Water Body No. WA-55-1010
(Segment No. 24-54-01)

WASHINGTON STATE DEPARTMENT OF ECOLOGY
ENVIRONMENTAL INVESTIGATIONS AND LABORATORY SERVICES PROGRAM
TOXICS INVESTIGATIONS/GROUND WATER MONITORING SECTION

TECHNICAL MEMORANDUM

January 25, 1990

TO: Mike Blum

THROUGH: Bill Yake

FROM: Art Johnson

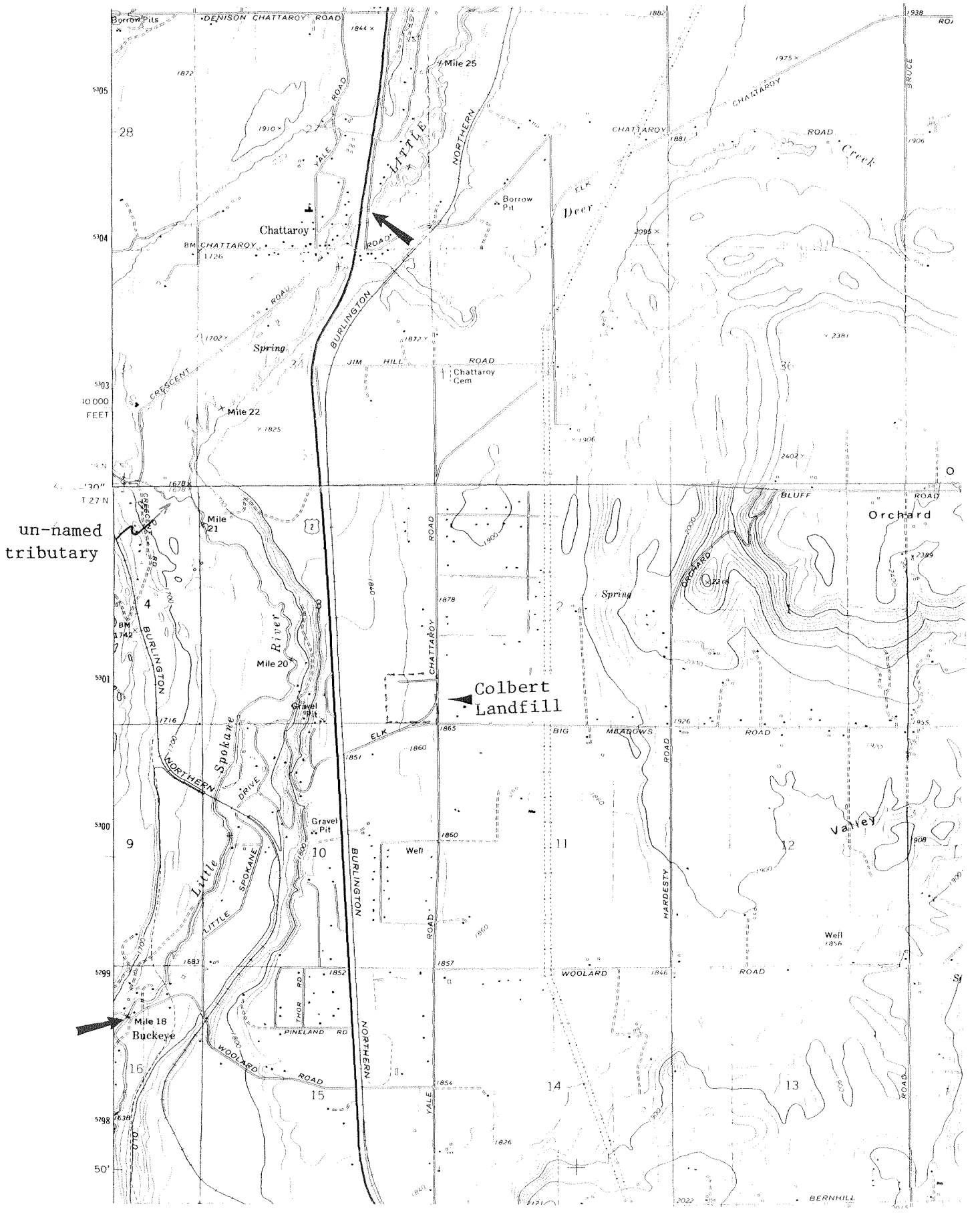
SUBJECT: Survey for Volatiles in the Little Spokane River

In response to your request, I conducted a brief survey of water quality in the Little Spokane River in the vicinity of the Colbert Landfill on September 12-13, 1989. The primary objective was to determine if the solvent-contaminated ground water plume beneath the landfill had reached the river. A secondary objective was to obtain general water quality data on this reach of the river.

Water samples were collected at Chattaroy just upstream of Highway 2 at the Eastern Washington University streamflow gaging station (river mile 23) and at the Woolard Road bridge (river mile 18). The Woolard bridge is approximately 1.5 miles downstream from Colbert Landfill (see figure).

Three grab samples were collected from center river at both sites over an 18-hour period. Sample containers for analysis of volatiles were standard 40 ml glass vials with teflon septa (I-Chem Series 300, Hayward CA) filled leaving no head space. A transfer blank was prepared in the field at the Woolard site; a transport blank was also carried through the survey. Samples were kept on ice and transported to the Ecology Manchester Laboratory on September 14. Volatiles were analyzed at Manchester by EPA Method 624 within 12 to 13 days of collection. Sampling and analysis methods for other water quality variables followed standard Ecology procedures described in Huntamer and Smith (1989).

River flow during the survey, based on gage heights at Chattaroy, ranged from 77.2 to 80.0 cfs (data provided by Greg Baca, Spokane Community College). Flow in the Little Spokane at the USGS Dartford gage (r.m. 11.4) was 109 cfs during the same period (data provided by Michael Boatsman, Ecology Eastern Regional Office). The 7-day, 10-year low flow for the Little Spokane at Dartford is 92 cfs; the 40-year average is 312 cfs (USGS, 1985).



SAMPLING STATIONS (→)

Results of analysis for volatiles showed a trace of 1,1,1-trichloroethane, the predominant ground water contaminant at Colbert, was present in all samples collected at Woolard bridge (Table 1). Concentrations were below the quantitation limit of the instrument and were estimated to be 2 ug/L. This concentration represents a load of approximately 0.8 lbs/ day going into the river--assuming complete mixing and ignoring losses through volatilization. There was no evidence of trichloroethane in the Little Spokane upstream of the fill. In the opinion of the analyst, Greg Perez, a conservative estimate of the highest trichloroethane concentration that could have been present in the Chattaroy samples and escape detection is on the order of 0.5 ug/L.

The only other volatile compound detected during the survey was 2 ug/L of methylene chloride in the transport blank. The complete data set for the survey, including recoveries of matrix spikes and surrogates, is attached.

Table 2 summarizes the remaining water quality data. The river was within Class AA - A standards for temperature, dissolved oxygen, pH, and turbidity. Although a number of constituents showed elevated concentrations at Woolard relative to Chattaroy, changes of this magnitude occur in many rivers and cannot, based on these data, be attributed to the Colbert plume. Chloride concentrations at both sampling sites appeared to decrease over the course of the survey; other constituents remained relatively unchanged.

Nitrite/nitrate concentrations were much higher at Woolard than Chattaroy (average of 0.88 vs. 0.18 mg/L). Preliminary results from samples collected on December 12, 1989, (described below) suggest an un-named, right bank (facing downstream) tributary at approximately river mile 21.1 is a major nitrogen source to this reach of the river. This tributary is identified on the accompanying figure.

Two potentially toxic metals were analyzed: cadmium, in light of its detection in the Colbert plume, and mercury because Ecology ambient monitoring data show elevated concentrations at the mouth of the Little Spokane. Neither metal was present in detectable amounts during the present survey.

As you know, detection of trichloroethane in the Little Spokane was the impetus for the above-mentioned December 12 survey, designed to determine where the plume was entering the river. Samples for analysis of volatiles, specific conductance, chloride, and nitrite/nitrate were collected along a ten-station transect between Woolard bridge and Chattaroy. Samples were also collected from Sterling Spring (left bank, west of Colbert Landfill) and the river mile 21.1 tributary. More sensitive analytical methods are being employed on these samples in an effort to better quantify trichloroethane concentrations and detect other volatile compounds of concern. Chemical analyses should be completed by the end of January.

REFERENCES:

Huntamer, D. and C. Smith. 1989. Lab User's Manual. Wash. Dept. Ecology, Manchester Laboratory.

USGS. 1985. Streamflow Statistics and Drainage Basin Characteristics of the Southwestern and Western Regions, Washington. Volume II. Open-file Report 84-145-B.

BY:AJ/sk
Attachments

cc: Carl Neuchterlein
Claude Sappington
Michael Boatsman
Dick Cunningham
Steve Twiss
Steve Hunter

Table 1. 1,1,1-Trichloroethane concentrations in the Little Spokane River above and below Colbert Landfill, September 1989.

Location	Date	Time	Sample No. (37-)	1,1,1-Trichloroethane (ug/L)
Chattaroy above Highway 2 Bridge	Sept 12	1430	8135	5 U
	Sept 12	1815	8133	5 U
	Sept 13	0755	8134	5 U
Woolard Road Bridge	Sept 12	1545	8130	2 J
			8130*	2 J
	Sept 12	1845	8131	2 J
	Sept 13	0830	8132	2 J
Transfer Blank	Sept 12	1615	8136	5 U
Transport Blank	--	--	8137	5 U
Method Blank	--	--	--	5 U

U = not detected; value shown is quantitation limit
J = estimated value
* = duplicate analysis

Table 2. Other water quality data for the Little Spokane River above and below Colbert Landfill, September 1989.

Location:	Chattaroy above Highway 2 Bridge			Woolard Road Bridge		
Date:	Sept 12	Sept 12	Sept 13	Sept 12	Sept 12	Sept 13
Time:	1430	1815	0755	1545	1845	0830
Sample No. (37-):	8135	8133	8134	8130	8131	8132
Flow (cfs)	80.0	78.6	77.2	--	--	--
Temperature (°C)	14.6	15.3	12.0	14.4	14.5	10.6
pH (S.U.)	8.3	8.4	7.9	8.3/8.3*	8.2	8.0
Dissolved Oxygen (mg/L)	10.6	10.8	8.0	10.1	9.2	9.2
Spec. Conductivity (umhos/cm)	179	167	185	232/233*	223	233
Total Suspended Solids (mg/L)	1	1 U	2	1/1 U*	1	2
Turbidity (NTU)	1.2	1.6	0.9	1.0/0.9*	1.1	1.3
Total Hardness (mg/L)	98	97	100	129/129*	128	125
Chloride (mg/L)	3.21	1.63	1.56	3.61	2.56	1.94/1.93*
Nitrite/Nitrate (mg/L)	0.18	0.17	0.18	0.88/0.88*	0.87	0.90
Sulfate (mg/L)	4.88	4.76	4.85	6.61	6.60	6.59/6.60*
Silica (mg/L)	16.9/15.9*	16.0	16.5	19.3	19.2	19.0
Total Alkalinity (mg/L)	94	92	94	116/115*	115	115
Calcium (mg/L)	27.4	26.8	26.9	34.6/34.5*	34.2	34.0
Mangesium (mg/L)	5.74	5.67	5.72	7.50/7.48*	7.32	7.27
Sodium (mg/L)	4.77	4.74	4.74	5.72/5.71*	5.58	5.58
Potassium (mg/L)	1.9	1.7	1.8	2.0/2.1*	2.1	2.1
Mercury (ug/L)	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U
Cadmium (ug/L)	0.20 U	0.20 U	0.20 U	0.20U/0.20U*	0.20 U	0.20 U
Iron (ug/L)	54.9	66.4	67.2	55.6/58.0*	67.2	67.9
Manganese (ug/L)	9.1	9.1	11.1	13.7/13.7*	14.3	16.3

Note: Metals are total recoverable
* = duplicate analysis
U - not detected at detection limit shown

Washington State Department of Ecology
Sample/Project Analysis Results

Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES) Officer: AFJ Account: D3400

Laboratory: Ecology, Manchester

Sample No: 89 378130 Description: WOOLARD Source: Ambient Stream/River

Begin Date: 89/09/12 :

Gen Inorg/Phys-Speci		Water-Total Result	Units
Cond@25C	Meter	232 *	umho/cm
pH LAB	Meter	8.3 *	Std Unts
Alk-Tot	CaCO3	116 *	mg/l
Alk-HCO3	CaCO3	116 *	mg/l
Alk-CO3	CaCO3	1U	mg/l
Hard-Tot	CaCO3	129 *	mg/l
Silica	Total	19.3 *	mg/l
Turbidty	Meter	1.0 *	NTU

Solids - Specified		Water-Total Result	Units
Solids	T-Suspen	1 *	mg/l

Nutrients - Specifie		Water-Total Result	Units
NO2NO3-N	Total	0.88 *	mg/l

Metals - Total Recov		Water-Total Result	Units
Cadmium	Tot-Rec	0.20U	ug/l
Mercury	Tot-Rec	.06U	ug/l

Metals - Total Recov Matrix Spike #1		Water-Total Result	Units
Cadmium	Tot-Rec	112	% Recov

Metals - Total Recov Matrix Spike #2		Water-Total Result	Units
Cadmium	Tot-Rec	109	% Recov

Metals - Total Recov Duplicate #1		Water-Total Result	Units
Cadmium	Tot-Rec	0.20U	ug/l

Metals - Total Recov		Water-Total Result	Units
Calcium	Tot-Rec	34.5 *	mg/l
Mgnsium	Tot-Rec	7.48 *	mg/l
Sodium	Tot-Rec	5.71 *	mg/l
Potssium	Tot-Rec	2.1 *	mg/l
Iron	Tot-Rec	58.0 *	ug/l
Mangnese	Tot-Rec	13.7 *	ug/l

Metals - Total Recov Matrix Spike #1		Water-Total Result	Units
Calcium	Tot-Rec	90	% Recov
Mgnsium	Tot-Rec	87	% Recov
Sodium	Tot-Rec	101	% Recov
Potssium	Tot-Rec	100	% Recov
Iron	Tot-Rec	97	% Recov
Mangnese	Tot Rec	96	% Recov

Metals - Total Recov Matrix Spike #2		Water-Total Result	Units
Calcium	Tot-Rec	95	% Recov
Mgnsium	Tot-Rec	88	% Recov
Sodium	Tot-Rec	102	% Recov
Potssium	Tot-Rec	95	% Recov
Iron	Tot-Rec	98	% Recov
Mangnese	Tot-Rec	97	% Recov

Metals - Total Recov Duplicate #1		Water-Total Result	Units
Calcium	Tot-Rec	34.6 *	mg/l
Mgnsium	Tot-Rec	7.50 *	mg/l
Sodium	Tot-Rec	5.72 *	mg/l
Potssium	Tot-Rec	2.0 *	mg/l
Iron	Tot-Rec	55.6 *	ug/l
Mangnese	Tot-Rec	13.7 *	ug/l

VOA - PP Scan (GCMS)	Water-Total Result	Units
Carbon Tetrachloride	5U	ug/l
Acetone	10U	ug/l
Chloroform	5U	ug/l
Benzene	5U	ug/l
1,1,1-Trichloroethane	2J*	ug/l
Bromomethane	10U	ug/l
Chloromethane	10U	ug/l
Dibromomethane	5U	ug/l
Bromochloromethane	5U	ug/l
Chloroethane	10U	ug/l
Vinyl Chloride	10U	ug/l
Methylene Chloride	5U	ug/l
Carbon Disulfide	5U	ug/l
Bromoform	5U	ug/l
Bromodichloromethane	5U	ug/l
1,1-Dichloroethane	5U	ug/l
1,1-Dichloroethene	5U	ug/l
Trichlorofluoromethane	5U	ug/l
Methane, Dichlorodiflu+	10U	ug/l
1,2-Dichloropropane	5U	ug/l
2-Butanone	10U	ug/l
1,1,2-Trichloroethane	5U	ug/l
Trichloroethene	5U	ug/l
ETHANE, 1,1,2,2-TETRAC+	5U	ug/l
1,2,3-Trichlorobenzene	5U	ug/l
Hexachlorobutadiene	5U	ug/l
Naphthalene	5U	ug/l
Total Xylenes	5U	ug/l
2-Chlorotoluene	5U	ug/l
1,2-Dichlorobenzene	5U	ug/l
1,2,4-Trimethylbenzene	5U	ug/l
DBCP	5U	ug/l
1,2,3-Trichloropropane	5U	ug/l
Tert-Butylbenzene	5U	ug/l
Isopropylbenzene (Cumo+	5U	ug/l
p-Isopropyltoluene	5U	ug/l
BENZENE, ETHYL-	5U	ug/l
BENZENE, ETHENYL-	5U	ug/l
BENZENE, PROPYL-	5U	ug/l
Butylbenzene	5U	ug/l
4-Chlorotoluene	5U	ug/l
1,4-Dichlorobenzene	5U	ug/l
1,2-Dibromoethane (EDB)	10U	ug/l
1,2-Dichloroethane	5U	ug/l
Vinyl Acetate	10U	ug/l

(Continued on next page)

Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES)

Officer: AFJ Account: D3400

Laboratory: Ecology, Manchester

Sample No: 89 378130 Description: WOOLARD Source: Ambient Stream/River

Begin Date: 89/09/12 :

VOA - PP Scan (GCMS) *** Continued ***	Water-Total Result	Units
4-Methyl-2-Pentanone	10U	ug/l
1,3,5-Trimethylbenzene	5U	ug/l
Bromobenzene	5U	ug/l
Toluene	5U	ug/l
Chlorobenzene	5U	ug/l
1,2,4-Trichlorobenzene	5U	ug/l
Dibromochloromethane	5U	ug/l
Tetrachloroethene	5U	ug/l
Sec-Butylbenzene	5U	ug/l
1,3-Dichloropropane	5U	ug/l
Cis-1,2-Dichloroethene	5U	ug/l
trans-1,2-Dichloroethe+	5U	ug/l
1,3-Dichlorobenzene	5U	ug/l
1,1-Dichloropropene	5U	ug/l
2,2-Dichloropropane	5U	ug/l
2-Hexanone	10U	ug/l
Ethane, 1,1,1,2-Tetrac+	5U	ug/l
cis-1,3-Dichloropropene	5U	ug/l
trans-1,3-Dichloroprop+	5U	ug/l
Surrog: D4-1,2-Dichlor+	93	% Recov
Surrog: 1,4-Bromofluor+	100	% Recov
Surrog: D8-Toluene	101	% Recov

VOA - PP Scan (GCMS) Duplicate #1	Water-Total Result	Units
Carbon Tetrachloride	5U	ug/l
Acetone	10U	ug/l
Chloroform	5U	ug/l
Benzene	5U	ug/l
1,1,1-Trichloroethane	2J*	ug/l
Bromomethane	10U	ug/l
Chloromethane	10U	ug/l
Dibromomethane	5U	ug/l
Bromochloromethane	5U	ug/l
Chloroethane	10U	ug/l
Vinyl Chloride	10U	ug/l
Methylene Chloride	5U	ug/l
Carbon Disulfide	5U	ug/l
Bromoform	5U	ug/l
Bromodichloromethane	5U	ug/l
1,1-Dichloroethane	5U	ug/l
1,1-Dichloroethene	5U	ug/l

VOA - PP Scan (GCMS) *** Continued *** Duplicate #1	Water-Total Result	Units
Trichlorofluoromethane	5U	ug/l
Methane, Dichlorodiflu+	10U	ug/l
1,2-Dichloropropane	5U	ug/l
2-Butanone	10U	ug/l
1,1,2-Trichloroethane	5U	ug/l
Trichloroethene	5U	ug/l
ETHANE, 1,1,2,2-TETRAC+	5U	ug/l
1,2,3-Trichlorobenzene	5U	ug/l
Hexachlorobutadiene	5U	ug/l
Naphthalene	5U	ug/l
Total Xylenes	5U	ug/l
2-Chlorotoluene	5U	ug/l
1,2-Dichlorobenzene	5U	ug/l
1,2,4-Trimethylbenzene	5U	ug/l
DBCP	5U	ug/l
1,2,3-Trichloropropane	5U	ug/l
Tert-Butylbenzene	5U	ug/l
Isopropylbenzene (Cume+	5U	ug/l
p-Isopropyltoluene	5U	ug/l
BENZENE, ETHYL-	5U	ug/l
BENZENE, ETHENYL-	5U	ug/l
BENZENE, PROPYL-	5U	ug/l
Butylbenzene	5U	ug/l
4-Chlorotoluene	5U	ug/l
1,4-Dichlorobenzene	5U	ug/l
1,2-Dibromoethane (EDB)	10U	ug/l
1,2-Dichloroethane	5U	ug/l
Vinyl Acetate	10U	ug/l
4-Methyl-2-Pentanone	10U	ug/l
1,3,5-Trimethylbenzene	5U	ug/l
Bromobenzene	5U	ug/l
Toluene	5U	ug/l
Chlorobenzene	5U	ug/l
1,2,4-Trichlorobenzene	5U	ug/l
Dibromochloromethane	5U	ug/l
Tetrachloroethene	5U	ug/l
Sec-Butylbenzene	5U	ug/l
1,3-Dichloropropane	5U	ug/l
Cis-1,2-Dichloroethene	5U	ug/l
trans-1,2-Dichloroethe+	5U	ug/l
1,3-Dichlorobenzene	5U	ug/l
1,1-Dichloropropene	5U	ug/l
2,2-Dichloropropane	5U	ug/l
2-Hexanone	10U	ug/l

VOA - PP Scan (GCMS) *** Continued *** Duplicate #1	Water-Total Result	Units
Ethane, 1,1,1,2-Tetrac+	5U	ug/l
cis-1,3-Dichloropropene	5U	ug/l
trans-1,3-Dichloroprop+	5U	ug/l
Surrog: D4-1,2-Dichlor+	100	% Recov
Surrog: 1,4-Bromofluor+	102	% Recov
Surrog: D8 Toluene	103	% Recov

Ion Chromatography	Water-Total Result	Units
Chloride	3.61 *	mg/l
Sulfate Total	6.61 *	mg/l

(Sample Complete)

Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES) Officer: AFJ Account: D3400

Laboratory: Ecology, Manchester

Sample No: 89 378131 Description: WOOLARD Source: Ambient Stream/River

Begin Date: 89/09/12 :

Gen Inorg/Phys-Speci		Water-Total Result		Units
Cond@25C	Meter	223	*	umho/cm
pH LAB	Meter	8.2	*	Std Unts
Alk-Tot	CaCO3	115	*	mg/l
Alk-HCO3	CaCO3	115	*	mg/l
Alk-CO3	CaCO3	1U		mg/l
Hard-Tot	CaCO3	128	*	mg/l
Silica	Total	19.2	*	mg/l
Turbidty	Meter	1.1	*	NTU

Solids - Specified		Water-Total Result		Units
Solids	T Suspen	1	*	mg/l

Nutrients - Specifie		Water-Total Result		Units
NO2NO3-N	Total	0.87	*	mg/l

Metals - Total Recov		Water-Total Result		Units
Cadmium	Tot-Rec	0.20U		ug/l
Mercury	Tot-Rec	.06U		ug/l

Metals - Total Recov		Water-Total Result		Units
Calcium	Tot-Rec	34.2	*	mg/l
Mgnsium	Tot-Rec	7.32	*	mg/l
Sodium	Tot-Rec	5.58	*	mg/l
Potssium	Tot-Rec	2.1	*	mg/l
Iron	Tot-Rec	67.2	*	ug/l
Mangnese	Tot-Rec	14.3	*	ug/l

VOA - PP Scan (GCMS)	Water-Total Result	Units
Carbon Tetrachloride	5U	ug/l
Acetone	10U	ug/l
Chloroform	5U	ug/l
Benzene	5U	ug/l
1,1,1-Trichloroethane	2J*	ug/l
Bromomethane	10U	ug/l
Chloromethane	10U	ug/l
Dibromomethane	5U	ug/l
Bromochloromethane	5U	ug/l
Chloroethane	10U	ug/l
Vinyl Chloride	10U	ug/l
Methylene Chloride	5U	ug/l
Carbon Disulfide	5U	ug/l
Bromoform	5U	ug/l
Bromodichloromethane	5U	ug/l
1,1-Dichloroethane	5U	ug/l
1,1-Dichloroethene	5U	ug/l
Trichlorofluoromethane	5U	ug/l
Methane, Dichlorodiflu+	10U	ug/l
1,2-Dichloropropane	5U	ug/l
2-Butanone	10U	ug/l
1,1,2-Trichloroethane	5U	ug/l
Trichloroethene	5U	ug/l
ETHANE, 1,1,2,2-TETRAC+	5U	ug/l
1,2,3-Trichlorobenzene	5U	ug/l
Hexachlorobutadiene	5U	ug/l
Naphthalene	5U	ug/l
Total Xylenes	5U	ug/l
2-Chlorotoluene	5U	ug/l
1,2-Dichlorobenzene	5U	ug/l
1,2,4-Trimethylbenzene	5U	ug/l
DBCP	5U	ug/l
1,2,3-Trichloropropane	5U	ug/l
Tert-Butylbenzene	5U	ug/l
Isopropylbenzene (Cume+	5U	ug/l
p-Isopropyltoluene	5U	ug/l
BENZENE, ETHYL-	5U	ug/l
BENZENE, ETHENYL-	5U	ug/l
BENZENE, PROPYL-	5U	ug/l
Butylbenzene	5U	ug/l
4-Chlorotoluene	5U	ug/l
1,4-Dichlorobenzene	5U	ug/l
1,2-Dibromoethane (EDB)	10U	ug/l
1,2-Dichloroethane	5U	ug/l
Vinyl Acetate	10U	ug/l

VOA - PP Scan (GCMS) *** Continued ***	Water-Total Result	Units
4-Methyl-2-Pentanone	10U	ug/l
1,3,5-Trimethylbenzene	5U	ug/l
Bromobenzene	5U	ug/l
Toluene	5U	ug/l
Chlorobenzene	5U	ug/l
1,2,4-Trichlorobenzene	5U	ug/l
Dibromochloromethane	5U	ug/l
Tetrachloroethene	5U	ug/l
Sec-Butylbenzene	5U	ug/l
1,3-Dichloropropane	5U	ug/l
Cis-1,2-Dichloroethene	5U	ug/l
trans-1,2-Dichloroethe+	5U	ug/l
1,3-Dichlorobenzene	5U	ug/l
1,1-Dichloropropene	5U	ug/l
2,2-Dichloropropane	5U	ug/l
2-Hexanone	10U	ug/l
Ethane, 1,1,1,2-Tetrac+	5U	ug/l
cis-1,3-Dichloropropene	5U	ug/l
trans-1,3-Dichloroprop+	5U	ug/l
Surrog: D4-1,2-Dichlor+	99	% Recov
Surrog: 1,4-Bromofluor+	98	% Recov
Surrog: D8-Toluene	103	% Recov

Ion Chromatography		Water-Total Result		Units
Chloride		2.56	*	mg/l
Sulfate	Total	6.60	*	mg/l

(Sample Complete)

Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES) Officer: AFJ Account: D3400

Laboratory: Ecology, Manchester

Sample No: 89 378132 Description: WOOLARD Source: Ambient Stream/River

Begin Date: 89/09/13 :

Gen Inorg/Phys-Speci		Water-Total Result		Units
Cond@25C	Meter	233	*	umho/cm
pH LAB	Meter	8.0	*	Std Unts
Alk-Tot	CaCO3	115	*	mg/l
Alk-HCO3	CaCO3	115	*	mg/l
Alk-CO3	CaCO3	1U		mg/l
Hard-Tot	CaCO3	125	*	mg/l
Silica	Total	19.0	*	mg/l
Turbidty	Meter	1.3	*	NTU

Solids - Specified		Water-Total Result		Units
Solids	T-Suspen	2	*	mg/l

Nutrients - Specifie		Water-Total Result		Units
NO2NO3-N	Total	0.90	*	mg/l

Metals - Total Recov		Water-Total Result	Units
Cadmium	Tot-Rec	0.20U	ug/l
Mercury	Tot-Rec	.06U	ug/l

Metals - Total Recov		Water-Total Result		Units
Calcium	Tot-Rec	34.0	*	mg/l
Mgnsium	Tot-Rec	7.27	*	mg/l
Sodium	Tot-Rec	5.58	*	mg/l
Potssium	Tot-Rec	2.1	*	mg/l
Iron	Tot-Rec	67.9	*	ug/l
Mangnese	Tot-Rec	16.3	*	ug/l

VOA - PP Scan (GCMS)	Water-Total Result	Units
Carbon Tetrachloride	5U	ug/l
Acetone	10U	ug/l
Chloroform	5U	ug/l
Benzene	5U	ug/l
1,1,1-Trichloroethane	2J*	ug/l
Bromomethane	10U	ug/l
Chloromethane	10U	ug/l
Dibromomethane	5U	ug/l
Bromochloromethane	5U	ug/l
Chloroethane	10U	ug/l
Vinyl Chloride	10U	ug/l
Methylene Chloride	5U	ug/l
Carbon Disulfide	5U	ug/l
Bromoform	5U	ug/l
Bromodichloromethane	5U	ug/l
1,1-Dichloroethane	5U	ug/l
1,1-Dichloroethene	5U	ug/l
Trichlorofluoromethane	5U	ug/l
Methane, Dichlorodiflu+	10U	ug/l
1,2-Dichloropropane	5U	ug/l
2-Butanone	10U	ug/l
1,1,2-Trichloroethane	5U	ug/l
Trichloroethene	5U	ug/l
ETHANE, 1,1,2,2-TETRAC+	5U	ug/l
1,2,3-Trichlorobenzene	5U	ug/l
Hexachlorobutadiene	5U	ug/l
Naphthalene	5U	ug/l
Total Xylenes	5U	ug/l
2-Chlorotoluene	5U	ug/l
1,2-Dichlorobenzene	5U	ug/l
1,2,4-Trimethylbenzene	5U	ug/l
DBCP	5U	ug/l
1,2,3-Trichloropropane	5U	ug/l
Tert-Butylbenzene	5U	ug/l
Isopropylbenzene (Cume+	5U	ug/l
p-Isopropyltoluene	5U	ug/l
BENZENE, ETHYL-	5U	ug/l
BENZENE, ETHENYL-	5U	ug/l
BENZENE, PROPYL-	5U	ug/l
Butylbenzene	5U	ug/l
4-Chlorotoluene	5U	ug/l
1,4-Dichlorobenzene	5U	ug/l
1,2-Dibromoethane (EDB)	10U	ug/l
1,2-Dichloroethane	5U	ug/l
Vinyl Acetate	10U	ug/l

VOA - PP Scan (GCMS) *** Continued ***	Water-Total Result	Units
4-Methyl-2-Pentanone	10U	ug/l
1,3,5-Trimethylbenzene	5U	ug/l
Bromobenzene	5U	ug/l
Toluene	5U	ug/l
Chlorobenzene	5U	ug/l
1,2,4-Trichlorobenzene	5U	ug/l
Dibromochloromethane	5U	ug/l
Tetrachloroethene	5U	ug/l
Sec-Butylbenzene	5U	ug/l
1,3-Dichloropropane	5U	ug/l
Cis-1,2-Dichloroethene	5U	ug/l
trans-1,2-Dichloroethe+	5U	ug/l
1,3-Dichlorobenzene	5U	ug/l
1,1-Dichloropropene	5U	ug/l
2,2-Dichloropropane	5U	ug/l
2-Hexanone	10U	ug/l
Ethane, 1,1,1,2-Tetrac+	5U	ug/l
cis-1,3-Dichloropropene	5U	ug/l
trans-1,3-Dichloroprop+	5U	ug/l
Surrog: D4-1,2-Dichlor+	93	% Recov
Surrog: 1,4-Bromofluor+	102	% Recov
Surrog: D8-Toluene	102	% Recov

Ion Chromatography		Water-Total Result		Units
Chloride		1.94	*	mg/l
Sulfate	Total	6.59	*	mg/l

(Sample Complete)

Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES) Officer: AFJ Account: D3400

Laboratory: Ecology, Manchester

Sample No: 89 378133 Description: CHATTARY Source: Ambient Stream/River

Begin Date: 89/09/12 :

Gen Inorg/Phys-Speci		Water-Total Result		Units
Cond@25C	Meter	167	*	umho/cm
pH LAB	Meter	8.4	*	Std Unts
Alk-Tot	CaCO3	92	*	mg/l
Alk-HCO3	CaCO3	93	*	mg/l
Alk-CO3	CaCO3	1U		mg/l
Hard-Tot	CaCO3	97	*	mg/l
Silica	Total	16.0	*	mg/l
Turbidty	Meter	1.6	*	NTU

Solids - Specified		Water-Total Result	Units
Solids	T-Suspen	1U	mg/l

Nutrients - Specifie		Water-Total Result		Units
NO2NO3-N	Total	0.17	*	mg/l

Metals - Total Recov		Water Total Result	Units
Cadmium	Tot-Rec	0.20U	ug/l
Mercury	Tot-Rec	.06U	ug/l

Metals - Total Recov Matrix Spike #1		Water-Total Result	Units
Mercury	Tot-Rec	108	% Recov

Metals - Total Recov Matrix Spike #2		Water-Total Result	Units
Mercury	Tot-Rec	118	% Recov

Metals - Total Recov		Water-Total Result		Units
Calcium	Tot-Rec	26.8	*	mg/l
Mgnsium	Tot-Rec	5.67	*	mg/l
Sodium	Tot-Rec	4.74	*	mg/l
Potssium	Tot-Rec	1.7	*	mg/l
Iron	Tot-Rec	66.4	*	ug/l
Mangnese	Tot-Rec	9.1	*	ug/l

VOA - PP Scan (GCMS)	Water-Total Result	Units
Carbon Tetrachloride	5U	ug/l
Acetone	10U	ug/l
Chloroform	5U	ug/l
Benzene	5U	ug/l
1,1,1-Trichloroethane	5U	ug/l
Bromomethane	10U	ug/l
Chloromethane	10U	ug/l
Dibromomethane	5U	ug/l
Bromochloromethane	5U	ug/l
Chloroethane	10U	ug/l
Vinyl Chloride	10U	ug/l
Methylene Chloride	5U	ug/l
Carbon Disulfide	5U	ug/l
Bromoform	5U	ug/l
Bromodichloromethane	5U	ug/l
1,1-Dichloroethane	5U	ug/l
1,1-Dichloroethene	5U	ug/l
Trichlorofluoromethane	5U	ug/l
Methane, Dichlorodiflu+	10U	ug/l
1,2-Dichloropropane	5U	ug/l
2-Butanone	10U	ug/l
1,1,2-Trichloroethane	5U	ug/l
Trichloroethene	5U	ug/l
ETHANE. 1,1,2,2-TETRAC+	5U	ug/l
1,2,3-Trichlorobenzene	5U	ug/l
Hexachlorobutadiene	5U	ug/l
Naphthalene	5U	ug/l
Total Xylenes	5U	ug/l
2-Chlorotoluene	5U	ug/l
1,2-Dichlorobenzene	5U	ug/l
1,2,4-Trimethylbenzene	5U	ug/l
DBCP	5U	ug/l
1,2,3-Trichloropropane	5U	ug/l
Tert-Butylbenzene	5U	ug/l

VOA - PP Scan (GCMS) *** Continued ***	Water Total Result	Units
Isopropylbenzene (Cume+	5U	ug/l
p-Isopropyltoluene	5U	ug/l
BENZENE, ETHYL-	5U	ug/l
BENZENE, ETHENYL	5U	ug/l
BENZENE, PROPYL-	5U	ug/l
Butylbenzene	5U	ug/l
4-Chlorotoluene	5U	ug/l
1,4-Dichlorobenzene	5U	ug/l
1,2-Dibromoethane (EDB)	10U	ug/l
1,2-Dichloroethane	5U	ug/l
Vinyl Acetate	10U	ug/l
4-Methyl-2-Pentanone	10U	ug/l
1,3,5-Trimethylbenzene	5U	ug/l
Bromobenzene	5U	ug/l
Toluene	5U	ug/l
Chlorobenzene	5U	ug/l
1,2,4-Trichlorobenzene	5U	ug/l
Dibromochloromethane	5U	ug/l
Tetrachloroethene	5U	ug/l
Sec-Butylbenzene	5U	ug/l
1,3-Dichloropropane	5U	ug/l
Cis-1,2-Dichloroethene	5U	ug/l
trans-1,2-Dichloroethe+	5U	ug/l
1,3-Dichlorobenzene	5U	ug/l
1,1-Dichloropropene	5U	ug/l
2,2-Dichloropropane	5U	ug/l
2-Hexanone	10U	ug/l
Ethane, 1,1,1,2-Tetrac+	5U	ug/l
cis-1,3-Dichloropropene	5U	ug/l
trans-1,3-Dichloroprop+	5U	ug/l
Surrog: D4-1,2-Dichlor+	95	% Recov
Surrog: 1,4-Bromofluor+	98	% Recov
Surrog: D8-Toluene	103	% Recov

VOA - PP Scan (GCMS) Matrix Spike #1	Water-Total Result	Units
Carbon Tetrachloride	95	% Recov
Acetone	10U	% Recov
Chloroform	98	% Recov
Benzene	110	% Recov
1,1,1-Trichloroethane	101	% Recov
Bromomethane	110	% Recov

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Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES) Officer: AFJ Account: D3400

Laboratory: Ecology, Manchester

Sample No: 89 378133 Description: CHATTARY Source: Ambient Stream/River

Begin Date: 89/09/12 :

VOA - PP Scan (GCMS) *** Continued *** Matrix Spike #1	Water-Total Result	Units
Chloromethane	114	% Recov
Dibromomethane	102	% Recov
Bromochloromethane	5U	% Recov
Chloroethane	113	% Recov
Vinyl Chloride	103	% Recov
Methylene Chloride	99B	% Recov
Carbon Disulfide	5U	% Recov
Bromoform	109	% Recov
Bromodichloromethane	127	% Recov
1,1-Dichloroethane	112	% Recov
1,1-Dichloroethene	93	% Recov
Trichlorofluoromethane	102	% Recov
Methane, Dichlorodiflu+	97	% Recov
1,2-Dichloropropane	86	% Recov
2-Butanone	154	% Recov
1,1,2-Trichloroethane	112	% Recov
Trichloroethene	102	% Recov
ETHANE, 1,1,2,2-TETRAC+	108	% Recov
1,2,3-Trichlorobenzene	103	% Recov
Hexachlorobutadiene	82	% Recov
Naphthalene	110	% Recov
Total Xylenes	95	% Recov
2-Chlorotoluene	91	% Recov
1,2-Dichlorobenzene	99	% Recov
1,2,4-Trimethylbenzene	90	% Recov
DBCP	115	% Recov
1,2,3-Trichloropropane	115	% Recov
Tert-Butylbenzene	90	% Recov
Isopropylbenzene (Cume+	89	% Recov
p-Isopropyltoluene	86	% Recov
BENZENE, ETHYL-	95	% Recov
BENZENE, ETHENYL-	98	% Recov
BENZENE, PROPYL-	88	% Recov
Butylbenzene	83	% Recov
4-Chlorotoluene	95	% Recov
1,4-Dichlorobenzene	92	% Recov
1,2-Dibromoethane (EDB)	114	% Recov
1,2-Dichloroethane	103	% Recov
Vinyl Acetate	78	% Recov
4-Methyl-2-Pentanone	130	% Recov
1,3,5-Trimethylbenzene	91	% Recov
Bromobenzene	104	% Recov
Toluene	104	% Recov
Chlorobenzene	103	% Recov

VOA - PP Scan (GCMS) *** Continued *** Matrix Spike #1	Water-Total Result	Units
1,2,4-Trichlorobenzene	94	% Recov
Dibromochloromethane	110	% Recov
Tetrachloroethene	90	% Recov
Sec-Butylbenzene	84	% Recov
1,3-Dichloropropane	115	% Recov
Cis-1,2-Dichloroethene	100	% Recov
trans-1,2-Dichloroethe+	94	% Recov
1,3-Dichlorobenzene	99	% Recov
1,1-Dichloropropene	98	% Recov
2,2-Dichloropropane	80	% Recov
2-Hexanone	140	% Recov
Ethane, 1,1,1,2-Tetrac+	105	% Recov
cis-1,3-Dichloropropene	109	% Recov
trans-1,3-Dichloroprop+	105	% Recov
Surrog: D4-1,2-Dichlor+	102	% Recov
Surrog: 1,4-Bromofluor+	99	% Recov
Surrog: D8 Toluene	105	% Recov

VOA - PP Scan (GCMS) Matrix Spike #2	Water-Total Result	Units
Carbon Tetrachloride	93	% Recov
Acetone	10U	% Recov
Chloroform	92	% Recov
Benzene	104	% Recov
1,1,1-Trichloroethane	94	% Recov
Bromomethane	103	% Recov
Chloromethane	110	% Recov
Dibromomethane	106	% Recov
Bromochloromethane	5U	% Recov
Chloroethane	100	% Recov
Vinyl Chloride	97	% Recov
Methylene Chloride	93B	% Recov
Carbon Disulfide	5U	% Recov
Bromoform	106	% Recov
Bromodichloromethane	131	% Recov
1,1-Dichloroethane	101	% Recov
1,1-Dichloroethene	83	% Recov
Trichlorofluoromethane	87	% Recov
Methane, Dichlorodiflu+	90	% Recov
1,2-Dichloropropane	96	% Recov
2-Butanone	140	% Recov
1,1,2-Trichloroethane	111	% Recov

VOA - PP Scan (GCMS) *** Continued *** Matrix Spike #2	Water-Total Result	Units
Trichloroethene	100	% Recov
ETHANE, 1,1,2,2-TETRAC+	104	% Recov
1,2,3-Trichlorobenzene	97	% Recov
Hexachlorobutadiene	75	% Recov
Naphthalene	106	% Recov
Total Xylenes	90	% Recov
2-Chlorotoluene	90	% Recov
1,2-Dichlorobenzene	95	% Recov
1,2,4-Trimethylbenzene	86	% Recov
DBCP	117	% Recov
1,2,3-Trichloropropane	110	% Recov
Tert-Butylbenzene	86	% Recov
Isopropylbenzene (Cume+	85	% Recov
p-Isopropyltoluene	80	% Recov
BENZENE, ETHYL-	90	% Recov
BENZENE, ETHENYL-	96	% Recov
BENZENE, PROPYL-	83	% Recov
Butylbenzene	82	% Recov
4-Chlorotoluene	89	% Recov
1,4-Dichlorobenzene	89	% Recov
1,2-Dibromoethane (EDB)	114	% Recov
1,2-Dichloroethane	98	% Recov
Vinyl Acetate	56	% Recov
4-Methyl-2-Pentanone	130	% Recov
1,3,5-Trimethylbenzene	84	% Recov
Bromobenzene	101	% Recov
Toluene	101	% Recov
Chlorobenzene	98	% Recov
1,2,4-Trichlorobenzene	92	% Recov
Dibromochloromethane	111	% Recov
Tetrachloroethene	83	% Recov
Sec-Butylbenzene	81	% Recov
1,3-Dichloropropane	116	% Recov
Cis-1,2-Dichloroethene	88	% Recov
trans-1,2-Dichloroethe+	88	% Recov
1,3-Dichlorobenzene	94	% Recov
1,1-Dichloropropene	89	% Recov
2,2-Dichloropropane	72	% Recov
2-Hexanone	140	% Recov
Ethane, 1,1,1,2-Tetrac+	103	% Recov
cis-1,3-Dichloropropene	109	% Recov
trans-1,3-Dichloroprop+	108	% Recov
Surrog: D4-1,2-Dichlor+	103	% Recov
Surrog: 1,4-Bromofluor+	99B	% Recov

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Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES)

Officer: AFJ Account: D3400

Laboratory: Ecology, Manchester

Sample No: 89 378133 Description: CHATTARY Source: Ambient Stream/River

Begin Date: 89/09/12 :

VOA - PP Scan (GCMS) *** Continued *** Matrix Spike #2	Water-Total Result	Units
Surrog: D8-Toluene	104	% Recov

Ion Chromatography	Water-Total Result	Units
Chloride	1.63 *	mg/l
Sulfate Total	4.76 *	mg/l

(Sample Complete)

Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES) Officer: AFJ Account: D3400

Laboratory: Ecology, Manchester

Sample No: 89 378134 Description: CHATTARY Source: Ambient Stream/River

Begin Date: 89/09/13 :

Gen Inorg/Phys-Speci		Water-Total Result		Units
Cond@25C	Meter	185	*	umho/cm
pH LAB	Meter	7.9	*	Std Unts
Alk-Tot	CaCO3	94	*	mg/l
Alk-HCO3	CaCO3	94	*	mg/l
Alk-CO3	CaCO3	1U		mg/l
Hard-Tot	CaCO3	100	*	mg/l
Silica	Total	16.5	*	mg/l
Turbidty	Meter	0.9	*	NTU

Solids - Specified		Water-Total Result		Units
Solids	T-Suspen	2	*	mg/l

Nutrients - Specifie		Water-Total Result		Units
NO2NO3-N	Total	0.19	*	mg/l

Metals - Total Recov		Water-Total Result	Units
Cadmium	Tot-Rec	0.20U	ug/l
Mercury	Tot-Rec	.06U	ug/l

Metals - Total Recov		Water-Total Result		Units
Calcium	Tot-Rec	26.9	*	mg/l
Mgnsium	Tot-Rec	5.72	*	mg/l
Sodium	Tot-Rec	4.74	*	mg/l
Potssium	Tot-Rec	1.8	*	mg/l
Iron	Tot-Rec	67.2	*	ug/l
Mangnese	Tot-Rec	11.1	*	ug/l

VOA - PP Scan (GCMS)	Water-Total Result	Units
Carbon Tetrachloride	5U	ug/l
Acetone	10U	ug/l
Chloroform	5U	ug/l
Benzene	5U	ug/l
1,1,1-Trichloroethane	5U	ug/l
Bromomethane	10U	ug/l
Chloromethane	10U	ug/l
Dibromomethane	5U	ug/l
Bromochloromethane	5U	ug/l
Chloroethane	10U	ug/l
Vinyl Chloride	10U	ug/l
Methylene Chloride	5U	ug/l
Carbon Disulfide	5U	ug/l
Bromoform	5U	ug/l
Bromodichloromethane	5U	ug/l
1,1-Dichloroethane	5U	ug/l
1,1-Dichloroethene	5U	ug/l
Trichlorofluoromethane	5U	ug/l
Methane, Dichlorodiflu+	10U	ug/l
1,2-Dichloropropane	5U	ug/l
2-Butanone	10U	ug/l
1,1,2-Trichloroethane	5U	ug/l
Trichloroethene	5U	ug/l
ETHANE, 1,1,2,2-TETRAC+	5U	ug/l
1,2,3-Trichlorobenzene	5U	ug/l
Hexachlorobutadiene	5U	ug/l
Naphthalene	5U	ug/l
Total Xylenes	5U	ug/l
2-Chlorotoluene	5U	ug/l
1,2-Dichlorobenzene	5U	ug/l
1,2,4-Trimethylbenzene	5U	ug/l
DBCP	5U	ug/l
1,2,3-Trichloropropane	5U	ug/l
Tert-Butylbenzene	5U	ug/l
Isopropylbenzene (Cume+	5U	ug/l
p-Isopropyltoluene	5U	ug/l
BENZENE, ETHYL-	5U	ug/l
BENZENE, ETHENYL-	5U	ug/l
BENZENE, PROPYL-	5U	ug/l
Butylbenzene	5U	ug/l
4-Chlorotoluene	5U	ug/l
1,4-Dichlorobenzene	5U	ug/l
1,2-Dibromoethane (EDB)	10U	ug/l
1,2-Dichloroethane	5U	ug/l
Vinyl Acetate	10U	ug/l

VOA - PP Scan (GCMS) *** Continuod ***	Water-Total Result	Units
4-Methyl-2-Pentanone	10U	ug/l
1,3,5-Trimethylbenzene	5U	ug/l
Bromobenzene	5U	ug/l
Toluene	5U	ug/l
Chlorobenzene	5U	ug/l
1,2,4-Trichlorobenzene	5U	ug/l
Dibromochloromethane	5U	ug/l
Tetrachloroethene	5U	ug/l
Sec-Butylbenzene	5U	ug/l
1,3-Dichloropropane	5U	ug/l
Cis-1,2-Dichloroethene	5U	ug/l
trans-1,2-Dichloroethe+	5U	ug/l
1,3-Dichlorobenzene	5U	ug/l
1,1-Dichloropropene	5U	ug/l
2,2-Dichloropropane	5U	ug/l
2-Hexanone	10U	ug/l
Ethane, 1,1,1,2-Tetrac+	5U	ug/l
cis-1,3-Dichloropropene	5U	ug/l
trans-1,3-Dichloroprop+	5U	ug/l
Surrog: D4-1,2-Dichlor+	96	% Recov
Surrog: 1,4-Bromofluor+	102	% Recov
Surrog: D8-Toluene	103	% Recov

Ion Chromatography		Water-Total Result		Units
Chloride		1.56	*	mg/l
Sulfate	Total	4.85	*	mg/l

(Sample Complete)

Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES) Officer: AFJ Account: D3400

Laboratory: Ecology, Manchester

Sample No: 89 378135 Description: CHATTARY Source: Ambient Stream/River

Begin Date: 89/09/12 :

Gen Inorg/Phys-Speci		Water-Total Result	Units
Cond@25C	Meter	179 *	umho/cm
pH LAB	Meter	8.3 *	Std Unts
Alk-Tot	CaCO3	94 *	mg/l
Alk-HCO3	CaCO3	94 *	mg/l
Alk-CO3	CaCO3	1U	mg/l
Hard-Tot	CaCO3	98 *	mg/l
Silica	Total	16.9 *	mg/l
Turbidty	Meter	1.2 *	NTU

Solids - Specified		Water-Total Result	Units
Solids	T-Suspen	1 *	mg/l

Nutrients - Specifie		Water-Total Result	Units
NO2NO3-N	Total	0.18 *	mg/l

Metals - Total Recov		Water-Total Result	Units
Cadmium	Tot-Rec	0.20U	ug/l
Mercury	Tot-Rec	.06U	ug/l

Metals - Total Recov		Water-Total Result	Units
Calcium	Tot-Rec	27.4 *	mg/l
Mgnsium	Tot-Rec	5.74 *	mg/l
Sodium	Tot-Rec	4.77 *	mg/l
Potssium	Tot-Rec	1.9 *	mg/l
Iron	Tot-Rec	54.9 *	ug/l
Mangnese	Tot-Rec	9.1 *	ug/l

VOA - PP Scan (GCMS)	Water-Total Result	Units
Carbon Tetrachloride	5U	ug/l
Acetone	10U	ug/l
Chloroform	5U	ug/l
Benzene	5U	ug/l
1,1,1-Trichloroethane	5U	ug/l
Bromomethane	10U	ug/l
Chloromethane	10U	ug/l
Dibromomethane	5U	ug/l
Bromochloromethane	5U	ug/l
Chloroethane	10U	ug/l
Vinyl Chloride	10U	ug/l
Methylene Chloride	5U	ug/l
Carbon Disulfide	5U	ug/l
Bromoform	5U	ug/l
Bromodichloromethane	5U	ug/l
1,1-Dichloroethane	5U	ug/l
1,1-Dichloroethene	5U	ug/l
Trichlorofluoromethane	5U	ug/l
Methane, Dichlorodiflu+	10U	ug/l
1,2-Dichloropropane	5U	ug/l
2-Butanone	10U	ug/l
1,1,2-Trichloroethane	5U	ug/l
Trichloroethene	5U	ug/l
ETHANE, 1,1,2,2-TETRAC+	5U	ug/l
1,2,3-Trichlorobenzene	5U	ug/l
Hexachlorobutadiene	5U	ug/l
Naphthalene	5U	ug/l
Total Xylenes	5U	ug/l
2-Chlorotoluene	5U	ug/l
1,2-Dichlorobenzene	5U	ug/l
1,2,4-Trimethylbenzene	5U	ug/l
DBCP	5U	ug/l
1,2,3-Trichloropropane	5U	ug/l
Tert-Butylbenzene	5U	ug/l
Isopropylbenzene (Cume+	5U	ug/l
p-Isopropyltoluene	5U	ug/l
BENZENE, ETHYL-	5U	ug/l
BENZENE, ETHENYL-	5U	ug/l
BENZENE, PROPYL-	5U	ug/l
Butylbenzene	5U	ug/l
4-Chlorotoluene	5U	ug/l
1,4-Dichlorobenzene	5U	ug/l
1,2-Dibromoethane (EDB)	10U	ug/l
1,2-Dichloroethane	5U	ug/l
Vinyl Acetate	10U	ug/l

VOA - PP Scan (GCMS) *** Continued ***	Water-Total Result	Units
4-Methyl-2-Pentanone	10U	ug/l
1,3,5-Trimethylbenzene	5U	ug/l
Bromobenzene	5U	ug/l
Toluene	5U	ug/l
Chlorobenzene	5U	ug/l
1,2,4-Trichlorobenzene	5U	ug/l
Dibromochloromethane	5U	ug/l
Tetrachloroethene	5U	ug/l
Sec-Butylbenzene	5U	ug/l
1,3-Dichloropropane	5U	ug/l
Cis-1,2-Dichloroethene	5U	ug/l
trans-1,2-Dichloroethe+	5U	ug/l
1,3-Dichlorobenzene	5U	ug/l
1,1-Dichloropropene	5U	ug/l
2,2-Dichloropropane	5U	ug/l
2-Hexanone	10U	ug/l
Ethane, 1,1,1,2-Tetrac+	5U	ug/l
cis-1,3-Dichloropropene	5U	ug/l
trans-1,3-Dichloroprop+	5U	ug/l
Surrog: D4-1,2-Dichlor+	96	% Recov
Surrog: 1,4-Bromofluor+	98	% Recov
Surrog: D8-Toluene	103	% Recov

Ion Chromatography		Water-Total Result	Units
Chloride		3.21 *	mg/l
Sulfate	Total	4.88 *	mg/l

(Sample Complete)

Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES) Officer: AFJ Account: D3400

Laboratory: Ecology, Manchester

Sample No: 89 378136 Description: TRNSFRBK Source: Ambient Stream/River

Begin Date: 89/09/12 :

VOA - PP Scan (GCMS)	Water-Total Result	Units
Carbon Tetrachloride	5U	ug/l
Acetone	10U	ug/l
Chloroform	5U	ug/l
Benzene	5U	ug/l
1,1,1-Trichloroethane	5U	ug/l
Bromomethane	10U	ug/l
Chloromethane	10U	ug/l
Dibromomethane	5U	ug/l
Bromochloromethane	5U	ug/l
Chloroethane	10U	ug/l
Vinyl Chloride	10U	ug/l
Methylene Chloride	5U	ug/l
Carbon Disulfide	5U	ug/l
Bromoform	5U	ug/l
Bromodichloromethane	5U	ug/l
1,1-Dichloroethane	5U	ug/l
1,1-Dichloroethene	5U	ug/l
Trichlorofluoromethane	5U	ug/l
Methane, Dichlorodiflu+	10U	ug/l
1,2-Dichloropropane	5U	ug/l
2-Butanone	10U	ug/l
1,1,2-Trichloroethane	5U	ug/l
Trichloroethene	5U	ug/l
ETHANE, 1,1,2,2-TETRAC+	5U	ug/l
1,2,3-Trichlorobenzene	5U	ug/l
Hexachlorobutadiene	5U	ug/l
Naphthalene	5U	ug/l
Total Xylenes	5U	ug/l
2-Chlorotoluene	5U	ug/l
1,2-Dichlorobenzene	5U	ug/l
1,2,4-Trimethylbenzene	5U	ug/l
DBCP	5U	ug/l
1,2,3-Trichloropropane	5U	ug/l
Tert-Butylbenzene	5U	ug/l
Isopropylbenzene (Cume+	5U	ug/l
p-Isopropyltoluene	5U	ug/l
BENZENE, ETHYL-	5U	ug/l
BENZENE, ETHENYL-	5U	ug/l
BENZENE, PROPYL-	5U	ug/l
Butylbenzene	5U	ug/l
4-Chlorotoluene	5U	ug/l
1,4-Dichlorobenzene	5U	ug/l
1,2-Dibromoethane (EDB)	10U	ug/l
1,2-Dichloroethane	5U	ug/l
Vinyl Acetate	10U	ug/l

VOA - PP Scan (GCMS) *** Continued ***	Water-Total Result	Units
4-Methyl-2-Pentanone	10U	ug/l
1,3,5-Trimethylbenzene	5U	ug/l
Bromobenzene	5U	ug/l
Toluene	5U	ug/l
Chlorobenzene	5U	ug/l
1,2,4-Trichlorobenzene	5U	ug/l
Dibromochloromethane	5U	ug/l
Tetrachloroethene	5U	ug/l
Sec-Butylbenzene	5U	ug/l
1,3-Dichloropropane	5U	ug/l
Cis-1,2-Dichloroethene	5U	ug/l
trans-1,2-Dichloroethe+	5U	ug/l
1,3-Dichlorobenzene	5U	ug/l
1,1-Dichloropropene	5U	ug/l
2,2-Dichloropropane	5U	ug/l
2-Hexanone	10U	ug/l
Ethane, 1,1,1,2-Tetrac+	5U	ug/l
cis-1,3-Dichloropropene	5U	ug/l
trans-1,3-Dichloroprop+	5U	ug/l
Surrog: D4-1,2-Dichlor+	96	% Recov
Surrog: 1,4-Bromofluor+	98	% Recov
Surrog: D8-Toluene	101	% Recov

(Sample Complete)

Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES) Officer: AFJ Account: D3400

Laboratory: Ecology, Manchester

Sample No: 89 378137 Description: TRNSPTBK Source: Ambient Stream/River

Begin Date: 89/09/12 :

Metals - Total Recov		Water-Total Result	Units
Cadmium	Tot-Rec	0.20U	ug/l
Mercury	Tot-Rec	.06U	ug/l

Metals - Total Recov		Water-Total Result	Units
Iron	Tot-Rec	5.0U	ug/l
Mangnese	Tot-Rec	2.0 *	ug/l

VOA - PP Scan (GCMS)	Water-Total Result	Units
Carbon Tetrachloride	5U	ug/l
Acetone	10U	ug/l
Chloroform	5U	ug/l
Benzene	5U	ug/l
1,1,1-Trichloroethane	5U	ug/l
Bromomethane	10U	ug/l
Chloromethane	10U	ug/l
Dibromomethane	5U	ug/l
Bromochloromethane	5U	ug/l
Chloroethane	10U	ug/l
Vinyl Chloride	10U	ug/l
Methylene Chloride	5U	ug/l
Carbon Disulfide	5U	ug/l
Bromoform	5U	ug/l
Bromodichloromethane	5U	ug/l
1,1-Dichloroethane	5U	ug/l
1,1-Dichloroethene	5U	ug/l
Trichlorofluoromethane	5U	ug/l
Methane, Dichlorodiflu+	10U	ug/l
1,2-Dichloropropane	5U	ug/l
2-Butanone	10U	ug/l
1,1,2-Trichloroethane	5U	ug/l
Trichloroethene	5U	ug/l
ETHANE, 1,1,2,2-TETRAC+	5U	ug/l
1,2,3-Trichlorobenzene	5U	ug/l
Hexachlorobutadiene	5U	ug/l
Naphthalene	5U	ug/l
Total Xylenes	5U	ug/l
2-Chlorotoluene	5U	ug/l
1,2-Dichlorobenzene	5U	ug/l
1,2,4-Trimethylbenzene	5U	ug/l

VOA - PP Scan (GCMS) *** Continued ***	Water-Total Result	Units
DBCP	5U	ug/l
1,2,3-Trichloropropane	5U	ug/l
Tert-Butylbenzene	5U	ug/l
Isopropylbenzene (Cume+	5U	ug/l
p-Isopropyltoluene	5U	ug/l
BENZENE, ETHYL-	5U	ug/l
BENZENE, ETHENYL-	5U	ug/l
BENZENE, PROPYL-	5U	ug/l
Butylbenzene	5U	ug/l
4-Chlorotoluene	5U	ug/l
1,4-Dichlorobenzene	5U	ug/l
1,2-Dibromoethane (EDB)	10U	ug/l
1,2-Dichloroethane	5U	ug/l
Vinyl Acetate	10U	ug/l
4-Methyl-2-Pentanone	10U	ug/l
1,3,5-Trimethylbenzene	5U	ug/l
Bromobenzene	5U	ug/l
Toluene	5U	ug/l
Chlorobenzene	5U	ug/l
1,2,4-Trichlorobenzene	5U	ug/l
Dibromochloromethane	5U	ug/l
Tetrachloroethene	5U	ug/l
Sec-Butylbenzene	5U	ug/l
1,3-Dichloropropane	5U	ug/l
Cis-1,2-Dichloroethene	5U	ug/l
trans-1,2-Dichloroethe+	5U	ug/l
1,3-Dichlorobenzene	5U	ug/l
1,1-Dichloropropene	5U	ug/l
2,2-Dichloropropane	5U	ug/l
2-Hexanone	10U	ug/l
Ethane, 1,1,1,2-Tetrac+	5U	ug/l
cis-1,3-Dichloropropene	5U	ug/l
trans-1,3-Dichloroprop+	5U	ug/l
Surrog: D4-1,2-Dichlor+	97	% Recov
Surrog: 1,4-Bromofluor+	100	% Recov
Surrog: D8-Toluene	101	% Recov

(Sample Complete)

Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES) Officer: AFJ Account: D3400

Blank ID: BW9268

VOA - PP Scan (GCMS) Blank #1	Water-Total Result	Units
Carbon Tetrachloride	5U	ug/l
Acetone	10U	ug/l
Chloroform	5U	ug/l
Benzene	5U	ug/l
1,1,1-Trichloroethane	5U	ug/l
Bromomethane	10U	ug/l
Chloromethane	10U	ug/l
Dibromomethane	5U	ug/l
Bromochloromethane	5U	ug/l
Chloroethane	10U	ug/l
Vinyl Chloride	10U	ug/l
Methylene Chloride	2J*	ug/l
Carbon Disulfide	5U	ug/l
Bromoform	5U	ug/l
Bromodichloromethane	5U	ug/l
1,1-Dichloroethane	5U	ug/l
1,1-Dichloroethene	5U	ug/l
Trichlorofluoromethane	5U	ug/l
Methane, Dichlorodiflu+	10U	ug/l
1,2-Dichloropropane	5U	ug/l
2-Butanone	10U	ug/l
1,1,2-Trichloroethane	5U	ug/l
Trichloroethene	5U	ug/l
ETHANE, 1,1,2,2-TETRAC+	5U	ug/l
1,2,3-Trichlorobenzene	5U	ug/l
Hexachlorobutadiene	5U	ug/l
Naphthalene	5U	ug/l
Total Xylenes	5U	ug/l
2-Chlorotoluene	5U	ug/l
1,2-Dichlorobenzene	5U	ug/l
1,2,4-Trimethylbenzene	5U	ug/l
DBCP	5U	ug/l
1,2,3 Trichloropropane	5U	ug/l
Tert-Butylbenzene	5U	ug/l
Isopropylbenzene (Cume+	5U	ug/l
p-Isopropyltoluene	5U	ug/l
BENZENE, ETHYL-	5U	ug/l
BENZENE, ETHENYL-	5U	ug/l
BENZENE, PROPYL-	5U	ug/l
Butylbenzene	5U	ug/l
4-Chlorotoluene	5U	ug/l
1,4-Dichlorobenzene	5U	ug/l
1,2-Dibromoethane (EDB)	10U	ug/l
1,2-Dichloroethane	5U	ug/l
Vinyl Acetate	10U	ug/l

VOA - PP Scan (GCMS) *** Continued *** Blank #1	Water-Total Result	Units
4-Methyl-2-Pentanone	10U	ug/l
1,3,5-Trimethylbenzene	5U	ug/l
Bromobenzene	5U	ug/l
Toluene	5U	ug/l
Chlorobenzene	5U	ug/l
1,2,4-Trichlorobenzene	5U	ug/l
Dibromochloromethane	5U	ug/l
Tetrachloroethene	5U	ug/l
Sec-Butylbenzene	5U	ug/l
1,3-Dichloropropane	5U	ug/l
Cis-1,2-Dichloroethene	5U	ug/l
trans-1,2-Dichloroethe+	5U	ug/l
1,3-Dichlorobenzene	5U	ug/l
1,1-Dichloropropene	5U	ug/l
2,2-Dichloropropane	5U	ug/l
2-Hexanone	10U	ug/l
Ethane, 1,1,1,2-Tetrac+	5U	ug/l
cis-1,3-Dichloropropene	5U	ug/l
trans-1,3-Dichloroprop+	5U	ug/l
Surrog: D4-1,2-Dichlor+	89	% Recov
Surrog: 1,4-Bromofluor+	98	% Recov
Surrog: D8-Toluene	104	% Recov

(Sample Complete)

Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES) Officer: AFJ Account: D3400

Blank ID: PB 41.72

Metals - Total Recov Blank #1		Water-Total Result	Units
Cadmium	Tot-Rec	0.37 *	ug/l

Metals - Total Recov Blank #2		Water-Total Result	Units
Calcium	Tot-Rec	.0010U	mg/l
Mgnsium	Tot-Rec	.0010U	mg/l
Sodium	Tot-Rec	.046 *	mg/l
Potssium	Tot-Rec	.50U	mg/l
Iron	Tot-Rec	5.0U	ug/l
Mangnese	Tot-Rec	1.0U	ug/l

(Sample Complete)

Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES)

Officer: AFJ

Account: D3400

Blank ID: PB 44.73

Metals - Total Recov Blank #2		Water-Total Result	Units
Cadmium	Tot-Rec	0.20U	ug/l

Metals - Total Recov Blank #1		Water-Total Result	Units
Calcium	Tot-Rec	.0010U	mg/l
Mgnsium	Tot-Rec	.0010U	mg/l
Sodium	Tot-Rec	.044 *	mg/l
Potssium	Tot-Rec	.50U	mg/l
Iron	Tot-Rec	5.0U	ug/l
Mangnese	Tot-Rec	1.0U	ug/l

(Sample Complete)