South Fork Manastash Creek, Naneum Creek, Cherry Creek, Yakima River, Umatanum Creek, Little Naches River, American River, Rattlesnake Creek, Moxee Drain,Wide Hollow Creek, South Fork Ahtanum, Granger Drain, Toppenish Creek, Satus Creek, Sulphur Creek, and Spring Creek.

TARGET ANALYTES: Organochlorine pesticide total PCBs, and semi-volatile organics. Conventional analyses included particle size and inorganic and organic carbon.

ANALYTICAL TECHNIQUES: EPA Method 8080 (U.S. EPA 1986) for organochlorine compounds, Wershaw et al. (1983,1987) modified for semi-volatile organics. Data are reported on a dry weight basis.

SAMPLING EQUIPMENT USED: Hand-held scoops and a Teflon-lined Ekman grab sampler.

SAMPLE HANDLING AND PROCESSING: Samples were wet seived using stainless-steel sieves (2-mm, 180-μm, and 62-μm openings) and the resulting size classes were chilled with ice. All sample containers were oven-baked and lids consisted of either Teflon or oven-baked aluminum foil inserts. Samples from 26 samples were individually processed and samples from 32 stations were composited into seven samples.

DATA GAPS: none

ABSTRACT

Contaminant data assessed in a variety of media (water, suspended and bed sediment, soil, and aquatic biota) were presented for samples collected from the Yakima River Basin between 1987 and 1990. The assessment was conducted as part of the U.S. Geological Survey's National Water Quality Assessment Program which was designed to describe the status and trends in the Nation's ground and surface water resources. For this study; water, sediments, molluscs, aquatic plants, fish, and crayfish were analyzed for organochlorine pesticides, total PCBs, and semi-volatile organics.

QA/QC EVALUATION - All data were reviewed for accuracy and precision. The review included an evaluation of method blanks, matrix spikes and duplicates, and surrogate recoveries to assure acceptable method performance.

DATA USE AND COMPARABILITY - Data have undergone extensive review and validation. All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Rinella, J.F., S.W. McKenzie, J.K. Crawford, W.T. Foreman, P.M. Gates, G.J. Fuhrer, and M.L. Janet. 1992. Surface-water-quality assessment of the Yakima River Basin, Washington: Pesticide and other trace-organic-compound data for water, sediment, soil, and aquatic biota, 1987-91. U.S. Geological Survey, Portland, OR. Open-File Report 92-644.

U.S. Environmental Protection Agency. 1986. Test methods for evaluating solid waste (3rd ed.). U.S. Environmental Protection Agency, Office of Solid Waste and Emergency response, Washington, D.C.

Wershaw, R.L., M.J. Fishman, R.R. Grabbe, and L.E. Lowe (eds.). 1987. Methods for the determination of organic substances in water and fluvial sediments. U.S. Geological Survey Techniques of Water-Resources Investigations, Book 5, Chapter A3.

Wershaw, R.L., M.J. Fishman, R.R. Grabbe, and L.E. Lowe (eds.). 1983. Methods for the determination of organic substances in water and fluvial sediments. U.S. Geological Survey Open-File report 82-1004.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: U.S. Geological Survey (National Water Quality Assessment Program)

AREA OF STUDY: Yakima River Basin

SAMPLING MEDIA: Streambed sediment (top 1 to 2 cm)

POSITIONING SYSTEM: N/A

ASSOCIATED TISSUE DATA: No

REFERENCE SOURCE: Ryder et al. 1992

CONTACT: Jeane Ryder, USGS, Denver, CO

PHONE: N/A FAX: N/A

SAMPLING PERIOD: August-September, 1987

NUMBER OF STATIONS SAMPLED: 430 sites

LOCATIONS OF STATIONS SAMPLED: All samples were collected within the Yakima River Basin. Samples were collected randomly from 269 lower-order streambed sites, 75 samples were collected from higher-order streambed sites, and the remaining samples represent storm water urban drains, soils, and analysis of variance sampling.

TARGET ANALYTES: Forty-four metals, TOC, and grain size information.

ANALYTICAL TECHNIQUES: Thirty-seven metals were analyzed by Inductively Coupled Plasma - Atomic Emission Spectrometry and three metals were analyzed by Atomic Absorption Spectrometry. Mercury was analyzed by cold vapor-Atomic Absorption Spectrometry. The remaining metals were analyzed by titration and fluorimetry. Total carbon was determined by combustion and infrared spectrometry and inorganic carbon was determined by titration. Organic carbon was calculated from the difference between total and inorganic carbon. Analytical methods are described in detail by Arbogast (1990). All results are repoted on dry weight basis.

SAMPLING EQUIPMENT USED: Stainless steel Ekman and ponar dredges, hand-held or pole mounted plastic scoops, stainless steel scoops.

SAMPLE HANDLING AND PROCESSING: Five to seven subsamples were collected from lower-order streams. The subsamples were sieved through a 2-mm stainless steel screen and transferred to a Hubco aerobic sample bag. The samples were air dried before shipped to the laboratory. The laboratory sieved the samples through a 63 micron sieve and the <63 micron portion was analyzed. Three to five subsamples from higher-order streams were composited in a plastic tub,

then wet sieved through a 63 micron stainless steel sieve. The sieved sediment/water slurry was placed in a 2 liter glass jar and allowed to stand overnight. After settling, the water was siphoned off and the settled fines placed in polypropylene containers and air dried.

DATA GAPS: None

ABSTRACT

The overall scope of the surface water NAWQA program includes organic and inorganic analyses of media such as water, sediments, and biota. Inorganic data from this report will be used to relate the occurrence and distribution of major and trace elements to geologic sources and land use activities. In addition, the elements associated with streambed sediments are important contributors to water column chemistry and will aid in modeling source-fate investigations. Forty-four metals were analyzed in addition to the determination of total, inorganic, and organic carbon for samples collected from 430 sites (Ryder et al. 1992).

QA/QC EVALUATION - Quality assurance was evaluated by including standard reference materials, random split samples, and laboratory duplicates. Quality assessment procedures and results for analytical precision and accuracy for the four NAWQA pilot studies are presented by Sanzolone and Ryder (1989).

DATA USE AND COMPARABILITY - Users of these data should be reminded that the results are for specific grain size fractions which can not be compared directly to results from bulk sediment analyses.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Arbogast, B.F. 1990. Quality assurance manual for the Branch of Geochemistry. U.S. Geological Survey. U.S. Geological Survey Open-File Report 90-668.

Ryder, J.L., R.F. Sanzolone, G.J. Fuhrer, and E.L. Mosier. 1992. Surface-water-quality assessment of the Yakima River basin in Washington: Chemical analyses of major, minor, and trace elements in fine-grained sediment. U.S. Department of the Interior, U.S. Geological Survey. Open-File Report 92-520.

Sanzolone, R.F., and J.L. Ryder. 1989. Quality assessment program and results for the NAWQA surface water pilot studies. U.S. Geological Survey Open-File Report 89-658.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: U.S. Fish and Wildlife Service (USFWS)

AREA OF STUDY: Columbia River - Grays Bay to Umatilla

SAMPLING MEDIA: Sediment

ASSOCIATED TISSUE DATA: Yes

POSITIONING SYSTEM: N/A

REFERENCE SOURCE: Schuler 1994

CONTACT: Carol Schuler, USFWS, Portland, OR

PHONE: (503) 231-6179 FAX: N/A

SAMPLING PERIOD: May-September 1991

NUMBER OF STATIONS SAMPLED: 8 Stations.

LOCATIONS OF STATIONS SAMPLED: Baker Bay, Camas, Cathlamet Bay, Lewis and Clark, Longview, Julia Butler, Ridgefield and Umatilla.

TARGET ANALYTES: Dioxins and furans; PCBs; organochlorine pesticides; Hg.

ANALYTICAL TECHNIQUES: Dioxins/furans (EPA Method 1613). All results are reported on a dry weight basis.

SAMPLING EQUIPMENT USED: N/A

SAMPLE HANDLING AND PROCESSING: N/A

DATA GAPS: Latitude and longitude of sampling locations. Type of analytical techniques used for chemical analysis. Sampling protocols and QA/QC procedures were not described.

ABSTRACT

The Columbia River Estuary is exposed to a variety of contaminants through municipal and industrial permitted discharges, urban and industrial nonpoint pollution, accidental spills of oil and hazardous materials, agricultural runoff, and accelerated population growth (Schuler 1992). This study intended to

provide information needed to determine if hazardous concentrations of organic pollutants are accumulating in fish and wildlife from the Columbia River and its National Wildlife Refuges. Sediment, aquatic invertebrates, fish, and bird egg samples were collected for this study. Preliminary study results were reported in Schuler (1992).

The data were provided as raw laboratory data sheets and hardcopies of summary spreadsheets. The data were entered from the summary spreadsheets that were provided by Carol Schuler of the U.S. Fish and Wildlife Service (Schuler 1994).

QA/QC EVALUATION - N/A.

DATA USE AND COMPARABILITY - All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Schuler, C. 1992. Organochlorine contaminants in aquatic resources from the Columbia River. Progress report. Fiscal year 1992. U.S. Department of the Interior, Fish and Wildlife Service, Portland Field Office, Portland, OR.

Schuler, C. 8 September 1994. Personal Communication (data sent to Ms. Kimberly Stark, Tetra Tech, Redmond, WA). U.S. Fish and Wildlife Service, Portland, OR.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: U.S. Army Corps of Engineers

AREA OF STUDY: Lower Columbia River, Willamette River

SAMPLING MEDIA: Surface and sub-surface sediment (top 2 cm to several feet)

POSITIONING SYSTEM: N/A

ASSOCIATED TISSUE DATA: No

REFERENCE SOURCE: Stockton 1991

CONTACT: James Britton, ACOE, Portland, OR

PHONE: (503) 326-6471 FAX: N/A

SAMPLING PERIOD: 1980 through 1990

NUMBER OF STATIONS SAMPLED: 170

LOCATIONS OF STATIONS SAMPLED: Astoria, Baker Bay, Cathlamet Bay, Chinook, Columbia River, Ilwaco, Skipanon, Tongue Point, Elochoman Slough, Oregon Slough, St. Helens, Willamette River, Wind River.

TARGET ANALYTES: Grain size, total organic carbon, ten metals, pesticides, total PCBs, total PAHs, oil and grease, and ammonia. All results are reported on a dry weight basis.

ANALYTICAL TECHNIQUES: The report is a printed copy of the Army Corps of Engineers' Columbia River sediment database as of May 1991. Information regarding analytical techniques was not available.

SAMPLING EQUIPMENT USED: Information on equipment type was not available.

SAMPLE HANDLING AND PROCESSING: Sample handling and processing information was not available.

DATA GAPS: Latitude and longitude of sampling locations, analytical methods, sampling gear, sample handling and processing were not available. However, information for specific sampling projects is available from the Portland District Corps of Engineers. Latitude and longitude were estimated for entry in the database.

ABSTRACT

The report is a compilation of contaminant data entered in the U.S. Army Corps of Engineers, Portland District's Columbia River sediment database as of May 1991 (Stockton 1991). The database is separated into two sections containing estuarine and riverine data. The riverine database includes data from the Willamette River up to the Broadway Bridge area in Portland, as well as sampling stations as far upstream as Wind River. The estuarine database includes sampling stations in the lower reaches of the Columbia River. Sampling sites contained in the database are from Federal dredging projects. Data are provided for grain size, total organic carbon, metals, pesticides, total PCBs, and total PAHs. Samples include surface sediments and sediments collected by coring, which may include sub-surface sediments.

QA/QC EVALUATION - Information relevant to quality assurance/quality control was not available. However, the U.S. Army Corps of Engineers has a QA/QC program for review and evaluation of contaminant data. Information regarding the quality of specific data may be obtained by contacting the Portland District Corps of Engineers.

DATA USE AND COMPARABILITY - Users of these data should be cautioned that not all of the database entries are for surface sediments. Some analyses were conducted on sediments collected with coring devices. Therefore, some samples include sub-surface sediments collected from a few to several feet below the sediment surface.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Stockton, S.L. 24 May 1991. Personal Communication (transmittal of riverine database output to Mr. Bruce Bennet, Tetra Tech, Inc., Bellevue, WA). Chief, Planning and Engineering Division, U.S. Army Corps of Engineers, Portland, OR.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: U.S. Army Corps of Engineers (USACOE)

AREA OF STUDY: Lower Columbia River

SAMPLING MEDIA: Surface sediment

POSITIONING SYSTEM: N/A

ASSOCIATED TISSUE DATA: No

REFERENCE SOURCE: Siipola 1994

CONTACT: Mark Siipola, USACOE, Portland, OR.

PHONE: (503) 326-6463 FAX: N/A

SAMPLING PERIOD: May 1990, September 1991

NUMBER OF STATIONS SAMPLED: 16 stations

LOCATIONS OF STATIONS SAMPLED: Columbia River between RM 149-181 (Cascade Locks to Mayer State Park); lower Columbia River (Camas, St. Helens, Longview and Wauna).

TARGET ANALYTES: Dioxins and furans; PAHs; PCBs; metals.

ANALYTICAL TECHNIQUES: Dioxins and furans (EPA Method 8290). All results are reported on a dry weight basis.

SAMPLING EQUIPMENT USED: Benthos gravity corer

SAMPLE HANDLING AND PROCESSING: N/A

DATA GAPS: Latitude and longitude of sampling locations. Latitude and longitude were estimated for entry along with the data provided in the database.

ABSTRACT

These data represent the USACOE, Portland District's sediment quality data with regard to dioxins and furans in sediment samples from areas that have already been dredged and areas that may potentially be

dredged (Siipola 1994). Sample locations include areas where there is potential dioxin and furan sediment contamination and/or where previous sampling has indicated the presence of similar hydrophobic organic compounds (PCBs, PAHs, pesticides) or dioxin/furans. PAHs, PCBs, pesticides and metal analysis results are reported in Stockton (1992).

QA/QC EVALUATION - Laboratory method blanks and internal standards were prepared and processed along with each extraction batch as part of the QA/QC procedure.

DATA USE AND COMPARABILITY - Users of these data should be reminded that targeted sample areas consisted of areas where dioxins and furans were expected to be present.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Siipola, M.D. 17 August 1994. Personal Communication (data package containing sediment dioxin data submitted to Mr. Curtis DeGasperi, Tetra Tech, Inc., Redmond, WA). U.S. Army Corps of Engineers, Portland District, Portland, OR. Data for 1989 U.S. Government Moorings study - Willamette River. Analyses of Columbia River/Willamette River sediment samples - 1990 reconnaissance study. Various locations in Bonneville Pool - 1991. Mouth of Columbia River - 1992.

Stockton, S.L. 29 January 1992. Personal Communication (transmittal of Columbia River and Willamette River sediment dioxin/furan data). Chief, Planning and Engineering Division, U.S. Army Corps of Engineers, Portland, OR.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: Oregon Department of Environmental Quality (ODEQ)

AREA OF STUDY: Lower Columbia River-St. Helens

SAMPLING MEDIA: Surface sediment (top 2 cm)

ASSOCIATED TISSUE DATA: Yes

POSITIONING SYSTEM: Trimble Navigation GPS

REFERENCE SOURCE: Tetra Tech 1992a

CONTACT: Steve Ellis, Tetra Tech, Inc., Redmond, WA

PHONE: (206) 883-1912 FAX: (206) 881-6997

SAMPLING PERIOD: September 1991

NUMBER OF STATIONS SAMPLED: 5 sites

LOCATIONS OF STATIONS SAMPLED: Multnomah Channel, Fishtrap Shoal, St. Helens Marina, Warrior Rock, and Columbia City

TARGET ANALYTES: Seventeen dioxin and furan congeners. Conventional analyses included particle size, total solids, and total organic carbon (TOC).

ANALYTICAL TECHNIQUES: Dioxins and furans (EPA Method 1613A), TOC (modified EPA Method 415.1), total solids (EPA Method 160.3.), particle size (Puget Sound Estuary Program Protocols). All results are reported on a dry weight basis.

SAMPLING EQUIPMENT USED: 0.06 m^2 van Veen grab sampler.

SAMPLE HANDLING AND PROCESSING: Each sediment sample consisted of a composite of at least four grab samples. Surface sediments (top 2 cm) were transferred to a stainless steel bowl and homogenized with a stainless steel spatula. The samples were placed in jars and stored on ice except for the samples designated for TOC analysis. These samples were stored on dry ice.

DATA GAPS: none

ABSTRACT

Monitoring of sediment and crayfish (*Pacifastacus leniusculus*) was conducted in order to satisfy monitoring requirements set forth in the City of St. Helens National Discharge Elimination System (NPDES) Permit (Tetra Tech 1992). Samples were collected from five sites to evaluate the accumulation of dioxins and furans in sediment and crayfish. Sediment and crayfish sampling primarily focused on locations downriver from the location of the outfall pipe.

Sediment samples were collected and analyzed for seventeen dioxin/furan congeners, particle size distribution, total solids, and total organic carbon. All sediment data are presented on dry weight basis and TOC-normalized values are also provided in the report. Sampling station latitude and longitude were recorded from geographic coordinates provided by a Trimble Navigation Global Positioning System receiver.

QA/QC EVALUATION - Data were reviewed by Dr. William Luksemburg of Alta Analytical Laboratory. The review included all ion chromatograms, initial and continuing calibrations, column performance check mixes, calculations of positive values and detection limits, ion abundance ratios for internal/surrogate/recovery standards and positive natives, matrix spikes and duplicates, and calculation of lipid content. No data were qualified based upon review of QA/QC data. Method blank, laboratory control sample, internal standard, and detection limit data were included in the report.

DATA USE AND COMPARABILITY - Comparisons between sediment and crayfish tissue contaminant data collected for this study are possible as the sampling locations for crayfish correspond to sediment sampling sites.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Tetra Tech. 1992. City of St. Helens discharge monitoring report: Accumulation of dioxins and furans in sediment and biota. Prepared for City of St. Helens, St. Helens, OR. Tetra Tech, Inc., Bellevue, WA.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: Oregon Department of Environmental Quality (ODEQ)

AREA OF STUDY: Lower Columbia River-Wauna

SAMPLING MEDIA: Surface sediment (top 2 cm)

ASSOCIATED TISSUE DATA: Yes

POSITIONING SYSTEM: Trimble Navigation GPS

REFERENCE SOURCE: Tetra Tech 1992c

CONTACT: Steve Ellis, Tetra Tech, Inc., Redmond, WA

PHONE: (206) 883-1912 FAX: (206) 881-6997

SAMPLING PERIOD: September 1991

NUMBER OF STATIONS SAMPLED: 5 sites

LOCATIONS OF STATIONS SAMPLED: Wallace Island, Westport Slough, Downriver from mill, Bradwood, Clifton Channel

TARGET ANALYTES: Seventeen dioxin and furan congeners. Conventional analyses included particle size, total solids, and total organic carbon (TOC).

ANALYTICAL TECHNIQUES: Dioxins and furans (EPA Method 1613A), TOC (modified EPA Method 415.1), total solids (EPA Method 160.3.), particle size (Puget Sound Estuary Program Protocols). All results are reported on a dry weight basis.

SAMPLING EQUIPMENT USED: 0.06 m^2 van Veen grab sampler.

SAMPLE HANDLING AND PROCESSING: Each sediment sample consisted of a composite of at least four grab samples. Surface sediments (top 2 cm) were transferred to a stainless steel bowl and homogenized with a stainless steel spatula. The samples were placed in jars and stored on ice except for the samples designated for TOC analysis. These samples were stored on dry ice.

DATA GAPS: none

ABSTRACT

Monitoring of sediment and crayfish (*Pacifastacus leniusculus*) was conducted in order to satisfy monitoring requirements set forth in the James River Wauna Mill's National Discharge Elimination System (NPDES) Permit (Tetra Tech 1992). Samples were collected from five sites to evaluate the accumulation of dioxins and furans in sediment and crayfish. Sediment and crayfish sampling primarily focused on locations downriver from the location of the outfall pipe.

Sediment samples were collected and analyzed for seventeen dioxin/furan congeners, particle size distribution, total solids, and total organic carbon. Data are presented on a dry weight basis and TOC-normalized values are also provided in the report. Sampling station latitude and longitude were recorded from geographic coordinates provided by a Trimble Navigation Global Positioning System receiver.

QA/QC EVALUATION - Data were reviewed by Dr. William Luksemburg of Alta Analytical Laboratory. The review included all ion chromatograms, initial and continuing calibrations, column performance check mixes, calculations of positive values and detection limits, ion abundance ratios for internal/surrogate/recovery standards and positive natives, matrix spikes and duplicates, and calculation of lipid content. No data were qualified based upon review of QA/QC data. Method blank, laboratory control sample, internal standard, and detection limit data were included in the report.

DATA USE AND COMPARABILITY - Comparisons between sediment and crayfish tissue contaminant data collected for this study are possible as the sampling locations for crayfish correspond to sediment sampling sites.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Tetra Tech. 1992. James River Wauna Mill discharge monitoring report: Accumulation of dioxins and furans in sediment and biota. Prepared for James River Corporation, Wauna, OR. Tetra Tech, Inc., Bellevue, WA.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: Lower Columbia River Bi-State Program (Bi-State)

AREA OF STUDY: Lower Columbia River - Bonneville Dam to river mouth

SAMPLING MEDIA: Surface sediment (top 2 cm)

POSITIONING SYSTEM: Magnavox MX 2000 GPS Navigator System

ASSOCIATED TISSUE DATA: Yes

REFERENCE SOURCE: Tetra Tech 1993

CONTACT: Steve Ellis, Tetra Tech, Inc., Redmond, WA

PHONE: (206) 883-1912 FAX: (206) 881-6997

SAMPLING PERIOD: September-October 1991

NUMBER OF STATIONS SAMPLED: 54 stations

LOCATIONS OF STATIONS SAMPLED: Mainstem and backwater areas of the lower Columbia River—River Mile 0 to 147, the mouth of the Columbia River to Bonneville Dam.

TARGET ANALYTES: Seventeen dioxin and furan congeners, 7 PCB Aroclors, 16 metals and trace elements (Al, Sb, As, Ba, Be, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Se, Ag, Tl, Zn), cyanide, 52 semi-volatile organic compounds (SVOCs) including 11 phenolic compounds and 15 polynuclear aromatic hydrocarbons, 28 pesticides, 7 PCB Aroclors, 3 butyltin compounds including tributyltin, and 7 long-lived radionuclides. Conventional analyses included sediment grain size and total organic carbon content. All data are reported on a dry weight basis.

ANALYTICAL TECHNIQUES: Dioxins and furans (EPA Method 1613 with modifications); PCB Aroclors (EPA Method 8080); metals and trace elements [Ag, Al, Ba, Cu, Cr, Fe, Ni, Sb, Tl, and Zn by ICP (EPA Method 200.7); As (EPA 7060), Be (EPA 7091), Cd (EPA 7131), Pb (EPA 7421), and Se (EPA 7740) by GFAA; Hg (EPA 7471) by CVAA)]; cyanide [colorimetry (EPA 9010)]; SVOCs (EPA 8270); pesticides and PCBs (EPA 8080), Butyltins (GC/MS with SIM); radionuclides by alpha spectroscopy and gamma counting.

SAMPLING EQUIPMENT USED: 0.1 m^2 stainless steel van Veen grab, Magnavox MX 2000 Global Positioning System (GPS)

SAMPLE HANDLING AND PROCESSING: Sediment samples consisted of a homogenized composite of at least 3 grab samples. Samples were shipped on ice to laboratory. Sample chain-of-custody proceedures were followed.

DATA GAPS: none

ABSTRACT

Tetra Tech, Inc., was contracted by the Lower Columbia River Bi-State Program to conduct a reconnaissance level survey of water, sediment, and biota (fish and crayfish) contaminant levels in these media of the lower Columbia River below Bonneville Dam (Tetra Tech 1993). Sediment and fish tissue sampling (including crayfish) focused on locations in the mainstem and backwater areas of the lower river. Sediment sampling was conducted using a stainless steel 0.1 m^2 van Veen grab deployed by winch from a vessel. Station latitude and longitude were recorded from geographic coordinates provided by a Magnavox MX 2000 Global Positioning System (GPS) Navigator System receiver onboard the vessel. The GPS locational information was not corrected for the U.S. Department of Defense's Selective Availability, and therefore the GPS latitudes and longitudes provided are accurate to approximately ± 100 m.

QA/QC EVALUATION - The sediment data submitted by the laboratories were reviewed and validated by Tetra Tech using guidance provided in the Quality Assurance/Quality Control (QA/QC) Plan developed for this project and guidance provided by U.S. EPA (1988a,b). A data validation report was prepared as part of the final report and is bound separately as Volume 2: Appendix A, Data Validation Reports. The QA/QC procedures included sampling and analysis of field and laboratory replicates and matrix spike/matrix spike duplicate (MS/MSD) analyses on a minimum of 5 percent of the samples that were collected. Some data were qualified based on review of laboratory replicate and MS/MSD results, and additional instrument calibration and performance data provided by the laboratories.

DATA USE AND COMPARABILITY - Although comparison between sediment and fish tissue contaminant data collected in this program is possible, the sampling area for fish at a particular station was generally greater than the area designated as the sediment sampling station. Furthermore, with the exception of crayfish, it is not known to what extent the fish species collected reside in the vicinity of the sampling station. The original data may be found in Volume 3: Data Tables. Appendices B, C, D, &E. of Tetra Tech (1993).

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Tetra Tech. 1993. Reconnaissance Survey of the lower Columbia River. Task 6: Reconnaissance report. Volumes 1, 2, and 3. Prepared for Columbia River Bi-State Program. Tetra Tech, Inc., Redmond, WA.

U.S. Environmental Protection Agency. 1988a. Laboratory data validation functional guidelines for evaluating inorganics analyses. U.S. EPA/Hazardous Site Evaluation Division, Washington, D.C.

U.S. Environmental Protection Agency. 1988b. Laboratory data validation functional guidelines for evaluating organics analyses. U.S. EPA/Hazardous Site Evaluation Division, Washington, D.C.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: Lower Columbia River Bi-State Program (Bi-State)

AREA OF STUDY: Lower Columbia River - Bonneville Dam to river mouth

SAMPLING MEDIA: Surface sediment (top 2 cm)

POSITIONING SYSTEM: Magnavox MX 2000 GPS Navigator System

ASSOCIATED TISSUE DATA: Yes

REFERENCE SOURCE: Tetra Tech 1994

CONTACT: Steve Ellis, Tetra Tech, Inc., Redmond, WA

PHONE: (206) 883-1912 FAX: (206) 881-6997

SAMPLING PERIOD: June-July 1993

NUMBER OF STATIONS SAMPLED: 15 stations

LOCATIONS OF STATIONS SAMPLED: Backwater areas of the lower Columbia River—River Mile 14 to 141, Youngs Bay to Skamania Landing.

TARGET ANALYTES: Seventeen dioxin and furan congeners, 7 PCB Aroclors, 16 metals and trace elements (Al, Sb, As, Ba, Be, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Se, Ag, Tl, Zn), cyanide, 59 semi-volatile organic compounds (SVOCs) including 11 phenolic compounds and 17 polynuclear aromatic hydrocarbons, 26 pesticides, 6 PCB Aroclors, 3 butyltin compounds including tributyltin, and 8 long-lived radionuclides. Conventional analyses included sediment grain size and total organic carbon content. All data are reported on a dry weight basis.

ANALYTICAL TECHNIQUES: Dioxins and furans (EPA Method 1613 with modifications); PCB Aroclors (EPA Method 8080); metals and trace elements [Ag, Al, Ba, Be, Cu, Cr, Fe, Ni, Tl, and Zn by ICP (EPA Method 200.7); Sb (EPA 204.2), As (EPA 206.2), Cd (EPA 213.2), Pb (EPA 239.2), and Se (EPA 270.2) by GFAA; Hg (EPA 245.2) by CVAA)]; cyanide (SM 4500-CN E); SVOCs (EPA 8270) with SIM for PAH analysis; pesticides and PCBs (EPA 8080); butyltins (GC/MS with SIM); radionuclides by alpha spectroscopy and gamma counting.

SAMPLING EQUIPMENT USED: 0.02 m^2 stainless-steel Petite-Ponar grab sampler, Magnavox MX 2000 Global Positioning System (GPS)

SAMPLE HANDLING AND PROCESSING: Sediment samples consisted of a homogenized composite of the top 2 cm of sediment from at least 3 grab samples. Three composite samples were collected from each station. Samples were shipped on ice to laboratory. Sample chain-of-custody proceedures were followed.

Rm 18

DATA GAPS: none

ABSTRACT

Tetra Tech, Inc., was contracted by the Lower Columbia River Bi-State Program to conduct a supplemental reconnaissance survey of sediment and biota (fish and crayfish) contaminant levels in backwater areas of the lower Columbia River (Tetra Tech 1994). These samples were intended to expand the data base of the original reconnaissance survey reported in Tetra Tech (1993). Station latitude and longitude were recorded from geographic coordinates provided by a Magnavox MX 2000 Global Positioning System (GPS) Navigator System receiver. The GPS locational information was not corrected for the U.S. Department of Defense's Selective Availability, and therefore the GPS latitudes and longitudes provided are accurate to approximately ± 100 m.

QA/QC EVALUATION - The sediment data submitted by the laboratories were reviewed and validated by Tetra Tech using guidance provided in the Quality Assurance/Quality Control (QA/QC) Plan developed for this project and guidance provided by U.S. EPA (1988a,b). A data validation report was prepared as part of the final report and is bound separately as Volume 2: Appendix A, Data Validation Reports. The QA/QC procedures included sampling and analysis of field and laboratory replicates and matrix spike/matrix spike duplicate (MS/MSD) analyses on a minimum of 5 percent of the samples that were collected. Some data were qualified based on review of laboratory replicate and MS/MSD results, and instrument calibration and performance data provided by the laboratories.

DATA USE AND COMPARABILITY - The field replicated data allow for statistical comparisons. Although comparison between sediment and fish tissue contaminant data collected in this program is possible, the sampling area for fish at a particular station was generally greater than the area designated as the sediment sampling station. Furthermore, with the exception of crayfish, it is not known to what extent the fish species collected reside in the vicinity of the sampling station. The original data may be found in Volume 3: Data Tables - Appendices B, C, D, & E of Tetra Tech (1994).

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Tetra Tech. 1993. Reconnaissance Survey of the lower Columbia River. Task 6: Reconnaissance report. Volumes 1, 2, and 3. Prepared for Columbia River Bi-State Program. Tetra Tech, Inc., Redmond, WA.

Tetra Tech. 1994. Draft report. Lower Columbia River Backwater Reconnaissance Survey. Volumes 1, 2, and 3. Prepared for Lower Columbia River Bi-State Committee. Tetra Tech, Inc., Redmond, WA.

U.S. Environmental Protection Agency. 1988a. Laboratory data validation functional guidelines for evaluating inorganics analyses. U.S. EPA/Hazardous Site Evaluation Division, Washington, D.C.

U.S. Environmental Protection Agency. 1988b. Laboratory data validation functional guidelines for evaluating organics analyses. U.S. EPA/Hazardous Site Evaluation Division, Washington, D.C.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: U.S. Army Corps of Engineers (USACOE)

AREA OF STUDY: Lower Columbia River - Old mouth of Cowlitz River

SAMPLING MEDIA: Surface and sub-surface sediment

POSITIONING SYSTEM: N/A

ASSOCIATED TISSUE DATA: No

REFERENCE SOURCE: U.S. Army Corps of Engineers 1991

CONTACT: Mark Siipola, USACOE, Portland, OR

PHONE: (503) 326-6463 FAX: N/A

SAMPLING PERIOD: January 1991

NUMBER OF STATIONS SAMPLED: 5 stations

LOCATIONS OF STATIONS SAMPLED: Old mouth of the Cowlitz River

TARGET ANALYTES: Nine metals, polynuclear aromatic hydrocarbons, phenols, organochlorine pesticides, PCBs, grain size, and volatile solids. All data are reported on a dry weight basis.

ANALYTICAL TECHNIQUES: Samples were analyzed following EPA methodology for all chemical analyses. U.S. Army Corps of Engineers methodology was followed for physical parameters. All results are reported on a dry weight basis.

SAMPLING EQUIPMENT USED: Vibra-core sampler

SAMPLE HANDLING AND PROCESSING: Subsamples of sample cores were transferred to glass jars lined with teflon lids. Samples were cold stored in an ice chest.

DATA GAPS: Latitude and longitude of sampling locations were not provided. Latitude and longitude were estimated for entry along with the data provided in the database.

ABSTRACT

The old mouth of the Cowlitz River provides a channel from deep water in the Columbia River to old river mile 0.7 of the Cowlitz River. The site has been dredged in the past to maintain the channel. The

objective of the study was to evaluate the sediments for chemical contaminants and physical parameters which would prohibit unconfined in-water disposal. Analytical testing for metals, polynuclear aromatic hydrocarbons, phenols, pesticides, and PCBs were conducted on four sediment samples collected in January 1991. Six samples were analyzed for grain size and volatile solids.

QA/QC EVALUATION - Laboratory quality control consisted of method blanks, duplicate analyses, matrix spikes, and surrogate spike recoveries. All QC data were within acceptable limits with the exception of matrix spike recoveries for three pesticides. The recoveries were outside of the upper control limits; however, as these compounds were not detected in the samples, it was determined that the data were not adversely impacted by the high recoveries.

DATA USE AND COMPARABILITY - Data presented for this report were from the laboratory data sheets. Results were compared to CENPP Tiered Testing Guidelines and requirements of Section 404 of the Clean Water Act for acceptability for in-water disposal.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

U.S. Army Corps of Engineers. 1991. Old mouth of the Cowlitz River sediment evaluation. Unpublished data. U.S. Army Corps of Engineers, Portland District, Troutdale, OR.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: James River Corporation

AREA OF STUDY: Lower Columbia River - Camas

SAMPLING MEDIA: Surface sediment

POSITIONING SYSTEM: N/A

ASSOCIATED TISSUE DATA: No

REFERENCE SOURCE: Young 1988

CONTACT: Carol Whittaker, James River Mill, Camas, WA

PHONE: (206) 834-8390 FAX: N/A

SAMPLING PERIOD: September 1988

NUMBER OF STATIONS SAMPLED: 3 stations

LOCATIONS OF STATIONS SAMPLED: Parker's Landing (RM 121), Camas ASB Outfall, 300 ft. downstream (RM 120), and Hassalo Rock (RM 117).

TARGET ANALYTES: Metals (Sb, As, Ba, Be, B, Cd, Ca, Cr, Cu, Pb, Mn, Hg, Ni, Se, Ag, Tl, Sn, Zn); organics (PCBs, pesticides, semi-volatiles). All data are reported on a dry weight basis.

ANALYTICAL TECHNIQUES: N/A

SAMPLING EQUIPMENT USED: Stainless steel bucket and diver

SAMPLE HANDLING AND PROCESSING: Procedures followed those in the 16th Ed. of Standards Methods and corresponding EPA publication.

DATA GAPS: Latitude and longitude were not provided. Latitude and longitude were estimated for entry along with the data provided in the database.

ABSTRACT

The Puget Sound Water Quality Authority (PSWQA) is responsible for developing, adopting and overseeing the implementation of a water quality management plan for Puget Sound. The Department

of Ecology, which adopts some of PSWQA's ideas, began investigative work in 1987 to monitor Columbia River dischargers to ensure they are consistent with the PSWQA demands for marine waters. The particular focus of this investigation was tho confirm the impact of the Camas Mill's wastewater discharge on Columbia River sediments (Young 1988).

QA/QC EVALUATION - N/A

DATA USE AND COMPARABILITY - Users of these data should be reminded that they were collected in the vicinity of a potential souce of industrial pollutants.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Standard Methods for the Examination of Water and Wastewater, 16th Ed., American Public Health Association, Washington, D.C., 1985.

Young, S.R. 1988. Columbia River sediment. Report to D.F. Bachman, Environmental Department, James River-Camas Mill, October 18, 1988.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: James River Corporation

AREA OF STUDY: Lower Columbia River - Camas

SAMPLING MEDIA: Surface sediment

POSITIONING SYSTEM: N/A

ASSOCIATED TISSUE DATA: No

REFERENCE SOURCE: Young 1989

CONTACT: Carol Whittaker, James River Mill, Camas, WA

PHONE: (206) 834-8390 FAX: N/A

SAMPLING PERIOD: September 1989

NUMBER OF STATIONS SAMPLED: 3 stations

LOCATIONS OF STATIONS SAMPLED: Parker's Landing (RM 121), Camas ASB Outfall, 300 ft. downstream (RM 120), and Hassalo Rock (RM 117).

TARGET ANALYTES: Metals (Sb, As, Ba, Be, B, Cd, Ca, Cr, Cu, Pb, Mn, Hg, Ni, Se, Ag, Tl, Sn and Zn), organics (PCB, pesticides, volatiles) and TOC. All data are reported on a dry weight basis.

ANALYTICAL TECHNIQUES: N/A

SAMPLING EQUIPMENT USED: Stainless steel pitcher fastened to the end of a rigid probe.

SAMPLE HANDLING AND PROCESSING: Procedures followed those in the 16th Ed. of Standards Methods and corresponding EPA publication.

DATA GAPS: Latitude and longitude were not provided. Latitude and longitude were estimated for entry along with the data provided in the database.

ABSTRACT

The Puget Sound Water Quality Authority (PSWQA) is responsible for developing, adopting and overseeing the implementation of a water quality management plan for Puget Sound. The Department

of Ecology, which adopts some of PSWQA's ideas, began investigative work in 1987 to monitor Columbia River dischargers to ensure they are consistent with the PSWQA demands for marine waters. The particular focus of this investigation was to confirm the impact of the Camas Mill's wastewater discharge on Columbia River sediments (Young 1989). This study is a follow up on the Young (1988) study which initially sampled the outfall area in 1988.

QA/QC EVALUATION - N/A.

DATA USE AND COMPARABILITY - Users of these data should be reminded that they were collected in the vicinity of a potential souce of industrial pollutants.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Standard Methods for the Examination of Water and Wastewater, 16th Ed., American Public Health Association, Washington, D.C., 1985.

Young, S.R. 1988. Columbia River sediment. Report to D.F. Bachman, Environmental Department, James River-Camas Mill, October 18, 1988.

Young, S.R. 1989. Columbia River sediment. Report to D.F. Bachman, Environmental Department, James River-Camas Mill, November 28, 1989.

COLUMBIA RIVER BASIN BIOTA AND SEDIMENT DATABASE
SEDIMENT DATA ABSTRACT

AGENCY SPONSOR: Washington State Department of Ecology (WDOE)

AREA OF STUDY: Lower Columbia River - Vancouver

SAMPLING MEDIA: Surface sediment (top 2 cm)

POSITIONING SYSTEM: N/A

ASSOCIATED TISSUE DATA: No

REFERENCE SOURCE: Zinner 1990

CONTACT: Lisa Zinner

PHONE: (206) 407-6000 FAX: N/A

SAMPLING PERIOD: January 1990

NUMBER OF STATIONS SAMPLED: 1 station

LOCATIONS OF STATIONS SAMPLED: The sampling location was 60 - 70 feet downstream from ALCOA-Vancouver's outfall diffuser.

TARGET ANALYTES: VOAs, BNAs, metals, pesticides/PCBs and general chemistry.

ANALYTICAL TECHNIQUES: VOA (EPA 8260), BNA (EPA 8270), metals (EPA 200) and pesticides/PCBs (EPA 8080). All results are reported on a dry weight basis.

SAMPLING EQUIPMENT USED: 0.1 m^2 van Veen grab sampler

SAMPLE HANDLING AND PROCESSING: Sample consisted of a composite of six grab samples. The samples were mixed thoroughly and then divided for separate analysis. Samples collected for volatile organics analysis were taken directly from the grab sampler. Samples were kept on ice and shipped to the laboratory.

DATA GAPS: none

ABSTRACT

The objectives of the Aluminum Company of America (Alcoa) Class II Inspection was to verify effluent compliance with NPDES permit (NPDES Permit No. WA-000029-9), determine effluent toxicity using

a suite of bioassays, identify possible chemical pollutants in selected inplant wastewaters, settling lagoon influent and lagoon effluent samples with a priority pollutant scan, assess the impact of the industrial discharge on the receiving water sediments with chemical analysis for priority pollutants and toxicity testing using a *Hyallela* bioassay, review Alcoa laboratory procedures to determine conformance to standard techniques and advance state-of-the-art compliance inspections by contributing to ongoing developmental efforts with centrifugation (Zinner 1990). Samples of water and sediments were taken at each effluent and influent location and upstream and downstream from the facility.

QA/QC EVALUATION - N/A

DATA USE AND COMPARABILITY - Users of these data should be reminded that they were collected in the vicinity of a potential source of industrial pollution.

All data entered in the database were reviewed for data entry errors. All detected errors were corrected.

REFERENCES:

Zinner, L. 1990. Aluminum Company of America (ALCOA) Class II Inspection, January 1990. Washington State Department of Ecology, Environmental Investigations and Laboratory Services Program, Olympia, WA.

APPENDIX E

DATABASE CHEMICAL LIST AND

9-CHARACTER CHEMICAL CODE NAMES

APPENDIX E: DATABASE CHEMICAL LIST AND 9-CHARACTER CHEMICAL CODE NAMES

Chemical group	Chemical	Chemical code
Butyltin	Dibutyltin	DBT
Butyltin	Monobutyltin	MBT
Butyltin	Tributyltin	TBT
Conventionals	AVS	AVS
Conventionals	Ammonia nitrogen	NH3-N
Conventionals	Cyanide	Cyanide
Conventionals	Cyanide, Total	Cyanide_T
Conventionals	Cyanide, weak & diss.	CyanideWD
Conventionals	Fluoride, Total	FluorideT
Conventionals	Inorganic Carbon	CarbonIN
Conventionals	Oil and Grease	OIL_GREAS
Conventionals	Phosphorus	Phosphrs
Conventionals	Sulfide	Sulfide
Conventionals	Sulfur	Sulfur
Conventionals	TKN	TKN
Conventionals	Total Carbon	CarbonTOT
Dioxin/furans	1,2,3,4,6,7,8-HpCDD	HpCDD4678
Dioxin/furans	1,2,3,4,6,7,8-HpCDF	HpCDF4678
Dioxin/furans	1,2,3,4,6,7/1,2,3,4,7,8-HxCDF	HxCDF6778
Dioxin/furans	1,2,3,4,7,8,9-HpCDF	HpCDF4789
Dioxin/furans	1,2,3,4,7,8-HxCDD	HxCDD3478
Dioxin/furans	1,2,3,4,7,8-HxCDF	HxCDF3478
Dioxin/furans	1,2,3,6,7,8-HxCDD	HxCDD3678
Dioxin/furans	1,2,3,6,7,8-HxCDF	HxCDF3678
Dioxin/furans	1,2,3,7,8,9-HxCDD	HxCDD3789
Dioxin/furans	1,2,3,7,8,9-HxCDF	HxCDF3789
Dioxin/furans	1,2,3,7,8-PeCDD	PeCDD2378
Dioxin/furans	1,2,3,7,8-PeCDF	PeCDF2378
Dioxin/furans	1,2,4,7,8-PeCDD	PeCDD2478
Dioxin/furans	2,3,4,6,7,8-HxCDF	HxCDF4678
Dioxin/furans	2,3,4,6,7-PeCDF	PeCDF3467
Dioxin/furans	2,3,4,7,8-PeCDF	PeCDF3478
Dioxin/furans	2,3,6,7-TCDF	TCDF2367
Dioxin/furans	2,3,7,8-TCDD	TCDD2378
Dioxin/furans	2,3,7,8-TCDF	TCDF2378
Dioxin/furans	3,4,6,7-TCDF	TCDF3467
Dioxin/furans	OCDD	OCDD
Dioxin/furans	OCDF	OCDF
Dioxin/furans	TOTAL HpCDD	TOTHpCD
Dioxin/furans	TOTAL HpCDF	TOTHpCF

Chemical group	Chemical	Chemical code
Dioxin/furans	TOTAL HxCDD	TOTHxCD
Dioxin/furans	TOTAL HxCDF	TOTHxCF
Dioxin/furans	TOTAL PeCDD	TOTPeCD
Dioxin/furans	TOTAL PeCDF	TOTPeCF
Dioxin/furans	TOTAL TCDD	TOTTCDD
Dioxin/furans	TOTAL TCDF	TOTTCDF
Guaiacols/Catechols/Phenolics	2-Cyclopenten-1-one,2-methyl	2Cyclo12M
Guaiacols/Catechols/Phenolics	2-Cyclopenten-1-one,3-methyl	2Cyclo13M
Guaiacols/Catechols/Phenolics	3,4,5-Trichlorocatechol	345ClCate
Guaiacols/Catechols/Phenolics	3,4,5-Trichloroguaiacol	345ClGuai
Guaiacols/Catechols/Phenolics	3-Cyclopenten-1-one,2-methyl	3Cyclo12M
Guaiacols/Catechols/Phenolics	3-Cyclopenten-1-one,3-methyl	3Cyclo13M
Guaiacols/Catechols/Phenolics	4,5,6-Trichloroguaiacol	456ClGuai
Guaiacols/Catechols/Phenolics	4,5-Dichlorocatechol	45CLCATE
Guaiacols/Catechols/Phenolics	4,5-Dichloroguaiacol	45ClGuai
Guaiacols/Catechols/Phenolics	4-Allylguaiacol (eugenol)	4AlGuai
Guaiacols/Catechols/Phenolics	4-Chlorocatechol	4ClCate
Guaiacols/Catechols/Phenolics	4-Chloroguaiacol	4ClGuai
Guaiacols/Catechols/Phenolics	4-Propenylguaiacol	4ProGuai
Guaiacols/Catechols/Phenolics	5,6-Dichlorovanillin	56ClVani
Guaiacols/Catechols/Phenolics	6-Chlorovanillin	6ClVani
Guaiacols/Catechols/Phenolics	Ethanone, 1-phenyl-	1PhenEth
Guaiacols/Catechols/Phenolics	Guaiacol (2-methoxyphenol)	Guaiacol
Guaiacols/Catechols/Phenolics	Tetrachlorocatechol	TetClCate
Guaiacols/Catechols/Phenolics	Tetrachloroguaiacol	TetClGuai
Guaiacols/Catechols/Phenolics	Trichlorosyringol	TriClSyri
Guaiacols/Catechols/Phenolics	Trichlorotrimethoxybenzene	TriClTMBZ
Guaiacols/Catechols/Phenolics	a-Terpineol	TerpinolA
Guaiacols/Catechols/Phenolics	o-Chlorophenol	ClPhenolO
Metal	Aluminum	Al
Metal	Antimony	Sb
Metal	Arsenic	As
Metal	Barium	Ba
Metal	Beryllium	Be
Metal	Cadmium	Cd
Metal	Calcium	Ca
Metal	Chromium	Cr
Metal	Cobalt	Co
Metal	Copper	Cu
Metal	Iron	Fe
Metal	Lead	Pb
Metal	Magnesium	Mg

Chemical group	Chemical	Chemical code
Metal	Manganese	Mn
Metal	Mercury	Hg
Metal	Nickel	Ni
Metal	Potassium	K
Metal	Selenium	Se
Metal	Silver	Ag
Metal	Sodium	Na
Metal	Thallium	Tl
Metal	Tin	Sn
Metal	Vanadium	V
Metal	Zinc	Zn
Metals	Aluminum	Al
Metals	Antimony	Sb
Metals	Arsenic	As
Metals	Barium	Ba
Metals	Beryllium	Be
Metals	Boron	Bo
Metals	Cadmium	Cd
Metals	Cadmium (flm)	Cd(flm)
Metals	Cadmium (frn)	Cd(frn)
Metals	Calcium	Ca
Metals	Cesium	Cs
Metals	Chromium	Cr
Metals	Cobalt	Co
Metals	Copper	Cu
Metals	Europium	Eu
Metals	Gallium	Ga
Metals	Iron	Fe
Metals	Lanthanum	La
Metals	Lead	Pb
Metals	Lithium	Li
Metals	Magnesium	Mg
Metals	Manganese	Mn
Metals	Mercury	Hg
Metals	Molybdenum	Mo
Metals	Neodymium	Nd
Metals	Nickel	Ni
Metals	Niobium	Nb
Metals	Potassium	K
Metals	Scandium	Sc
Metals	Selenium	Se
Metals	Silicon	Si

Chemical group	Chemical	Chemical code
Metals	Silver	Ag
Metals	Sodium	Na
Metals	Strontium	Sr
Metals	Thallium	Tl
Metals	Thorium	Th
Metals	Tin	Sn
Metals	Titanium	Ti
Metals	Uranium	U
Metals	Vanadium	V
Metals	Ytterbium	Yb
Metals	Yttrium	Y
Metals	Zinc	Zn
N/A	DDM4	DDM4
Organic halogens	EOX	EOX
PCBs	Aroclor 1016	PCB1016
PCBs	Aroclor 1221	PCB1221
PCBs	Aroclor 1232	PCB1232
PCBs	Aroclor 1242	PCB1242
PCBs	Aroclor 1242/1016	P12421016
PCBs	Aroclor 1248	PCB1248
PCBs	Aroclor 1254	PCB1254
PCBs	Aroclor 1260	PCB1260
PCBs	Decachloro PCBs	DecaPCBs
PCBs	Dichloro PCBs	DiPCBs
PCBs	Heptachloro PCBs	HepPCBs
PCBs	Hexachloro PCBs	HexPCBs
PCBs	Monochloro PCBs	MonoPCBs
PCBs	Nonachloro PCBs	NonaPCBs
PCBs	Octachloro PCBs	OctaPCBs
PCBs	PCB 001	PCB001
PCBs	PCB 002	PCB002
PCBs	PCB 003	PCB003
PCBs	PCB 004	PCB004
PCBs	PCB 005	PCB005
PCBs	PCB 008	PCB008
PCBs	PCB 018	PCB018
PCBs	PCB 028	PCB028
PCBs	PCB 044	PCB044
PCBs	PCB 052	PCB052
PCBs	PCB 066	PCB066
PCBs	PCB 077	PCB077
PCBs	PCB 101	PCB101

Chemical group	Chemical	Chemical code
PCBs	PCB 105	PCB105
PCBs	PCB 118	PCB118
PCBs	PCB 126	PCB126
PCBs	PCB 128	PCB128
PCBs	PCB 138	PCB138
PCBs	PCB 153	PCB153
PCBs	PCB 169	PCB169
PCBs	PCB 170	PCB170
PCBs	PCB 180	PCB180
PCBs	PCB 187	PCB187
PCBs	PCB 195	PCB195
PCBs	PCB 206	PCB206
PCBs	PCB 209	PCB209
PCBs	Pentachloro PCBs	PentPCBs
PCBs	TOTAL PCBs	TOTPCBs
PCBs	Tetrachloro PCBs	TetraPCBs
PCBs	Trichloro PCBs	TriPCBs
Pesticide (Dinitroanilines)	Isopropalin	Isopropln
Pesticide (Dinitroanilines)	Trifluralin	Triflurln
Pesticide (Organochlorines)	Aldrin	Aldrin
Pesticide (Organochlorines)	Chlordane	Chlordane
Pesticide (Organochlorines)	Chlordane (tech)	Chlordane
Pesticide (Organochlorines)	Dacthal	Dacthal
Pesticide (Organochlorines)	Dicofol	Dicofol
Pesticide (Organochlorines)	Dieldrin	Dieldrin
Pesticide (Organochlorines)	Endosulfan	Endoslfn
Pesticide (Organochlorines)	Endosulfan I	Endoslfn1
Pesticide (Organochlorines)	Endosulfan II	Endoslfn2
Pesticide (Organochlorines)	Endosulfan sulfate	EndoslfnS
Pesticide (Organochlorines)	Endrin	Endrin
Pesticide (Organochlorines)	Endrin aldehyde	Endrin-al
Pesticide (Organochlorines)	Endrin ketone	Endrin-ke
Pesticide (Organochlorines)	Heptachlor	Heptachl
Pesticide (Organochlorines)	Heptachlor epoxide	Heptacle
Pesticide (Organochlorines)	Hexachlorobenzene	Hexclbnz
Pesticide (Organochlorines)	Kepone	Kepone
Pesticide (Organochlorines)	Lindane	BHC-gamma
Pesticide (Organochlorines)	Methoxychlor	Methoxycl
Pesticide (Organochlorines)	Mirex	Mirex
Pesticide (Organochlorines)	Nitrofen	Nitrofen
Pesticide (Organochlorines)	Oxychlordane	Oxychldn
Pesticide (Organochlorines)	PCN	PCN

Chemical group	Chemical	Chemical code
Pesticide (Organochlorines)	Pentachloroanisole	Pntclanis
Pesticide (Organochlorines)	Pentachloronitrobenzene	Pencinbnz
Pesticide (Organochlorines)	Pentachlorophenol	Penclphen
Pesticide (Organochlorines)	Perthane	Perthane
Pesticide (Organochlorines)	TOTAL BHC	TOTBHC
Pesticide (Organochlorines)	TOTAL DDD	TOTDDD
Pesticide (Organochlorines)	TOTAL DDE	TOTDDE
Pesticide (Organochlorines)	TOTAL DDT	TOTDDT
Pesticide (Organochlorines)	Total Chlordane	Chlordane
Pesticide (Organochlorines)	Toxaphene	Toxaphene
Pesticide (Organochlorines)	alpha-BHC	BHC-alpha
Pesticide (Organochlorines)	alpha-Chlordane	Chldane-a
Pesticide (Organochlorines)	alpha-Endosulfan	EndoslfnA
Pesticide (Organochlorines)	beta-BHC	BHC-beta
Pesticide (Organochlorines)	beta-Endosulfan	EndoslfnB
Pesticide (Organochlorines)	cis-Chlordane	CldaneCis
Pesticide (Organochlorines)	cis-Nonachlor	Non-cis
Pesticide (Organochlorines)	delta-BHC	BHC-delta
Pesticide (Organochlorines)	gamma-BHC	BHC-gamma
Pesticide (Organochlorines)	gamma-Chlordane	Chldane-g
Pesticide (Organochlorines)	o,p'-DDD	DDD-op'
Pesticide (Organochlorines)	o,p'-DDE	DDE-op'
Pesticide (Organochlorines)	o,p'-DDT	DDT-op'
Pesticide (Organochlorines)	p,p'-DDD	DDD-pp'
Pesticide (Organochlorines)	p,p'-DDD-ole	DDD-pp'
Pesticide (Organochlorines)	p,p'-DDE	DDE-pp'
Pesticide (Organochlorines)	p,p'-DDT	DDT-pp'
Pesticide (Organochlorines)	p,p'-Methoxychlor	MtoxyclPP
Pesticide (Organochlorines)	tetra-Nonachlor	Non-tetra
Pesticide (Organochlorines)	trans-Nonachlor	Non-trans
Pesticide (Organophosphorus)	Chlorpyrifos	Chlpyrfos
Pesticide (Organophosphorus)	Malathion	Malathion
Pesticide (Organophosphorus)	Methyl parathion	Metparath
Pesticide (Organophosphorus)	Parathion	Parathion
Radionuclide	Americium 241	Am-241
Radionuclide	Cesium 137	Cs-137
Radionuclide	Cobalt 60	Co-60
Radionuclide	Europium 152	Eu-152
Radionuclide	Europium 154	Eu-154
Radionuclide	Europium 155	Eu-155
Radionuclide	Plutonium 238	Pu-238
Radionuclide	Plutonium 239/240	Pu239/240

Chemical group	Chemical	Chemical code
Resin/Fatty Acids	1,2-Chlorodehydroabietic acid	12ClDehya
Resin/Fatty Acids	1,4-Chlorodehydroabietic acid	14Dehya
Resin/Fatty Acids	9,10-Dichlorosteric acid	9-10ClSta
Resin/Fatty Acids	Abietic acid	Abietic
Resin/Fatty Acids	Dehydroabietic acid	Dehyabiet
Resin/Fatty Acids	Dichlorodehydroabietic acid	DiClDehya
Resin/Fatty Acids	Dichlorostearic acid	DiClStear
Resin/Fatty Acids	Eicosatrienoic acid	Eicosatri
Resin/Fatty Acids	Hexadecanoic acid	Hexadecan
Resin/Fatty Acids	Isopimaric acid	Isopimar
Resin/Fatty Acids	Levopimaric acid	Levopimar
Resin/Fatty Acids	Linoleic acid	Linoleic
Resin/Fatty Acids	Neoabietic acid	Neoabieti
Resin/Fatty Acids	Octadecanoic acid	Octadecan
Resin/Fatty Acids	Oleic acid	Oleic
Resin/Fatty Acids	Palmitoleic acid	Palmitole
Resin/Fatty Acids	Palustric acid	Palustric
Resin/Fatty Acids	Pimaric acid	Pimaric
Resin/Fatty Acids	Sandaracopimaric acid	Sandaraco
Resin/Fatty Acids	TOTAL Resin acids	TOTResinA
Semi-volatile	1,2,3,4-Tetrachlorobenzene	1234ClBnz
Semi-volatile	1,2,3,5-Tetrachlorobenzene	1235ClBnz
Semi-volatile	1,2,3-Trichlorobenzene	123ClBnz
Semi-volatile	1,2,4,5-Tetrachlorobenzene	1245ClBnz
Semi-volatile	1,2,4-Trichlorobenzene	124ClBnz
Semi-volatile	1,2,4-Trimethylbenzene	124MBnz
Semi-volatile	1,2-Dichlorobenzene	12ClBnz
Semi-volatile	1,3,5-Trichlorobenzene	135ClBnz
Semi-volatile	1,3,5-Trimethylbenzene	135MBnz
Semi-volatile	1,3-Dichlorobenzene	13ClBnz
Semi-volatile	1,4-Dichlorobenzene	14ClBnz
Semi-volatile	2,2,4-Trimethylpentane	224MPent
Semi-volatile	2,2-Dichloropropane	22ClProp
Semi-volatile	2,3,4-Trichlorophenol	234ClPhen
Semi-volatile	2,3,6-Trichlorophenol	236ClPhen
Semi-volatile	2,4,5-Trichlorophenol	145ClPhen
Semi-volatile	2,4,6-Trichlorophenol	246ClPhen
Semi-volatile	2,4-Dichlorophenol	14ClPhen
Semi-volatile	2,4-Dimethylphenol	14MPhen
Semi-volatile	2,4-Dinitrophenol	14NPhen
Semi-volatile	2,4-Dinitrotoluene	24NTolue
Semi-volatile	2,6-Dimethylnaphthalene	26MetNpht

Chemical group	Chemical	Chemical code
Semi-volatile	2,6-Dinitrotoluene	26NToluen
Semi-volatile	2-Chlorophenol	2ClPhen
Semi-volatile	2-Cyclohexen-1-one,3,5,5-t	2Hexanone
Semi-volatile	2-Methyl-4,6-dinitrophenol	2M46NPhen
Semi-volatile	2-Methylphenol	2MPhen
Semi-volatile	2-Nitroaniline	2NAniline
Semi-volatile	2-Nitrophenol	2NPhen
Semi-volatile	3,3'-Dichlorobenzidine	33'ClBnzd
Semi-volatile	3-Nitroaniline	3NAniline
Semi-volatile	4,6-Dinitro-2-methylphenol	46N2MPhen
Semi-volatile	4-Bromophenyl phenyl ether	4BPhenEth
Semi-volatile	4-Chloro-3-methylphenol	4Cl3MPhen
Semi-volatile	4-Chloroaniline	4ClAnilin
Semi-volatile	4-Chlorophenylphenylether	4ClPhenEt
Semi-volatile	4-Methylphenol	4MPhen
Semi-volatile	4-Nitroaniline	4NAniline
Semi-volatile	4-Nitrophenol	4NPhen
Semi-volatile	Acridine	Acridine
Semi-volatile	Aniline	Aniline
Semi-volatile	Azulene	Azulene
Semi-volatile	Benzidine	Benzidine
Semi-volatile	Benzoic acid	Benzoacid
Semi-volatile	Benzyl Alcohol	Benzalcoh
Semi-volatile	Biphenyl	Biphenyl
Semi-volatile	Bis(2-chloroethoxy)methane	2ClEthMet
Semi-volatile	Bis(2-chloroethyl)ether	2ClEthEth
Semi-volatile	Bis(2-chloroisopropyl)ether	2ClIsoEth
Semi-volatile	Bis(2-chloroisopropyl)ether	2ClIsoEth
Semi-volatile	Bis(2-ethylhexyl)phthalate	2EthHexPh
Semi-volatile	Butyl benzyl phthalate	ButBenzPh
Semi-volatile	Carbazole	Carbazole
Semi-volatile	Di-n-butylphthalate	2nButphth
Semi-volatile	Di-n-octylphthalate	2nOctphth
Semi-volatile	Dibenzofuran	DiBenzFur
Semi-volatile	Dibromochlorophenol	DiBrClPhn
Semi-volatile	Dibutylphthalate	DiButPhth
Semi-volatile	Diethyl phthalate	DiEthPhth
Semi-volatile	Dimethyl phthalate	DiMetPhth
Semi-volatile	Diphenyl Disulfide	DiPhenDiS
Semi-volatile	Hexachlorobutadiene	HexClButa
Semi-volatile	Hexachlorocyclopentadiene	HexClCycp
Semi-volatile	Hexachloroethane	HexClEtha

Chemical group	Chemical	Chemical code
Semi-volatile	Hydrazine, 1,2-Diphenyl-	Hydrzin12
Semi-volatile	Isophorone	Isophoron
Semi-volatile	N-Butyl benzyl phthalate	NButBnzPh
Semi-volatile	N-Nitroso-di-n-propylamine	Nitro2Pro
Semi-volatile	N-Nitroso-di-n-propylamine	Nitro2Pro
Semi-volatile	N-Nitrosodimethylamine	Nitro2Met
Semi-volatile	N-Nitrosodiphenylamine	Nitro2Phe
Semi-volatile	Nitrobenzene	NBnz
Semi-volatile	Octachlorostyrene	OctClSty
Semi-volatile	Pentachlorobenzene	PentClBnz
Semi-volatile	Phenol	Phenol
Semi-volatile	Pyridine	Pyridine
Semi-volatile (PAH)	1,2,5,6-Dibenzoanthracene	1256BnzAn
Semi-volatile (PAH)	1,2-Benzanthracene	12BnzAnth
Semi-volatile (PAH)	1,6,7-Trimethylnaphthalene	167MNphth
Semi-volatile (PAH)	1-Methylnaphthalene	1MetNphth
Semi-volatile (PAH)	1-Methylphenanthrene	1MetPhena
Semi-volatile (PAH)	2-Chloronaphthalene	2ClNaphth
Semi-volatile (PAH)	2-Methylnaphthalene	2MetNpht
Semi-volatile (PAH)	Acenaphthene	Acenaphen
Semi-volatile (PAH)	Acenaphthylene	Acenaphyl
Semi-volatile (PAH)	Anthracene	Anthracen
Semi-volatile (PAH)	Benz[a]anthracene	BnzaAnth
Semi-volatile (PAH)	Benzo[a]pyrene	BnzaPyren
Semi-volatile (PAH)	Benzo[b,k]fluoranthene	BnzbkFluo
Semi-volatile (PAH)	Benzo[b]fluoranthene	BnzbFluor
Semi-volatile (PAH)	Benzo[e]pyrene	BnzePyren
Semi-volatile (PAH)	Benzo[g,h,i]perylene	BnzghiPry
Semi-volatile (PAH)	Benzo[k]fluoranthene	BnzkFluor
Semi-volatile (PAH)	Chrysene	Chrysene
Semi-volatile (PAH)	Dibenz[a,h]anthracene	BnzahAnth
Semi-volatile (PAH)	Dibenzothiophene	BnzThioph
Semi-volatile (PAH)	Fluoranthene	Fluoranth
Semi-volatile (PAH)	Fluorene	Fluorene
Semi-volatile (PAH)	Indeno[1,2,3-cd]pyrene	Id123Pyrn
Semi-volatile (PAH)	Naphthalene	Naphthaln
Semi-volatile (PAH)	Naphthalene, 1-methyl	Naph1met
Semi-volatile (PAH)	Naphthalene, 2-methyl	Naph2met
Semi-volatile (PAH)	Perylene	Perylene
Semi-volatile (PAH)	Phenanthrene	Phenanthr
Semi-volatile (PAH)	Phenanthrene, 1-methyl-7-(1	Phnan1met
Semi-volatile (PAH)	Pyrene	Pyrene

Chemical group	Chemical	Chemical code
Semi-volatile (PAH)	Retene	Retene
Semi-volatile (PAH)	TOTAL PAHs	TOTPAH
Volatiles	1,1,1,2-Tetrachloroethane	1112ClEth
Volatiles	1,1,1-Trichloroethane	111ClEtha
Volatiles	1,1,2,2-Tetrachloroethane	1122ClEth
Volatiles	1,1,2-Trichloroethane	112ClEtha
Volatiles	1,1-Dichloroethane	11ClEtha
Volatiles	1,1-Dichloroethene	11ClEthe
Volatiles	1,1-Dichloropropene	11ClPrope
Volatiles	1,2,3-Trichloropropane	123ClProp
Volatiles	1,2-Dibromoethane	12BrMet
Volatiles	1,2-Dichlorobenzene	12ClBnz
Volatiles	1,2-Dichlorobenzene	12ClBnz
Volatiles	1,2-Dichloroethane	12ClEtha
Volatiles	1,2-Dichloroethene	12ClEthe
Volatiles	1,2-Dichloropropane	12ClPropa
Volatiles	1,3-Dichlorobenzene	13ClBnz
Volatiles	1,3-Dichlorobenzene	13ClBnz
Volatiles	1,3-Dichloropropane	13ClPropa
Volatiles	1,4-Dichlorobenzene	14ClBnz
Volatiles	1,4-Dichlorobenzene	14ClBnz
Volatiles	2-Butanone (MEK)	2But(MEK)
Volatiles	2-Chloroethylvinylether	2ClEtViEt
Volatiles	2-Chlorotoluene	2ClToluen
Volatiles	2-Hexanone (MBK)	2Hex(MBK)
Volatiles	4-Chlorotoluene	4ClToluen
Volatiles	4-Methyl-2-pentanone	4M2Pntone
Volatiles	Acetone	Acetone
Volatiles	Benzene	Benzene
Volatiles	Bromobenzene	BrBenzene
Volatiles	Bromochloromethane	BrClMeth
Volatiles	Bromodichloromethane	Br2ClMeth
Volatiles	Bromoform	Bromoform
Volatiles	Bromomethane	BrMethane
Volatiles	Butylbenzene	ButBBnz
Volatiles	Carbon Disulfide	CarbonDiS
Volatiles	Carbon Tetrachloride	CarbonTet
Volatiles	Chlorobenzene	ClBenzene
Volatiles	Chloroethane	ClEthane
Volatiles	Chloroform	Cloroform
Volatiles	Chloromethane	ClMethane
Volatiles	Dibromochloromethane	DiBrClMet

Chemical group	Chemical	Chemical code
Volatiles	Dibromomethane	DiBrMeth
Volatiles	Dichlorodifluoromethane	DiClFlMet
Volatiles	Dichloroethane	DiClEth
Volatiles	Ethyl benzene	EthBnz
Volatiles	Formaldehyde	Formldehy
Volatiles	Freon 113	Freon113
Volatiles	Isopropylbenzene (cumene)	IsoProBnz
Volatiles	Methylene chloride	MetCl
Volatiles	Propylbenzene	PropBnz
Volatiles	Styrene	Syrene
Volatiles	TOTAL Xylenes	TOTXylene
Volatiles	Tetrachloroethene	TetClEth
Volatiles	Toluene	Toluene
Volatiles	Trichloroethane	TriClEtha
Volatiles	Trichloroethene	TriClEthe
Volatiles	Trichlorofluoromethane	TriClFlMe
Volatiles	Vinyl acetate	VinAcetat
Volatiles	Vinyl chloride	VinChlori
Volatiles	cis-1,2-Dichloroethane	12ClEthaC
Volatiles	cis-1,2-Dichloroethene	12ClEtheC
Volatiles	cis-1,2-Dichloropropene	12ClProeC
Volatiles	cis-1,3-Dichloropropene	14ClProeC
Volatiles	m,p-Xylene	Xylene_MP
Volatiles	o-Xylene	Xylene_O
Volatiles	p-Chloro-m-cresol	PClMCres
Volatiles	p-Isopropyltoluene	IsoProTol
Volatiles	sec-Butylbenzene	ButBnzSec
Volatiles	tert-Butylbenzene	ButBnzTer
Volatiles	trans-1,2-Dichloroethane	12ClEthaT
Volatiles	trans-1,2-Dichloroethene	12ClEtheT
Volatiles	trans-1,2-Dichloropropene	12ClProeT
Volatiles	trans-1,3-Dichloropropane	13ClProaT
Volatiles	trans-1,3-Dichloropropene	13ClProeT