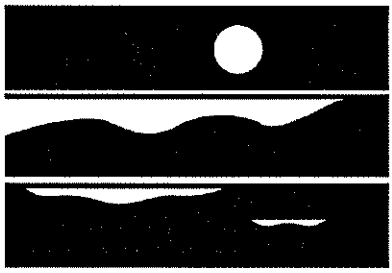

City of Ellensburg
Wastewater Treatment Plant
Class II Inspection, April 1994

April 1995

Water Body No. WA-39-1030

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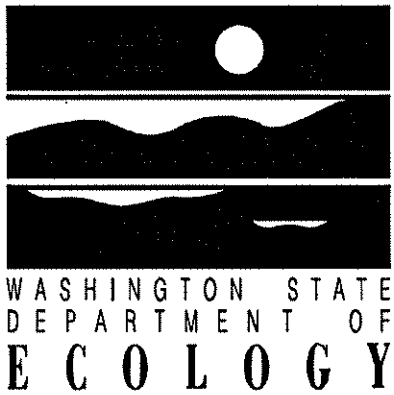

City of Ellensburg Wastewater Treatment Plant Class II Inspection, April 1994

by
Steven Golding

Environmental Investigations and Laboratory Services Program
Olympia, Washington 98504-7710

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Abstract

A Class II Inspection was conducted at the City of Ellensburg Wastewater Treatment Plant (WWTP) on April 19 and 20, 1994. The plant was producing a good quality effluent. The effluent met the limits in Ellensburg's National Pollutant Discharge Elimination System (NPDES) permit for BOD_5, total suspended solids (TSS), and pH. Fecal coliform counts met weekly average limits and in one sample out of four exceeded monthly limits. Infiltration appeared to be responsible for the weak influent to the WWTP.

Nitrification of the effluent reduced TKN and NH_3 through the plant considerably. Some denitrification also appeared to be occurring. Effluent ammonia met State fresh water quality criteria. VOA and BNA organic compounds and priority pollutant metals found in the effluent were all in concentrations below State fresh water quality criteria. None of the four bioassay tests conducted showed toxicity to the effluent sample. The sludge fecal coliform count met EPA requirements for Class A sewage sludge. Eleven priority pollutant metals were detected in the sludge, all below EPA limits for land application of sludge.

Summary

Flow Measurements

Flow of effluent is measured by an in-line propeller meter. In the absence of an accessible flow measuring device, flow measurements were not verified by Ecology.

NPDES Permit Compliance / General Chemistry / Plant Operation

The plant was producing a good quality effluent during the inspection. The effluent met the limits in Ellensburg's National Pollutant Discharge Elimination System (NPDES) permit for BOD_5, total suspended solids (TSS) and pH. Fecal coliform counts met weekly average limits and exceeded monthly limits in one sample out of four.

Effluent BOD_5 for a 24-hour sample was found to be 4.7% of the influent BOD_5, within the required monthly average reduction to within 15%. The TSS of the effluent was 3.4% of the influent TSS, within the required monthly average reduction to within 15%.

Influent BOD_5 and TSS concentrations were characteristic of a weak domestic wastewater influent. Infiltration appeared to be responsible for the weak influent to the WWTP.

The reduction in TKN and NH_3-N between influent and effluent indicates that the facility was achieving substantial nitrification at the time of the inspection. Denitrification also appeared to be occurring to some extent. The effluent met fresh water criteria for ammonia. A nitrogen balance showed that an estimated 24% of the nitrogen entering the plant left the plant in the effluent, an estimated 18% left the plant as sludge TKN, and an estimated 58% was lost as N_2 gas from wastewater processes and the digesters and as $NO_2 + NO_3$ in the digested sludge.

Split Sample Comparison

The Ellensburg influent sample was stronger than the Ecology influent sample, with higher BOD_5 concentrations and approximately double the concentration of TSS. This difference appears to be a result of the Ellensburg compositer sampling a slug of septage. Septage delivery to the plant is scheduled to end in 1995.

The Ellensburg and Ecology effluent samples and analyses were in good agreement for TSS. The Ecology effluent BOD_5 sample (15 mg/L) was almost four times the

concentration of the Ellensburg sample (4 mg/L). The Ecology effluent subsample used by Ellensburg for the BOD_5 analysis appeared to be nonrepresentative.

Priority Pollutant Scans

All VOA and BNA compounds in the effluent for which there are State fresh water quality criteria were found well below the criteria.

No pesticide/PCB compounds were found in the influent or effluent.

Zinc and copper were the only priority pollutant metals detected in the effluent. They were found at concentrations below State fresh water quality criteria.

Bioassays

None of the four bioassay tests conducted showed toxicity to the effluent sample.

Sludge

The fecal coliform count (1,760/100g-dry wt) met the 100,000/100g-dry wt maximum requirement for Class A sewage sludge in accordance with EPA regulations.

Four VOA compounds and three BNA compounds were found in the sludge sample. The BNA compound found in the highest concentration was bis(2-ethylhexyl)phthalate (31,000 µg/Kg-dry wt).

Three pesticide compounds were found in the sludge. The pesticide compound found in the highest concentration was 4,4'-DDE (58 µg/Kg-dry wt est. -- estimated concentration). Also found was 4,4'-DDD (28 µg/Kg-dry wt est.) and gamma-chlordane (13 µg/Kg-dry wt est.).

Eleven priority pollutant metals were detected in the sludge, all below EPA sludge application limits for land application of sludge.

Recommendations

- The effluent flow meter should be checked regularly per manufacturer's recommendations, and meter accuracy should be assured.
- Efforts should be continued to reduce infiltration to the Ellensburg WWTP collection system.
- The UV disinfection system which has become operational subsequent to the inspection should be operated to attain fecal coliform permit limits.

Introduction

A Class II Inspection was conducted at the City of Ellensburg Wastewater Treatment Plant (WWTP) on April 19 and 20, 1994. Conducting the inspection of the facility were environmental engineers Guy Hoyle-Dodson and Steven Golding from the Ecology Toxics Investigations Unit. WWTP foreman Rick Bollinger assisted during the inspection. Subsequent to the inspection, Bob Morrell served as interim WWTP foreman until Irma Grogan accepted the position of WWTP foreman. Rick Frye of the Ecology Central Regional Office requested the inspection for permit manager Phelps Freeborn.

The City of Ellensburg (Ellensburg) operates a sanitary wastewater treatment facility regulated under NPDES Permit No. WA-002434-1 (expiration date July 1, 1995). Wastewater collection is from residential and business areas of the City of Ellensburg and Central Washington University (Figure 1).

The wastewater treatment system consists of a grit chamber, comminutor, two aeration basins operated in parallel, two secondary clarifiers, and a chlorine contact chamber (Figure 2). Conversion from chlorination to UV disinfection was achieved subsequent to the inspection, in January 1995 (Morrell, 1995). Flow is measured with an in-line propeller meter at the head of the chlorine contact chamber. Treated wastewater is discharged into the Yakima River through a 6-port diffuser at a depth of approximately 3.5 feet. The tops of the ports are about at water level during low flow conditions in late summer (Freeborn, 1994a).

Solids handling processes include a centrifuge for sludge dewatering, primary and secondary anaerobic digesters, supernatant lagoons, and sludge drying beds.

A previous Yakima River Basin Class II Inspection (conducted in September 1992) found the Ellensburg effluent to be of good quality (Glenn, 1993). There was no significant reduction in NH_3 through the plant at that time. An effluent NH_3-N concentration of approximately 9 mg/L was accompanied by an effluent NO_2+NO_3-N concentration of less than 0.01 mg/L, indicating that nitrification was not taking place. Subsequently Ecology has worked with plant personnel and the plant has been achieving nitrification since the summer of 1993. According to self-reporting data, effluent NH_3-N concentrations have been reduced to below 1 mg/L and effluent NO_2+NO_3 concentrations have increased to between 2 and 6 mg/L. The present permit has no effluent limitation for NH_3.

Objectives of the inspection included:

1. Evaluate NPDES Permit compliance.

2. Evaluate NH_3 removal, performing a nitrogen balance for the plant.

3. Verify sampling and laboratory procedures with split samples.

4. Characterize wastewater toxicity with priority pollutant scans and bioassays.

Procedures

In normal operations, centrifuge centrate and lagoon supernatant streams are returned to the headworks upstream of possible sampling points. In order to collect influent samples which did not include these return flows, the centrifuge centrate and lagoon supernatant streams were shut off the night of April 18, 1994, prior to the beginning of sample collection. The interruption of return flows was expected to have little or no significant effect upon plant operation or effluent characteristics.

Composite samples were collected by Ecology at influent (Inf-E) and effluent (Eff-E) locations. Ecology collected influent, effluent, aeration basin, sludge, centrifuge centrate return flow, and lagoon supernatant grab samples. Ellensburg collected influent and effluent composite samples and effluent and lagoon supernatant grab samples.

A more detailed description of sampling procedures appears in Appendix A. Sampling station descriptions appear in Table 1. The sampling schedule, parameters analyzed, and sample splits are included in Appendix B. Ecology analytical methods and laboratories performing the analyses are summarized in Appendix C. Ecology field and laboratory QA/QC are summarized in Appendix D. Quality assurance cleaning procedures are included in Appendix E. A glossary of terms appears in Appendix I.

Results and Discussion

Flow Measurements

Flow of effluent is measured by an in-line propeller meter. There is no provision for measuring influent flow. In the absence of an accessible flow measuring device, flow measurements were not verified by Ecology. The effluent flow meter should be checked regularly per manufacturer's recommendations and meter accuracy should be assured.

Flow during the 24-hour period of composite sampling was 3.16 MGD as prorated to 24-hours from a measurement period of 1006 on April 19 to 0825 on April 20.

NPDES Permit Compliance / General Chemistry / Plant Operation

The conventional parameters of 5-day biochemical oxygen demand (BOD_5), TSS, and pH indicate an effluent of good quality (Table 2). The effluent met National Pollutant Discharge Elimination System (NPDES) permit limits for BOD_5, total suspended solids (TSS), and pH (Table 3). Fecal coliform counts met weekly average limits and in one sample out of four exceeded monthly limits.

The estimated Ecology BOD results that appear in Table 2 were obtained from a contract laboratory. Because the contract laboratory used improper dilutions for these tests, the influent BOD concentrations were reported as indefinite and are not referred to in this report. Because Ecology effluent BOD results were estimates from tests with improper dilutions and BOD analyses between Eff-E and a duplicate sample (Dupe) were not in agreement, BOD_5 results from the Ecology effluent sample appear to be in error and are not referred to in this report. Ellensburg laboratory BOD_5 results (Table 4) are considered more representative than the Ecology results and are referred to in this report.

Because the Ellensburg sample of Ecology effluent was taken from the bottom of a sample container for the BOD_5 test (Bradley, 1995), the resulting BOD_5 was high and nonrepresentative. The result of the Ellensburg BOD_5 analysis of the Ellensburg composite effluent sample (4 mg/L), will be taken as representative of the Ellensburg effluent during the inspection (Table 4).

Using the result of Ellensburg's BOD_5 analyses of the Ecology influent and Ellensburg effluent 24-hour composite samples (Table 4), effluent BOD_5 was found to be 4.7% of the influent BOD_5 (95.3% removal). This is within the NPDES limit of 15%. Effluent TSS for the Ecology sample was found to be 3.4% of the influent TSS. This is within the NPDES limit of 15% (Table 3).

The Ecology influent sample, with 86 mg/L BOD_5 and 88 mg/L TSS, was indicative of a weak domestic wastewater influent (Metcalf and Eddy, 1991). Infiltration appeared to be responsible for the weak influent to the WWTP.

There is considerable infiltration into the Ellensburg sewer system in the spring and summer months (Figure 3; Freeborn, 1994b). The infiltration is a result of irrigation in the area causing rising water tables (Freeborn, 1995). Influent BOD_5 and TSS loading remain fairly constant throughout the year, however (Figures 4 and 5; Freeborn 1994). The flow

rate through the Ellensburg WWTP was somewhat higher than average at the time of the inspection.

According to Irma Grogan (1995), Ellensburg has been inspecting their collection system with TV and has been making repairs as problems become apparent. As a result, flow has been maintained in recent years despite growth, and influent during the higher flow months has been less weak. Although monthly monitoring reports indicate that all monthly average flow rates have been lower than the 8.0 MGD permitted, the effort to reduce infiltration to the Ellensburg WWTP collection system should be continued.

Nitrification and Denitrification through the Plant

In analyzing Ecology nitrogen data it was evident that TKN laboratory results were in error. TKN is the total of organic nitrogen and ammonia. Therefore TKN should always be approximately equal to or greater than the ammonia concentration of the same sample. For Inf-E, the contract laboratory ARI reported a TKN of 1.0 mg/L and an NH_3 of 10.4 mg/L (Table 2). A comparison of reported influent and effluent TKN concentrations also demonstrated that the influent TKN concentration was in error. Effluent TKN (12.3 mg/L) was much higher than the influent TKN (1.0 mg/L). In WWTPs the opposite is found: TKN decreases markedly through plants as organic nitrogen is converted to NH_3, and in some cases NH_3 is converted to NO_2 and NO_3 through nitrification (Metcalf and Eddy, 1991).

While it is possible that the reported TKN values are invalid, it appears instead that the TKN values were reversed in the laboratory. Nitrogen data for Ellensburg, correcting for the TKN reversal, is as follows:

	Inf-E (mg/L)	Eff-E (mg/L)
TKN	12.3	1.0
NH_3-N	10.4	0.271
NO_2+NO_3-N	3.43	2.70
NO_2-N		0.369
Alkalinity	158	108

The reduction in TKN and NH_3-N through the plant indicate that substantial nitrification was taking place. The reduction in alkalinity between influent and effluent is at a rate consistent with the observed reduction of TKN (a stoichiometric rate of 7.14 mg/L alkalinity destroyed per 1 mg/L NH_4^+-N oxidized in the nitrification process - Metcalf and Eddy, 1991). This reduction in alkalinity is an indication of substantial nitrification and adds further support to the conclusion that the TKN values were reversed.

Since nitrification is the conversion of NH_3 to NO_2 and NO_3, the absence of an increase in NO_2 and NO_3 suggests that there was subsequent denitrification of the effluent, with the NO_2 and NO_3 being converted to gaseous N_2. That the reduction in alkalinity through the plant was somewhat less than the stoichiometric rate is consistent with some denitrification having taken place. Denitrification adds approximately half as much alkalinity (3.6 mg/L per 1 mg/L NO_3-N) as nitrification removes per mg/L NH_3-N (WPCF, 1977). The presence of NO_3 in the effluent indicates that denitrification, while significant, was only partial.

Changes in plant operations in 1993 brought about considerable reductions in effluent NH_3-N. A summary of monthly discharging monitoring shows that effluent NH_3-N was significantly reduced from average concentrations of approximately 10 mg/L in 1991 and 1992 to monthly average concentrations below 1 mg/L from July through December, 1993 (Freeborn, 1994b).

During the summer months of 1993 when the plant began producing an effluent with consistently low ammonia concentrations, effluent nitrate concentrations were reported to range up to 6 mg/L, consistent with the occurrence of nitrification. These relatively high effluent nitrate concentrations indicate that significant denitrification may not generally occur at this facility.

Attention has been given here to denitrification since an objective of this inspection was to determine the fate of nitrogen through the plant and to perform a nitrogen balance. While denitrification offers the advantage of decreasing total nitrogen in the effluent, it should be noted that there is no requirement to operate the Ellensburg plant in a denitrifying mode and any denitrification which occurred during the inspection was not a requirement of the design and operation of the plant.

The low effluent NH_3 concentration in the effluent (0.271 mg/L) was within acute ammonia criteria of 9.3 mg/L and chronic criteria of 1.7 mg/L. These criteria were derived in accordance with State water quality criteria (Ecology, 1992) with 90th percentile temperature and pH data for the Yakima River, 1974-1981 (Rinella, *et al* 1992). Ninetieth percentile temperature and pH values were 15.5°C and 7.7 respectively.

Nitrogen Balance

In accordance with an objective of this inspection, an attempt was made to determine the nitrogen balance across the wastewater treatment plant (Appendix F). It was calculated that 415 lb/day of nitrogen entered the plant, 98 lb/day (24%) of the incoming nitrogen left the plant in the effluent, and 74 lb/day (18%) of the incoming nitrogen left the plant as sludge TKN. The remaining 243 lb/day (58%) of unaccounted for nitrogen, or "balance", can be attributed to nitrogen in forms which were not measured: N_2 released to the atmosphere from denitrification during wastewater treatment and N_2 released by

denitrification in the anaerobic digesters as well as $NO_2 + NO_3$ in the digested sludge. If the sludge had been sampled upstream of the digester rather than downstream, the unknowns of nitrogen loss and conversion to nitrates would have been eliminated from the nitrogen balance.

Split Sample Comparison

Samples were split to determine the comparability of Ecology and permittee laboratory results and sampling methods (Table 4). Ecology contract laboratory BOD_5 results were disregarded because inappropriate dilutions were used for the analyses. The BOD_5 analyses discussed below were all performed by the Ellensburg laboratory.

Influent

Ecology and Ellensburg TSS results for both Ecology and Ellensburg influent samples were in close agreement indicating consistency between the laboratories (Table 4).

The Ellensburg influent sample was stronger than the Ecology influent sample, with higher BOD_5 concentrations and approximately double the concentration of TSS. Ellensburg reported that the automatic sampler sampled during the discharging of septage into the system by truck. The Ellensburg influent sample (Inf-L) was higher in TSS than the monthly average for all 12 months of TSS monthly monitoring report data for 1993 (Freeborn, 1994b).

Typical septage has a BOD_5 of 6,000 mg/L and a TSS of 15,000 mg/L, giving it a TSS/BOD_5 ratio of 2.5 (Metcalf and Eddy, 1991). The Ellensburg influent had a TSS/BOD_5 ratio of 1.36. This was the highest ratio of any month in 1992 and 1993 from Ellensburg monthly monitoring reports. Only two of the 24 months had ratios greater than one. The high TSS and high TSS/BOD_5 ratio of the Ellensburg influent sample support the conclusion that the sample contained septage. A dilution of one part septage to seven parts of influent in the single subsample would account for the increased TSS of the Ellensburg influent sample. Previous Ellensburg self-reporting has indicated occasional high concentrations of TSS in individual samples.

While the Ecology influent sample was more representative, it was likely to have been weaker than a truly representative sample would have been since no septage was included in the Ecology sample. The dumping of septage creates slug loads to the influent which make it difficult to obtain a representative influent sample. This problem is expected to be resolved since the City of Ellensburg had given notice to Kittitas County to stop discharging septage in 1995.

Effluent

Ecology and Ellensburg TSS results for both Ecology and Ellensburg effluent samples were in close agreement indicating consistency between the laboratories (Table 4). The close agreement between the parameters of the Ecology and Ellensburg effluent sample is consistent with the placement of both Ecology and Ellensburg effluent compositer intakes in well-mixed regions of flow. Ecology analyses for Eff-E and for a duplicate sample split in the field (Dupe) yielded results that were in close agreement for most parameters (Table 2).

Priority Pollutant Scans

Seven priority pollutant and other target volatile organic acid (VOA) compounds were detected in the influent (Table 5). Acetone was found in the highest concentration (49 µg/L). Because acetone is used in laboratory cleaning of equipment, the concentration found may not be representative of the sample. The other VOA compounds detected were at low concentrations (3 µg/L est. or less). Two base-neutral acid (BNA) compounds were detected in the influent at concentrations of 4µg/L est. or less.

Four priority pollutant and other target VOA compounds were detected in the effluent. Other than acetone (15 µg/L), the VOA compounds detected in the effluent were at concentrations of 3µg/L est. or less. No BNA compounds were detected in the effluent.

All VOA and BNA compounds in the effluent for which there are State fresh water quality criteria were found well below the criteria (Table 5 - Ecology, 1992).

No pesticide/PCB compounds were found in the influent or effluent.

Of the seven priority pollutant metals detected in the influent samples, zinc was found in the highest concentration (57.9 µg/L). Zinc and copper were the only priority pollutant metals found in the effluent.

Both priority pollutant metals in the effluent were found well below State acute and chronic fresh water criteria (Table 5 - Ecology, 1992).

A complete list of parameters analyzed and analytical results is included in Appendix G. A number of tentatively identified compounds (TICs) were found in the influent samples in concentrations up to 1100 µg/L (est.) TICs were found in the effluent samples in concentrations up to 19 µg/L (est.). TICs are summarized in Appendix H.

Bioassays

None of the four bioassay tests conducted showed toxicity to the effluent sample (Table 6). The *Daphnia magna* and fathead minnow survival tests resulted in 100% survival in 100% effluent, with NOECs of 100% effluent and LC50s of greater than 100% effluent. The *Ceriodaphnia dubia* test resulted in 100% survival in 100% effluent, with an NOEC of 100% effluent for survival, an LC50 of greater than 100% effluent, and an NOEC of 100% effluent for reproduction. The fathead minnow survival and growth test resulted in an NOEC of 100% effluent for survival, an LC50 of greater than 100% effluent, and an NOEC of 100% effluent for growth.

Sludge

Sludge from the secondary anaerobic digester is placed in sludge drying beds. Dried sludge is trucked off-site and applied to agricultural land.

The dried sludge sample contained 62.6% solids. The fecal coliform count (1,760/100g) was lower than the 1,000/g (100,000/100g) maximum limit for Class A sewage sludge in accordance with EPA regulations (EPA, 1993). Class A sewage sludge is suitable for use on agricultural lands without time restrictions to harvesting.

Four VOA compounds were found in the sludge sample (Table 7). Other than acetone (84 µg/Kg-dry wt), the VOA compounds found were in concentrations of 24 µg/Kg-dry wt (est.) or lower. Three BNA compounds were found in the sludge. The BNA compound found in the highest concentration was bis(2-ethylhexyl)phthalate (31,000 µg/Kg-dry wt).

A number of TICs were found in the sludge sample in concentrations up to 430,000 µg/Kg-dry wt (Appendix H).

Three pesticide compounds were found in the sludge. The pesticide compound found in the highest concentration was 4,4'-DDE (58 µg/Kg-dry wt est.). Also found was 4,4'-DDD (28 µg/Kg-dry wt est.) and gamma-Chlordane (13 µg/Kg-dry wt est.).

Eleven priority pollutant metals were detected in the sludge, all below EPA sludge application limits for land application of sludge (Table 7).

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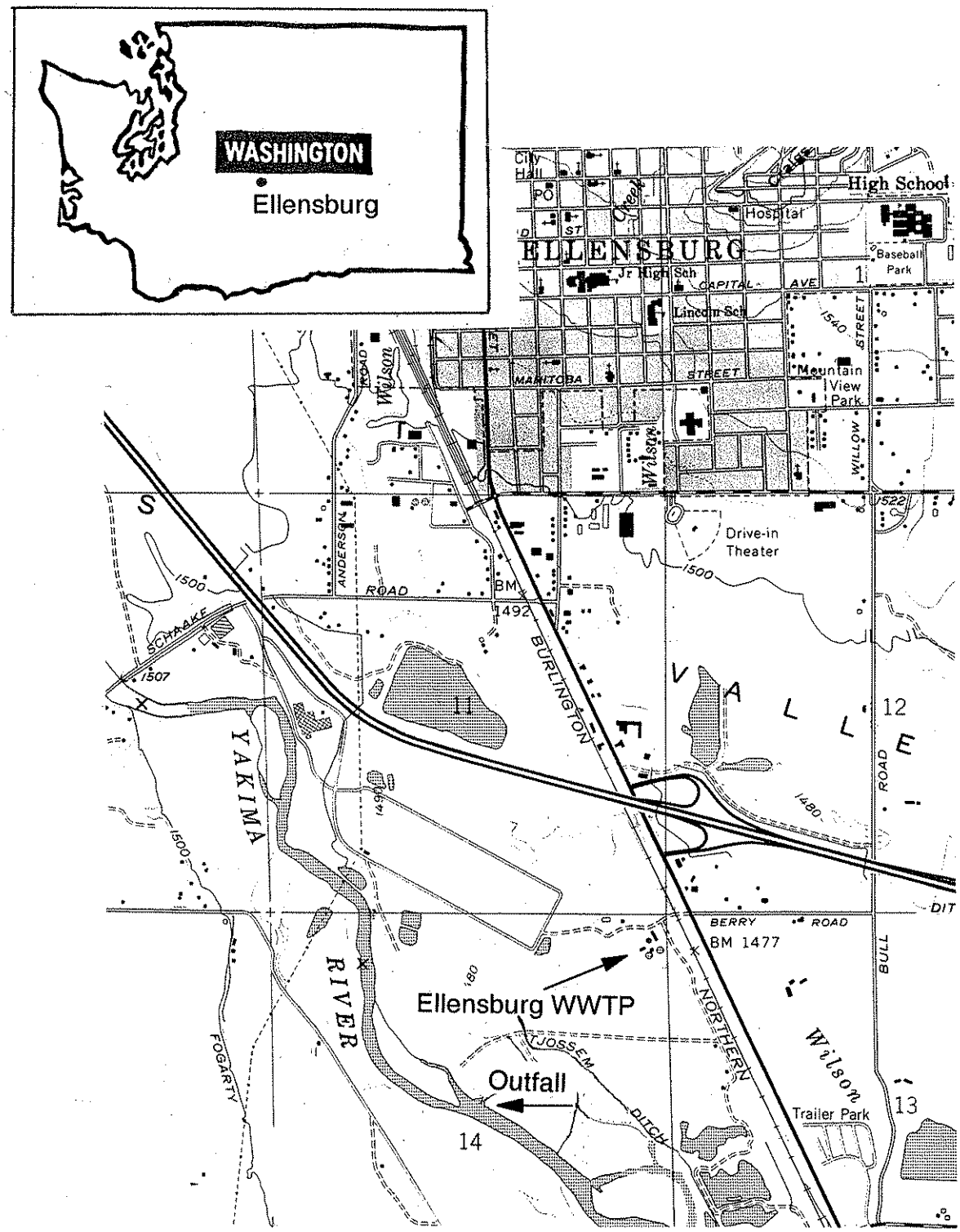

Figure 1 – Location Map – Ellensburg Wastewater Treatment Plant, April 1994.

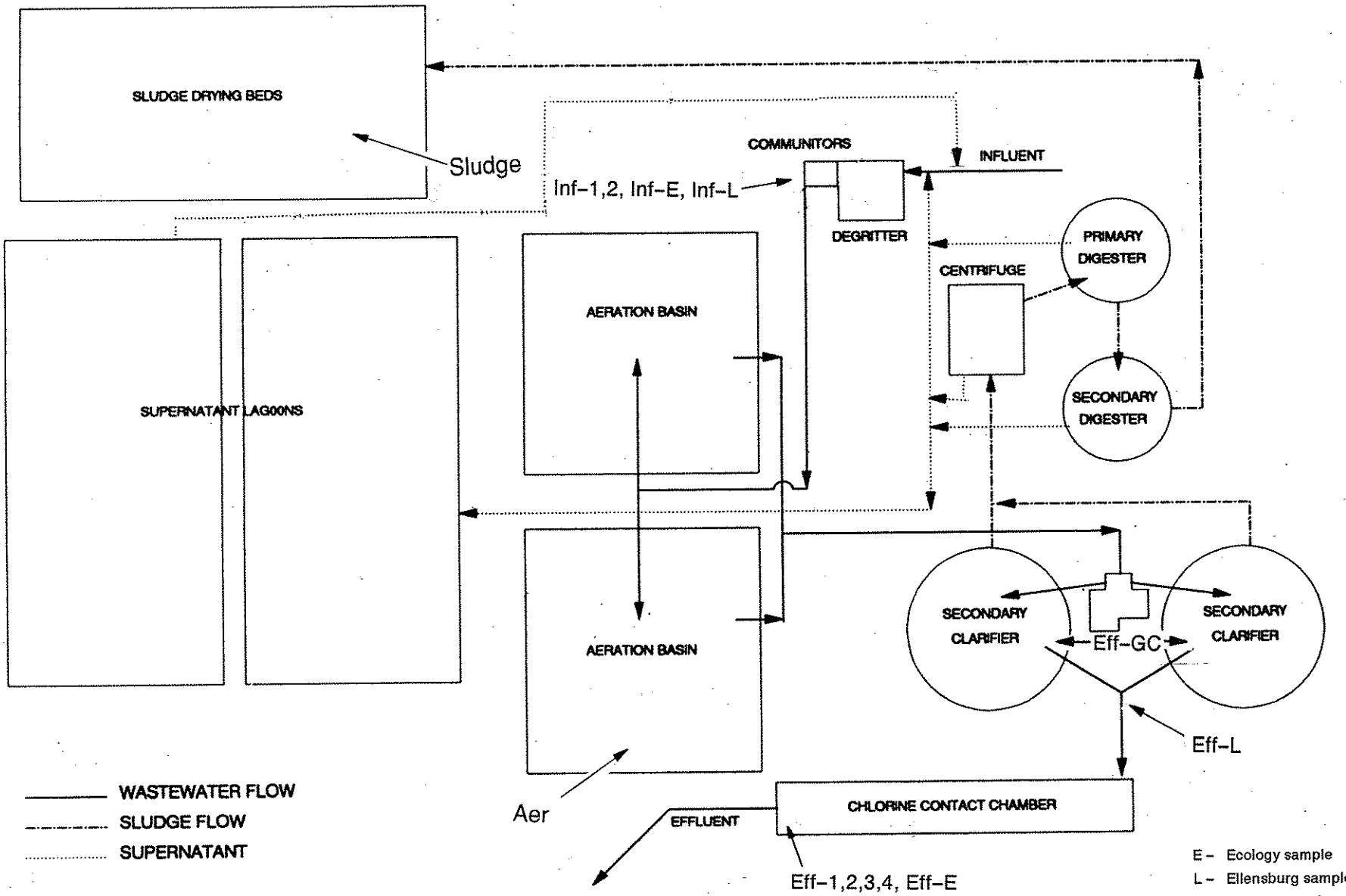

Figure 2 – Flow Schematic and Sampling Locations – Ellensburg, April 1994.

Figure 3 – Ellensburg WwTP Monthly Average Flow – 1989 through 1993.

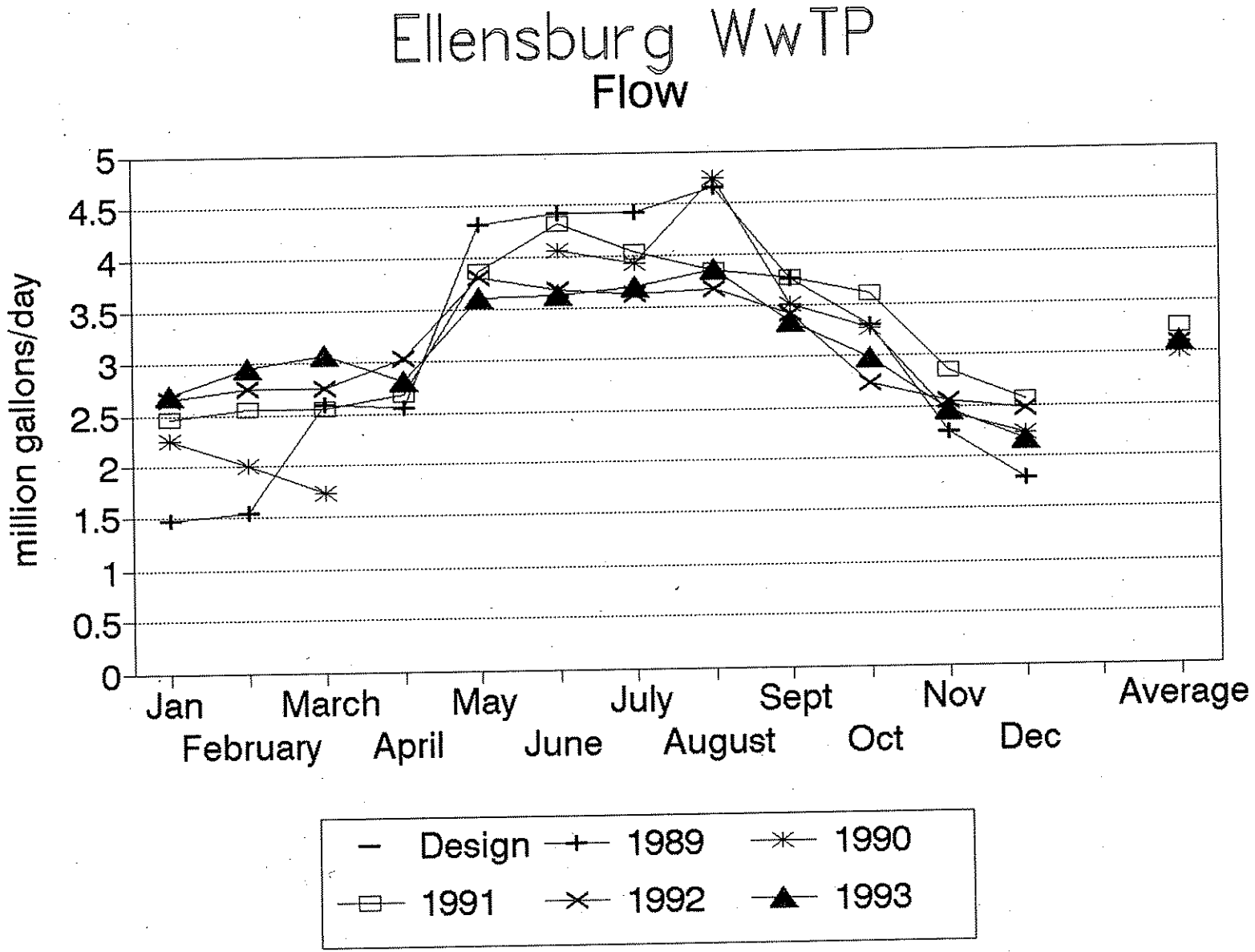

Figure based on self-monitoring data reported by Ellensburg.

Figure 4 – Ellensburg WwTP Monthly BOD5 Loading – 1989 through 1993

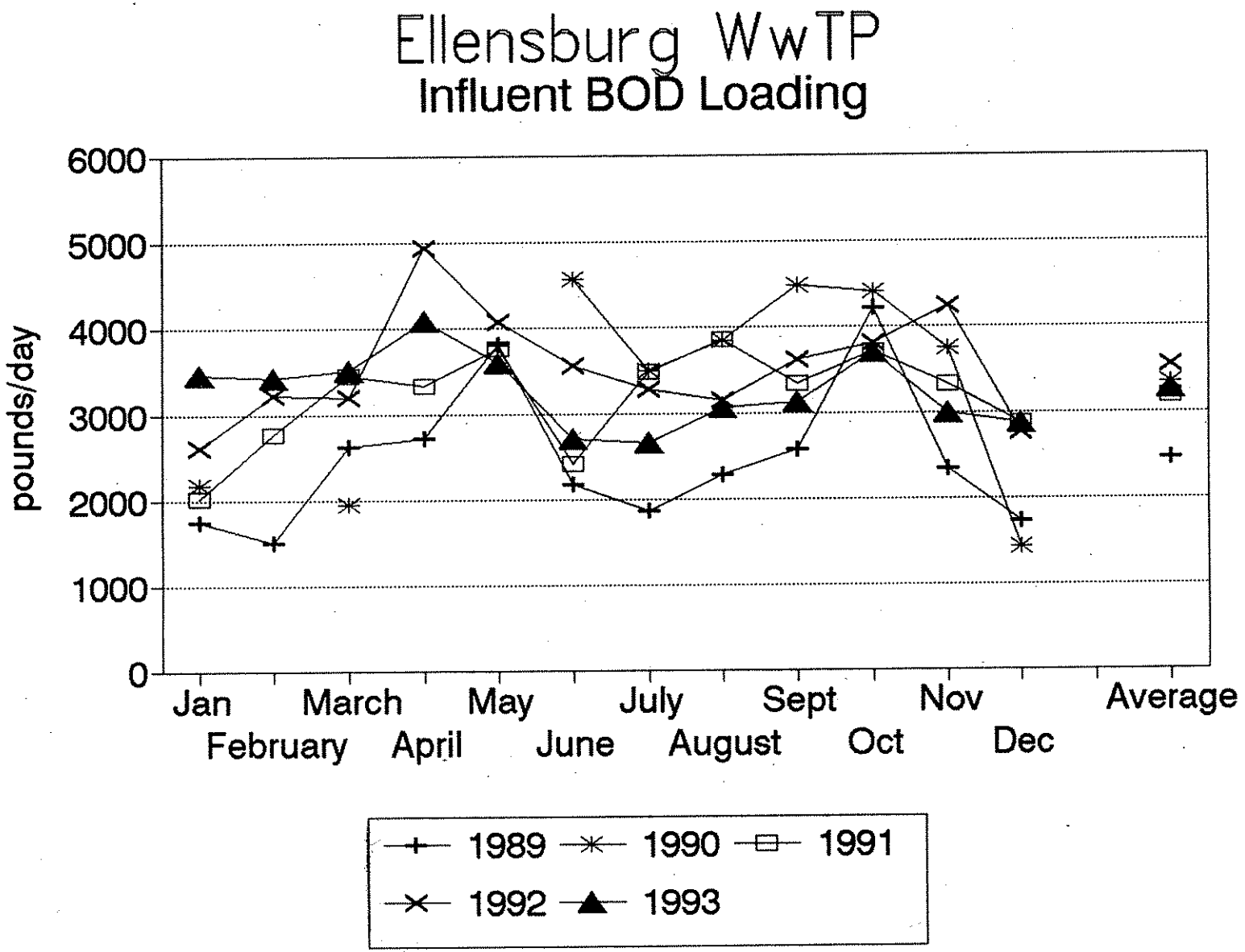

Figure based on self-monitoring data reported by Ellensburg.

Figure 5 – Ellensburg WwTP Monthly Average TSS Loading – 1989 through 1993

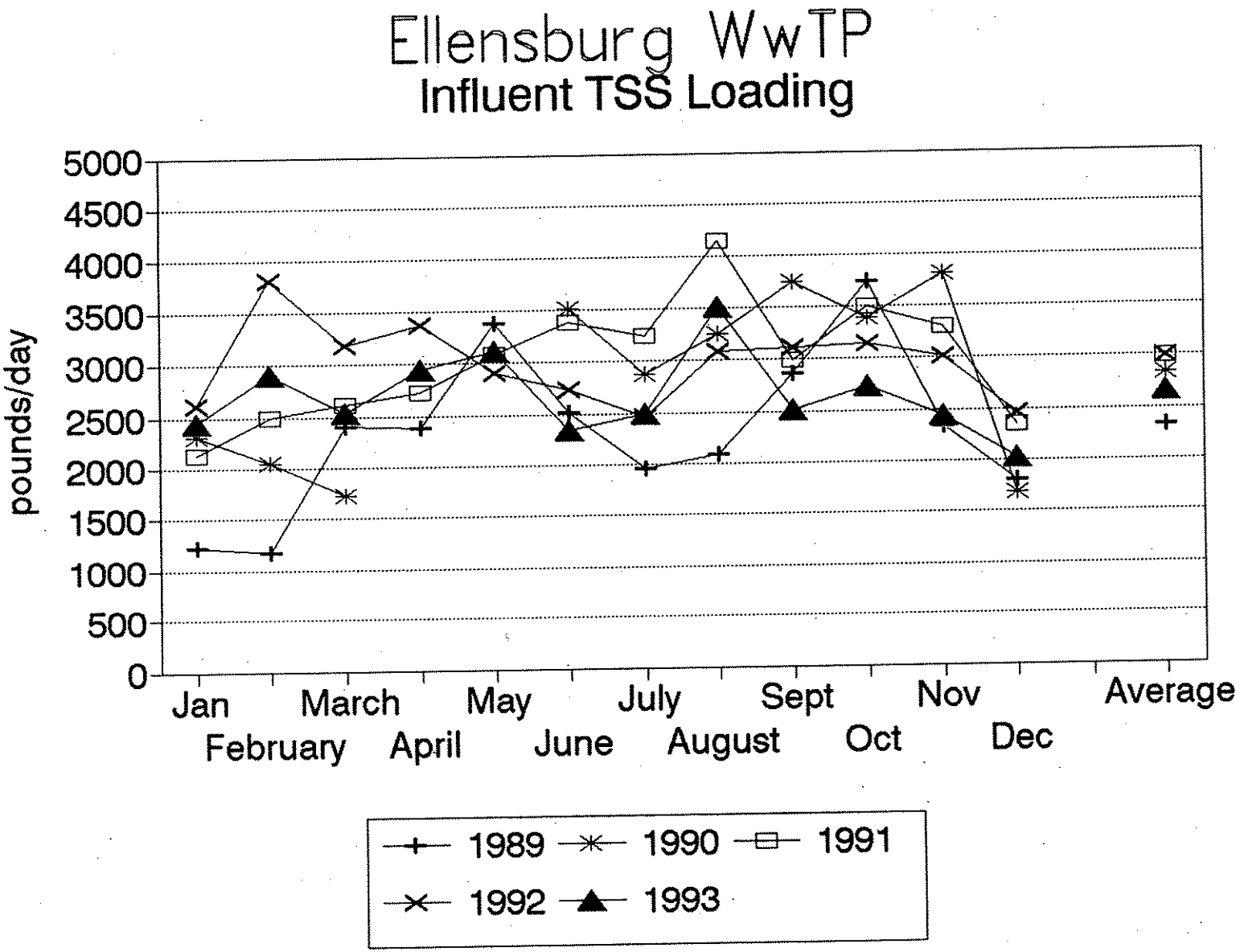

Figure based on self-monitoring data reported by Ellensburg.

Table 1 - Sampling Station Descriptions - Ellensburg, April 1994.

Ecology influent grab and composite samples (Inf-1,2; Inf-E)

Influent grab samples were taken from the headworks outlet box downstream of the grit chamber and screen. Samples were taken in a well mixed region upstream of the outlet pipe. The influent compositor sample intake was positioned two feet below the surface and above the bottom of the headworks outlet box upstream of the outlet pipe.

Ellensburg influent composite samples (Inf-L)

The compositor intake was positioned two feet above the bottom of the headworks outlet box upstream of the outlet pipe. A permanent line brought sample to the sampler located in the plant laboratory.

Ecology effluent grab and composite samples (Eff-1,2,3,4; Eff-E)

Samples were taken from the downstream end of the chlorine contact chamber, just upstream of the chamber's effluent weir. The compositor intake was positioned one foot below the surface, two feet away from the side of the chamber.

Ecology effluent grab composite sample (Eff-GC)

The sample was taken as equal portions of grab sample collected from the outlet channel of each of the two clarifiers, upstream of chlorination.

Ellensburg effluent composite sample (Eff-L)

The compositer intake was located in the pipe connecting the two clarifiers, upstream of chlorination. A permanent copper line brought sample to the sampler located in the plant laboratory.

Aeration basin samples (Aer-1; Aer-2)

Samples were taken from aeration basin #1 (the aeration basin nearer the headworks). Grab samples were taken five feet from the edge of the aeration basin in a well-mixed zone while the aerators were on.

Sludge

The sample was taken as a grab composite sample from sludge drying beds.

Centrifuge centrate (Centri)

The grab sample was taken from a tap on the line from the centrifuge.

Lagoon supernatant (Supnt)

The grab sample of the flow from the supernatant lagoons was taken by Ellensburg and split with Ecology.

Table 2 – General Chemistry Results – Ellensburg, April 1994.

Parameter	Location:	Inf–1	Inf–2	Inf–E	Inf–L	Aer–1	Aer–2	Eff–1	Eff–2	Eff–E	Eff–L	Eff–GC	Sludge	Dupe	Eff–3	Eff–4	Centri	Supnt
	Type:	grab	grab	comp	comp	grab	grab	grab	grab	comp	comp	comp	grab	comp	grab	grab	grab	grab
	Date:	4/19	4/19	4/19–20	4/19–20	4/19	4/19	4/19	4/19	4/19–20	4/19–20	4/19–20	4/19	4/19–20	4/20	4/20	4/19	4/18
	Time:	1110	1425	0915–0915	0830–0830	1025	1315	1035	1330	0915–0915	0830–0830	***	1540	0915–0915	0805	1110	1520	1430
	Lab Log #:	168155	168156	168157	168158	168159	168160	168161	168162	168163	168164	168165	168166	168167	168168	168169	168170	168171
GENERAL CHEMISTRY																		
Conductivity (umhos/cm)		488	515	455	461			341	343	362	363			363				
Alkalinity (mg/L CaCO3)				158	162					108	110	109		108				
Hardness (mg/L CaCO3)				123	130J					102	104	106		103				
TS (mg/L)				370	502	1710	1600			260	576			328			929	
TNVS (mg/L)				210	234	415	505			191	418			189			316	
TSS (mg/L)		111	121	88	176	1420	1500	3	3	3	3	5		3			782	
TNVSS (mg/L)				14	41	361	412J			1	1			1			164	
% Solids													62.6					
% Volatile Solids													55.8					
BOD5 (mg/L)				>24.0J*	67.5J*					8.6J*	4.2J*			17.3J*			67.7J*	
BOD INH (mg/L)				>22.8J*	>82.8J*					16.1J*	4.7J*			26.4J*				
COD (mg/L)				241	277					32.6	16.1			108				
TOC (water mg/L)		60.6	49.1	49.2	54.9			11.1	11.6	12.6	11.0			13.0				
TOC (soil/sed %C dry wt)													22.8					
Total Kjeldahl N (TKN mg/L)				1.0						12.3								
TKN (soil/sed mg/Kg)													22500					
NH3–N (mg/L)		0.458	8.59	10.4	11.1			0.076	0.249	0.271	0.123			0.271			0.824	0.010
NO2+NO3–N (mg/L)		2.20	2.51	3.43	2.77			1.21	3.89	2.70	2.50			2.43			0.056	0.050
NO2–N (mg/L)									0.239	0.369					0.023			
Total–P (mg/L)		3.17	2.67	2.35	2.81			1.31	2.46	2.45	1.30			1.22			2.74	17.8
F–Coliform MF (#/100mL)															150	320		
F–Coliform MPN (#/100mL)															220	220		
Fecal Coliform (sed #/100m													1100					
Total Coliform (sed #/100mL													350000					
FIELD OBSERVATIONS																		
Temperature (C)		15.3	17.0			14.9	16.2	15.4	18.6						13.4	14.2	16.9	
Temp–cooled (C)				4.0	9.2**					4.3	9.9**							
pH		7.3	7.3	7.3	7.6	7.2	6.8	7.1	6.9	7.2	7.3				7.1	7.1	7.2	
Conductivity (umhos/cm)		399	445	492	479	279	309	283	312	385	371				395	391	304	
Chlorine (mg/L)																		
Free								<0.1	<0.1	<0.1	<0.1				<0.1	<0.1		
Total								0.2	0.3	0.1	<0.1				0.3	0.4		

Inf – influent
Eff – effluent
Dupe – duplicate effluent sample
Aer – aeration basin
Centri – centrifuge centrate return flow
Supnt – lagoon supernatant
Sludge – sludge sample
E – Ecology sample
L – Ellensburg sample
J – estimated value

* – BOD analyses were performed with improper dilutions. The results are considered to be invalid.

** – samples were left out at room temperature before chilled temperature was recorded

*** – grab–composite sample taken as two grabs 1345 on 4/19 and 0815 on 4/20

Table 3 – NPDES Permit Limits and Inspection Results – Ellensburg, April 1994.

	NPDES Limits		Inspection Results	
Parameter	Monthly Average	Weekly Average	Composite Samples	Grab Samples
BOD5 (mg/L)	30	45	4 *	
lbs/day	1500	2250	105	
	15 % of influent		4.7 % of influent *	
TSS (mg/L)	30	45	3	
lbs/day	1200	1800	79	
	15 % of influent		3.4 % of influent	
Fecal Coliform (#/100mL)	200	400		150; 320; 220; 220
pH		6.0 to 9.0 (continuous)		7.1; 6.9
Flow	8.0 MGD	--	3.16 MGD **	

* based on Ellensburg laboratory analysis of Ecology influent sample and Ellensburg effluent sample.

** flow measured from 1006 on 4/19 to 0825 on 4/20, prorated to 24 hours

Table 4 – Split Sample Results Comparison – Ellensburg, April 1994.

Location:	Inf-E	Inf-L	Supnt	Eff-E	Eff-L	Eff-L1	Eff-3	Eff-4
Type:	comp	comp	grab	comp	comp	grab	grab	grab
Date:	4/19-20	4/19-20	4/18	4/19-20	4/19-20	4/19	4/20	4/20
Time:	0915-0915	0830-0830	1430	0915-0915	0830-0830	1130	0805	1110
Lab Log #:	168157	168158	168171	168163	168164		168168	168169
Sampled by:	Ecology	Ellensburg	Ellensburg	Ecology	Ellensburg	Ellensburg	Ecology	Ecology
Parameter								
Analysis by:								
BOD5 (mg/L)								
Ecology	>24.0J	67.5J		8.6J	4.2J			
Ellensburg	86	114	140	15	4			
TSS (mg/L)								
Ecology	88	176		3	3			
Ellensburg	71	155	438	4	3			
Fecal Coliform MF (#/100 mL)								
Ecology							150	320
Ellensburg						128		
Fecal Coliform MPN (#/100 mL)								
Ecology							220	220

E – Ecology
L – Ellensburg
Eff – final effluent
Inf – influent
Supnt – lagoon supernatant

comp – composite sample
grab – grab sample
J – estimated value
> – actual value is greater than stated value. The dilutions used in the test did not allow for an actual result.

MF – membrane filter method
MPN – most probable number method

Table 5 – Comparison of Organic Compounds and Metals Detected with Water Quality Criteria – Ellensburg, April 1994.

	Location:	Inf–1	Inf–2	Eff–1	Eff–2	Sludge	State Water Quality Criteria Summary	
	Type:	grab	grab	grab	grab	grab		
	Date:	4/19	4/19	4/19	4/19	4/19	Acute	Chronic
	Time:	1110	1425	1035	1330	1540	Fresh	Fresh
	Lab Log #:	168155	168156	168161	168162	168166		
(Group)[1]	VOA Compounds	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/Kg–dry)	(µg/L)	(µg/L)
a	Methylene Chloride					7 J	11,000 *(a)	
	Acetone	49	39	15		84		
	Carbon Disulfide		1 J			21 J		
a	Chloroform	1 J	2 J	3 J	2 J		28,900 *	1,240 *
	2–Butanone (MEK)					24 J		
	Tetrachloroethene		1 J				5,280 *	840 *
	Toluene		2 J	1 J			17,500 *	
	Total Xylenes	1 JX	3 JX					
h	1,4–Dichlorobenzene	1 J	1 J	1 J	1 J		1,120 *(h)	763 *(h)

		Inf–E	Eff–E	Sludge		
		comp	comp	grab		
		4/19–20	4/19–20	4/19		
		0915–0915	0915–0915	1540		
		168157	168163	168166		
(Group)[1]	BNA Compounds	(µg/L)	(µg/L)	(µg/Kg–dry)		
h	1,4–Dichlorobenzene	2 J			1120 *(h)	763 *(h)
n	Fluoranthene			640 J	3980 *	
n	Pyrene			830 J		
i	Bis(2–Ethylhexyl)Phthalate	4 J		31000	940 *(i)	3 *(i)

(Group)[1]	Pesticide/PCB Compounds	(µg/L)	(µg/L)	(µg/Kg–dry)	(µg/L)	(µg/L)
u	4,4'–DDE			58 J	1050 *	0.001 (u)
u	4,4'–DDD			28 J	0.6 *	0.001 (u)
v	gamma–Chlordane			13 JN	2.4 (v)	0.0043 (v)

J The analyte was positively identified. The associated numerical result is an estimate.
JN There is evidence that the analyte is present. The associated numerical result is an estimate.
X All xylene isomer results have been combined into one result for the VOA analyses.

Inf – influent
Eff – effluent
Sludge – sludge sample

a Total Halomethanes
h Total Dichlorobenzenes
i Total Phthalate Esters
u DDT plus metabolites
v Total Chlordane

Table 5 – (cont'd) – Ellensburg, April 1994.

Location:				State Water Quality Criteria Summary	
Type:	Inf–E	Eff–E	Sludge		
Date:	comp	comp	grab		
Time:	4/19–20	4/19–20	4/19		
Lab Log#:	0915–0915	0915–0915	1540		
	168157	168163	168166		
Metals **	(µg/L)	(µg/L)	(mg/Kg–dry)	Acute Fresh (µg/L)	Chronic Fresh (µg/L)
Arsenic	1.7 P		4.39 N	850 *	48 *
Pentavalent				360	190
Trivalent					
Beryllium			0.21 P	130 *	5.3 *
Cadmium	0.20 P		5.27	3.5 +	1.0 +
Chromium			28		
Total recoverable					
Total					
Hexavalent				16	11
Trivalent				1,765 +	210 +
Copper	24 P	4.8 P	695	16 +	10 +
Lead	3.5 P		130	58 +	2.2 +
Mercury (Total)	0.13 P		1.22	2.4	0.012
Nickel			28.5	1,370 +	152 +
Selenium			4.80	20	5.0
Silver	0.58 J		37.7 J	2.2 +	0.12
Zinc	57.9	23 P	937	106 +	96 +

[1]NOTE: SOME INDIVIDUAL COMPOUND CRITERIA OR LOELS MAY NOT AGREE WITH GROUP CRITERIA OR LOELS. REFER TO APPROPRIATE EPA DOCUMENT ON AMBIENT WATER QUALITY CRITERIA FOR FULL DISCUSSION.

J The analyte was positively identified. The associated numerical result is an estimate.
P The analyte was detected above the instrument detection limit but below the established minimum quantitation limit.
N The spike sample recovery is not within control limits.

* Insufficient data to develop criteria. Value presented is the LOEL – Lowest Observed Effect Level.
** Metals are total recoverable unless otherwise noted. Sludge metals are total.
\+ Hardness dependent criteria (102 mg/L used to represent effluent).

☐ – acute or chronic criteria exceeded

Inf – influent
Eff – effluent
Sludge – sludge sample
E – Ecology sample

Table 6 – Effluent Bioassay Results – Ellensburg, April 1994.

Daphnia magna – 48-hour survival test
(Daphnia magna)
Sample No. 168165

Sample Concentration	# Tested*	Percent Survival
0 % effluent	20	95
6.25 % effluent	20	100
12.5 % effluent	20	100
25 % effluent	20	100
50 % effluent	20	95
100 % effluent	20	100

NOEC = 100% effluent
LC50>100% effluent
* four replicates per concentration, five organisms per replicate

Ceriodaphnia dubia – survival/reproduction test
(Ceriodaphnia dubia)
Sample No. 168165

Sample Concentration	# Tested*	# Young Produced/Adult	Percent Survival
Control	10	20.7	100
6.25 %	10	18.9	100
12.5 %	10	21.1	100
25 %	10	21.4	100
50 %	10	21.8	100
100 %	10	23.2	100

Reproduction
NOEC = 100 % Effluent

Survival
NOEC = 100 % effluent
LC50 > 100 % effluent
* ten replicates per concentration, one organism per replicate

Fathead Minnow larval – survival and growth test
(Pimephales promelas)
Sample No. 168165

Sample Concentration	# Tested*	Percent Survival	Average Dry Weight (mg)
Control	40	87.5	0.44
6.25 % Effluent	40	100.0	0.46
12.5 % Effluent	40	100.0	0.46
25 % Effluent	40	100.0	0.47
50 % Effluent	40	65.0	0.50
100 % Effluent	40	77.5	0.52

Survival
NOEC = 100 % effluent
LC50 > 100 % effluent

Growth
NOEC = 100 % effluent
* four replicates per concentration, ten organisms per replicate

Fathead Minnow – 96 hour survival test
(Pimephales promelas)
Sample No. 168165

Sample Concentration	Number Tested*	Percent Survival
Control	40	97.5
6.25 % Effluent	40	97.5
12.5 % Effluent	40	100.0
25 % Effluent	40	100.0
50 % Effluent	40	90.0
100 % Effluent	40	100.0

NOEC = 100 % effluent
LC50 > 100 % effluent
* four replicates per concentration, ten organisms per replicate

Table 7 – Comparison of Sludge Organic Compounds and Metals Detected to EPA Criteria for Land Application – Ellensburg, April 1994.

Location:	Sludge
Type:	grab
Date:	4/19
Time:	1540
Lab Log#:	168166
VOA Compounds	µg/Kg-dry
Methylene Chloride	7J
Acetone	84
Carbon Disulfide	21J
2-Butanone (MEK)	24J
BNA Compounds	
Fluoranthene	640J
Pyrene	830J
Bis(2-Ethylhexyl)Phthalate	31000
Pesticide/PCB Compounds	µg/Kg-dry
4,4'-DDE	58J
4,4'-DDD	28J
gamma-Chlordane	13JN

Metals	Sludge grab 4/19 1540 168166 mg/Kg-dry	EPA Sludge Application Limits mg/Kg-dry	EPA Ceiling Concentrations mg/Kg-dry
Arsenic	4.39N	41	75
Beryllium	0.21P		
Cadmium	5.27	39	85
Chromium	28	1200	3000
Copper	695	1500	4300
Lead	130	300	840
Mercury	1.22	17	57
Nickel	28.5	420	420
Selenium	4.80	36	100
Silver	37.7		
Zinc	937	2800	7500

Sludge – sludge sample
grab – grab sample

J – The analyte was positively identified. The associated numerical result is an estimate.
N – The spike sample recovery is not within control limits.
P – The analyte was detected above the instrument detection limit but below the established minimum quantitation limit.

Appendices

Appendix A - Sampling Procedures - Ellensburg, April 1994.

Ecology Isco composite samplers were set up to collect equal volumes of sample every 30 minutes for 24 hours. The compositors were iced to keep samples cooled.

Ellensburg's composite influent and effluent samplers were located in the WWTP laboratory with sample transported to the lab through permanently installed lines. The lines were purged after each sampling and were reported to be flushed twice per week. As part of a lab upgrade, Ellensburg has tentative plans to place samplers remotely rather than in the lab (Grogan, 1995).

During the inspection, chlorine was added at the upstream end of the chlorine contact chamber. As a result the Ellensburg composite sample, taken upstream of the chlorine contact chamber, was unchlorinated while the Ecology sample, taken at the chlorine contact chamber effluent weir, was chlorinated. Samples of effluent before chlorination taken at two times comprised the grab-composite samples for bioassay tests. Previous to the inspection there were times when Ellensburg was not sampling and chlorine had been added to the clarifier launders.

Ellensburg composite samples for influent and effluent were flow proportioned, with sampling occuring typically slightly more often than once per hour. Ellensburg samples were refrigerated as they were being collected.

All Ecology composite samples and Ellensburg composite samples were split for both Ecology and Ellensburg laboratory analysis. Sampler configurations and locations are summarized in Figure 2 and Table 1.

Appendix B – Sampling Schedule – Ellensburg, April 1994.

Parameter	Location:	Inf–1	Inf–2	Inf–E	Inf–L	Aer–1	Aer–2	Eff–1	Eff–2	Eff–E	Eff–L	Eff–GC	Sludge	Dupe	Eff–3	Eff–4	Centri	Supnt
	Type:	grab	grab	comp	comp	grab	grab	grab	grab	comp	comp	comp	grab	comp	grab	grab	grab	
	Date:	4/19	4/19	4/19–20	4/19–20	4/19	4/19	4/19	4/19	4/19–20	4/19–20	4/19–20	4/19	4/19–20	4/20	4/20	4/19	4/18
	Time:	1110	1425	0915–0915	0830–0830	1025	1315	1035	1330	0915–0915	0830–0830	0815	1540	0915	0805	1110	1520	1430
	Lab Log #:	168155	168156	168157	168158	168159	168160	168161	168162	168163	168164	168165	168166	168167	168168	168169	168170	168171
GENERAL CHEMISTRY																		
Conductivity (umhos/cm)		E	E	E	E			E	E	E	E			E				
Alkalinity (mg/L CaCO3)				E	E					E	E	E		E				
Hardness (mg/L CaCO3)				E	E					E	E	E		E				
TS (mg/L)				E	E	E	E			E	E			E			E	
TNVS (mg/L)				E	E	E	E			E	E			E			E	
TSS (mg/L)		E	E	EL	EL	E	E	E	E	EL	EL	E		E			E	L
TNVSS (mg/L)				E	E	E	E		E		E			E			E	
% Solids													E					
% Volatile Solids													E					
BOD5 (mg/L)				EL	EL					EL	EL			E			E	L
BOD INH (mg/L)				E	E					E	E			E				
COD (mg/L)				E	E					E	E			E				
TOC (water mg/L)		E	E	E	E			E	E	E	E			E				
TOC (soil/sed %C dry wt)													E					
Total Kjeldahl N (TKN mg/L)				E	E					E								
TKN (soil/sed mg/Kg)													E					
NH3–N (mg/L)		E	E	E	E			E	E	E	E			E			E	E
NO2+NO3–N (mg/L)		E	E	E	E			E	E	E	E			E			E	E
NO2–N (mg/L)									E	E					E			
Total–P (mg/L)		E	E	E	E			E	E	E	E			E			E	E
F–Coliform MF (#/100mL)															E	E		
F–Coliform MPN (#/100mL)															E	E		
Fecal Coliform (sed #/100mL)													E					
Total Coliform (sed #/100mL)													E					
FIELD OBSERVATIONS																		
Temperature (C)		E	E			E	E	E	E						E	E	E	
Temp–cooled (C)				E	*					E	*							
pH		E	E	E	E	E	E	E	E	E	E				E	E	E	
Conductivity (umhos/cm)		E	E	E	E	E	E	E	E	E	E				E	E	E	
Chlorine (mg/L)																		
Free								E	E	E	E				E	E		
Total								E	E	E	E				E	E		

* – sample removed from refrigerator before temperature reading could be obtained

E – Ecology laboratory analysis
L – Ellensburg laboratory analysis

Inf – influent
Eff – effluent
Aer – aeration basin
Centri – centrifuge centrate return flow
Supnt – lagoon supernatant
Sludge – sludge sample
Dupe – duplicate effluent sample

Appendix C – Ecology Analytical Methods – Ellensburg, April 1994.

Laboratory Analysis	Method Used for Ecology Analysis	Laboratory Performing Analysis
Conductivity	EPA, Revised 1983: 120.1	Ecology Manchester Lab
Alkalinity	EPA, Revised 1983: 310.1	Ecology Manchester Lab
Hardness	EPA, Revised 1983: 130.2	Ecology Manchester Lab
TS	EPA, Revised 1983: 160.3	Ecology Manchester Lab
TNVS	EPA, Revised 1983: 160.3	Ecology Manchester Lab
TSS	EPA, Revised 1983: 160.2	Ecology Manchester Lab
TNVSS	EPA, Revised 1983: 160.2	Ecology Manchester Lab
% Solids	APHA, 1989: 2540G.	Ecology Manchester Lab
% Volatile Solids	EPA, Revised 1983: 160.4	Ecology Manchester Lab
BOD5	EPA, Revised 1983: 405.1	Analytical Resources, Inc.
BOD INH	EPA, Revised 1983: 405.1	Analytical Resources, Inc.
COD	EPA, Revised 1983: 410.1	Analytical Resources, Inc.
TOC (water)	EPA, Revised 1983: 415.1	Analytical Resources, Inc.
TOC (soil/sed)	EPA, Revised 1983: 415.1	Analytical Resources, Inc.
Total Kjeldahl N (TKN)	EPA, Revised 1983: 351.3	Analytical Resources, Inc.
TKN (soil/sed)	EPA, Revised 1983: 351.3	Analytical Resources, Inc.
NH3-N	EPA, Revised 1983: 350.1	Analytical Resources, Inc.
NO2+NO3-N	EPA, Revised 1983: 353.2	Analytical Resources, Inc.
NO2-N	EPA, Revised 1983: 353.2	Analytical Resources, Inc.
Total-P	EPA, Revised 1983: 365.3	Analytical Resources, Inc.
F-Coliform MF	APHA, 1992: 9222D.	Ecology Manchester Lab
F-Coliform MPN	APHA, 1992: 9221E.	Ecology Manchester Lab
F-Coliform (soil/sed)	APHA, 1989: 9221A.	Ecology Manchester Lab
T-Coliform (soil/sed)	APHA, 1989: 9221A.	Ecology Manchester Lab
VOC (water)	EPA, 1986: 8260	Weyerhaeuser
VOC (soil/sed)	EPA, 1986: 8240	Weyerhaeuser
BNAs (water)	EPA, 1986: 8270	Weyerhaeuser
BNAs (soil/sed)	EPA, 1986: 8270	Weyerhaeuser
Pest/PCB (water)	EPA, 1986: 8080	Weyerhaeuser
Pest/PCB (soil/sed)	EPA, 1986: 8080	Weyerhaeuser
PP Metals (water)	EPA, Revised 1983: 200-299	Ecology Manchester Lab
PP Metals (soil/sed)	EPA, Revised 1983: 200-299	Ecology Manchester Lab
Daphnia magna (chronic)	EPA, 1991	Ecology Manchester Lab
Ceriodaphnia (chronic)	EPA, 1991	Parametrix, Inc.
Fathead Minnow (acute)	EPA 1991	Parametrix, Inc.
Fathead Minnow (chronic)	EPA 1989	Parametrix, Inc.

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Appendix D - Quality Assurance/Quality Control (QA/QC) - Ellensburg, April 1994.

SAMPLING QA/QC

Ecology quality assurance procedures for sampling included priority pollutant cleaning of the sampling equipment prior to the inspection to prevent sample contamination (Appendix E). Chain-of-custody procedures were followed to assure the security of the samples (Ecology, 1994).

LABORATORY QA/QC

General Chemistry Analysis

Analyses were performed within holding times. The procedural blanks showed that the processes are free from contamination with the exception of BOD analyses. All sample results for BOD have been qualified with a "J". Some of the BOD results are from improper dilutions and have been given the ">" (greater than) symbol.

All check standards are reasonable, acceptable, and within QC limits. Replicate analyses are within QC limits with the exception of sludge TOC, which is qualified with a "J". All matrix spike recoveries and precision data are reasonable, acceptable, and within QC limits.

Temperatures of Ecology composite samples were within 1°C of the 4°C criteria. Ellensburg composite samples were removed from the refrigerators and allowed to warm before temperatures were recorded. As a result, the reliability of Ellensburg general chemistry results may be reduced. The Ellensburg composite samples were chilled immediately after splitting, however.

VOA, BNA, and Pesticide/PCB Priority Pollutant Organics Analysis

Wastewater and sludge samples were analyzed within the recommended holding times. No target analytes were detected in any of the method blanks with the exception of di-n-octyl phthalate, which was detected in the sludge method blank, but not in the sludge sample. Calibration was acceptable with the exception of the two VOA compounds 1,1,2,2-tetrachloroethane and 2-butanone and the BNA compound 4-nitroaniline. Blank spike recovery data are reasonable, acceptable, and within QC limits with the exceptions of the two BNA compounds 4-nitrophenol and pentachlorophenol, which exceeded QC limits only slightly. Surrogate recoveries were reasonable, acceptable, and within QC limits with the exception of the BNA compound terphenyl-d14 and several pesticide/PCB compounds qualified with a "UJ" or "J".

Metals Analysis

Wastewater and sludge samples were analyzed within the recommended holding times. Calibrations were acceptable. Procedural blanks showed no significant levels of analytes. All spike recoveries for wastewater were within acceptance limits except arsenic, thallium,

antimony and silver. Results for these analytes are qualified with an "N" or "J". Precision was within the CLP acceptance window. Laboratory control sample analyses were within the windows established for each parameter.

LABORATORY AUDIT

The Ellensburg laboratory was accredited on February 11, 1992. An onsite audit for re-accreditation was conducted in November 1994. The accreditation expires on February 10, 1996.

Appendix E - Priority Pollutant Cleaning Procedures - Ellensburg, April 1994.

PRIORITY POLLUTANT SAMPLING EQUIPMENT CLEANING PROCEDURES

1. Wash with laboratory detergent
2. Rinse several times with tap water
3. Rinse with 10% HNO_3 solution
4. Rinse three (3) times with distilled/deionized water
5. Rinse with high purity methylene chloride
6. Rinse with high purity acetone
7. Allow to dry and seal with aluminum foil

Appendix F - Nitrogen Balance - Ellensburg, April 1994.

N_{in} influent	=	N_{out} effluent	+	N_{out} sludge (TKN)	+	BALANCE
QC_{in} influent	=	QC_{out} effluent	+	N_{out} sludge (TKN)	+	BALANCE

TKN=12.3 mg/L	TKN = 1.0 mg/L	TKN = 22,500 mg/Kg
NO_2+NO_3-N=3.43mg/L	NO_2+NO_3-N=2.70mg/L	= 2.25% N dry wt
		(0.0225-N)(3308#/d dry*)
		=74.4 lb/d N

Q = flow rate
C = concentration
N = nitrogen (mass)

Influent Effluent Sludge
(15.73 mg/L)(8.34)(3.16MGD) = (3.70 mg/L)(8.34)(3.16MGD) + 74.4 lb/d + BALANCE
415 lb/d-N = 97.5 lb/d-N + 74.4 lb/d-N + BALANCE

BALANCE = 243 lb/day nitrogen

NOTE:

Because septage was not included in the Ecology influent sample, the actual influent nitrogen and the BALANCE would be somewhat higher than stated above. The volatilization of ammonia in the wastewater, while not considered, would not be appreciable since ammonia remains substantially in an aqueous solution at pH < 8 (WPCF, 1977). Also ammonia volatilization from the drying beds was not considered.

* sludge wastage to primary digester was calculated for the seven days up to and including the inspection dates as supplied by Ellensburg:

Date	WAS %TS	lbs (dry wt) to Primary Digester
4/14/94	0.76	3131
4/15/94	0.72	2830
4/16/94	0.61	2211
4/17/94	0.73	3086
4/18/94	0.68	2698
4/19/94	1.14	4776
AVERAGE	0.82	3308

Appendix G – VOA, BNA, Pesticide/PCB and Metals Scan Results – Ellensburg, April 1994.

Location:	Inf–1	Inf–2	Eff–1	Eff–2	Sludge
Type:	grab	grab	grab	grab	grab
Date:	4/19	4/19	4/19	4/19	4/19
Time:	1110	1425	1035	1330	1540
Lab Log #:	168155	168156	168161	168162	168166
VOA Compounds	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/Kg–dry)
Chloromethane	10 U	10 U	10 U	10 U	33 U
Bromomethane	10 U	10 U	10 U	10 U	33 U
Vinyl Chloride	10 U	10 U	10 U	10 U	33 U
Chloroethane	10 U	10 U	10 U	10 U	33 U
Methylene Chloride	10 U	10 U	10 U	10 U	7 J
Acetone	49	39	15	10 U	84
Carbon Disulfide	10 U	1 J	10 U	10 U	21 J
1,1–Dichloroethene	10 U	10 U	10 U	10 U	33 U
1,1–Dichloroethane	10 U	10 U	10 U	10 U	33 U
1,2–Dichloroethene (total)	10 U	10 U	10 U	10 U	33 U
Chloroform	1 J	2 J	3 J	2 J	33 U
1,2–Dichloroethane	10 U	10 U	10 U	10 U	33 U
2–Butanone (MEK)	10 UJ	10 UJ	10 UJ	10 UJ	24 J
1,1,1–Trichloroethane	10 U	10 U	10 U	10 U	33 U
Carbon Tetrachloride	10 U	10 U	10 U	10 U	33 U
Bromodichloromethane	10 U	10 U	10 U	10 U	33 U
1,2–Dichloropropane	10 U	10 U	10 U	10 U	33 U
cis–1,3–Dichloropropene	10 U	10 U	10 U	10 U	33 U
Trichloroethene	10 U	10 U	10 U	10 U	33 U
Dibromochloromethane	10 U	10 U	10 U	10 U	33 U
1,1,2–Trichloroethane	10 U	10 U	10 U	10 U	33 U
Benzene	10 U	10 U	10 U	10 U	33 U
trans–1,3–Dichloropropene	10 U	10 U	10 U	10 U	33 U
Bromoform	10 U	10 U	10 U	10 U	33 U
4–Methyl–2–Pentanone (MIBK)	10 U	10 U	10 U	10 U	33 U
2–Hexanone	10 U	10 U	10 U	10 U	33 U
Tetrachloroethene	10 U	1 J	10 U	10 U	33 U
1,1,2,2–Tetrachloroethane	10 UJ	10 UJ	10 UJ	10 UJ	33 U
Toluene	10 U	2 J	1 J	10 U	33 U
Chlorobenzene	10 U	10 U	10 U	10 U	33 U
Ethylbenzene	10 U	10 U	10 U	10 U	33 U
Styrene (Ethenylbenzene)	10 U	10 U	10 U	10 U	33 U
Total Xylenes	1 JX	3 JX	10 U	10 U	33 U
1,3–Dichlorobenzene	10 U	10 U	10 U	10 U	33 U
1,4–Dichlorobenzene	1 J	1 J	1 J	1 J	33 U
1,2–Dichlorobenzene	10 U	10 U	10 U	10 U	33 U

U The analyte was not detected at or above the reported result.
J The analyte was positively identified. The associated numerical result is an estimate.
UJ The analyte was not detected at or above the reported estimated result.
X All xylene isomer results have been combined into one result for the VOA analyses.

– detected analyte

Appendix G – (cont'd) – Ellensburg, April 1994.

Location:	Inf-E	Eff-E	Sludge
Type:	comp	comp	grab
Date:	4/19-20	4/19-20	4/19
Time:	0915-0915	0915-0915	1540
Lab Log#:	168157	168163	168166
BNA Compounds	(µg/L)	(µg/L)	(µg/Kg-dry)
Phenol	10 U	10 U	5400 U
Bis(2-Chloroethyl)Ether	10 U	10 U	5400 U
2-Chlorophenol	10 U	10 U	5400 U
1,3-Dichlorobenzene	10 U	10 U	5400 U
1,4-Dichlorobenzene	2 J	10 U	5400 U
1,2-Dichlorobenzene	10 U	10 U	5400 U
2-Methylphenol	10 U	10 U	5400 U
2,2-oxybis(1-Chloropropane)	10 U	10 U	5400 U
4-Methylphenol	10 U	10 U	5400 U
N-Nitroso-di-n-Propylamine	10 U	10 U	5400 U
Hexachloroethane	10 U	10 U	5400 U
Nitrobenzene	10 U	10 U	5400 U
Isophorone	10 U	10 U	5400 U
2-Nitrophenol	10 U	10 U	5400 U
2,4-Dimethylphenol	10 U	10 U	5400 U
Bis(2-Chloroethoxy)Methane	10 U	10 U	5400 U
2,4-Dichlorophenol	10 U	10 U	5400 U
1,2,4-Trichlorobenzene	10 U	10 U	5400 U
Naphthalene	10 U	10 U	5400 U
4-Chloroaniline	10 U	10 U	5400 U
Hexachlorobutadiene	10 U	10 U	5400 U
4-Chloro-3-Methylphenol	10 U	10 U	5400 U
2-Methylnaphthalene	10 U	10 U	5400 U
Hexachlorocyclopentadiene	10 U	10 U	5400 U
2,4,6-Trichlorophenol	10 U	10 U	5400 U
2,4,5-Trichlorophenol	25 U	25 U	13000 U
2-Chloronaphthalene	10 U	10 U	5400 U
2-Nitroaniline	25 U	25 U	13000 U
Dimethyl Phthalate	10 U	10 U	5400 U
Acenaphthylene	10 U	10 U	5400 U
2,6-Dinitrotoluene	10 U	10 U	5400 U
3-Nitroaniline	25 U	25 U	13000 U
Acenaphthene	10 U	10 U	5400 U
2,4-Dinitrophenol	25 U	25 U	13000 U
4-Nitrophenol	25 U	25 U	13000 U
Dibenzofuran	10 U	10 U	5400 U
2,4-Dinitrotoluene	10 U	10 U	5400 U
Diethyl Phthalate	10 U	10 U	5400 U
4-Chlorophenyl Phenylether	10 U	10 U	5400 U
Fluorene	10 U	10 U	5400 U
4-Nitroaniline	25 U	25 U	13000 UJ
4,6-Dinitro-2-Methylphenol	25 U	25 U	13000 U

U The analyte was not detected at or above the reported result.

J The analyte was positively identified. The associated numerical result is an estimate.

UJ The analyte was not detected at or above the reported estimated result.

[ ] – detected analyte

Appendix G – (cont'd) – Ellensburg, April 1994.

Location:	Inf-E		Eff-E		Sludge	
Type:	comp		comp		grab	
Date:	4/19-20		4/19-20		4/19	
Time:	0915-0915		0915-0915		1540	
Lab Log#:	168157		168163		168166	
BNA Compounds (cont'd)	(µg/L)		(µg/L)		(µg/Kg-dry)	
N-Nitrosodiphenylamine	10	U	10	U	5400	U
4-Bromophenyl Phenylether	10	U	10	U	5400	U
Hexachlorobenzene	10	U	10	U	5400	U
Pentachlorophenol	25	U	25	U	13000	U
Phenanthrene	10	U	10	U	5400	U
Anthracene	10	U	10	U	5400	U
Carbazole	10	U	10	U	5400	U
Di-n-Butyl Phthalate	10	U	10	U	5400	U
Fluoranthene	10	U	10	U	640	J
Pyrene	10	UJ	10	U	830	J
Butylbenzyl Phthalate	10	UJ	10	U	5400	U
3,3'-Dichlorobenzidine	10	UJ	10	U	5400	U
Benzo(a)Anthracene	10	UJ	10	U	5400	U
Chrysene	10	UJ	10	U	5400	U
Bis(2-Ethylhexyl)Phthalate	4	J	10	U	31000	
Di-n-Octyl Phthalate	10	U	10	U	5400	U
Benzo(b)Fluoranthene	10	U	10	U	5400	U
Benzo(k)Fluoranthene	10	U	10	U	5400	U
Benzo(a)Pyrene	10	U	10	U	5400	U
Indeno(1,2,3-cd)Pyrene	10	U	10	U	5400	U
Dibenzo(a,h)Anthracene	10	U	10	U	5400	U
Benzo(g,h,i)Perylene	10	U	10	U	5400	U

U The analyte was not detected at or above the reported result.
J The analyte was positively identified. The associated numerical result is an estimate.
UJ The analyte was not detected at or above the reported estimated result.

[ ] – detected analyte

Appendix – G – (cont'd) – Ellensburg, April 1994.

Location:	Inf-E		Eff-E		Sludge	
Type:	comp		comp		grab	
Date:	4/19-20		4/19-20		4/19	
Time:	0915-0915		0915-0915		1540	
Lab Log#:	168157		168163		168166	
Pesticide/PCB Compounds	(µg/L)		(µg/L)		(µg/Kg-dry)	
alpha-BHC	0.050	UJ	0.050	U	28	U
beta-BHC	0.050	UJ	0.050	U	28	U
delta-BHC	0.050	UJ	0.050	U	28	U
gamma-BHC (Lindane)	0.050	UJ	0.050	U	28	U
Heptachlor	0.050	UJ	0.050	U	28	U
Aldrin	0.050	UJ	0.050	U	28	U
Heptachlor Epoxide	0.050	UJ	0.050	U	28	U
Endosulfan I	0.050	UJ	0.050	U	28	U
Dieldrin	0.10	UJ	0.10	U	56	U
4,4'-DDE	0.10	UJ	0.10	U	58	J
Endrin	0.10	UJ	0.10	U	56	U
Endosulfan II	0.10	UJ	0.10	U	56	U
4,4'-DDD	0.10	UJ	0.10	U	28	J
Endosulfan Sulfate	0.10	UJ	0.10	U	56	U
4,4'-DDT	0.10	UJ	0.10	U	56	U
Methoxychlor	0.50	UJ	0.50	U	280	U
Endrin Ketone	0.10	UJ	0.10	U	56	U
alpha-Chlordane	0.050	UJ	0.050	U	29	U
gamma-Chlordane	0.050	UJ	0.050	U	13	JN
Toxaphene	5.0	UJ	5.0	U	2800	U
Aroclor-1016	1.0	UJ	1.0	UJ	540	UJ
Aroclor-1221	2.0	UJ	2.0	UJ	1100	UJ
Aroclor-1232	1.0	UJ	1.0	UJ	540	UJ
Aroclor-1242	1.0	UJ	1.0	UJ	540	UJ
Aroclor-1248	1.0	UJ	1.0	UJ	540	UJ
Aroclor-1254	1.0	UJ	1.0	UJ	540	UJ
Aroclor-1260	1.0	UJ	1.0	UJ	540	UJ
Endrin Aldehyde	0.10	UJ	0.10	U	56	UJ

U The analyte was not detected at or above the reported result.
J The analyte was positively identified. The associated numerical result is an estimate.
UJ The analyte was not detected at or above the reported estimated result.
JN There is evidence that the analyte is present. The associated numerical result is an estimate.

[ ] – detected analyte

Appendix G – (cont'd) – Ellensburg, April 1994.

Location:			
Type:	Inf–E	Eff–E	Sludge
Date:	comp	comp	grab
Time:	4/19–20	4/19–20	4/19
Lab Log#:	0915–0915	0915–0915	1540
	168157	168163	168166
Metals *	(µg/L)	(µg/L)	(mg/Kg–dry)
Antimony	30 U	30 U	3 UJ
Arsenic	1.7 P		4.39 N
Pentavalent			
Trivalent			
Beryllium	1 U	1 U	0.21 P
Cadmium	0.20 P	0.10 U	5.27
Chromium	5 U	5 U	28
Total recoverable			
Total			
Hexavalent			
Trivalent			
Copper	24 P	4.8 P	695
Lead	3.5 P	1.0 U	130
Mercury (Total)	0.13 P	0.05 U	1.22
Nickel	10 U	10 U	28.5
Selenium	2.0 U	2.0 U	4.80
Silver	0.58 J	0.50 UN	37.7 J
Thallium	2.5 U	2.5 U	0.50 UN
Zinc	57.9	23 P	937

U The analyte was not detected at or above the reported result.
J The analyte was positively identified. The associated numerical result is an estimate.
UJ The analyte was not detected at or above the reported estimated result.
P The analyte was detected above the instrument detection limit but below the established minimum quantitation limit.
UN The analyte was not detected and the sample spike recovery was not within detection limits.

– detected analyte

* Metals are total recoverable unless otherwise noted. Sludge metals are total.

Inf – influent
Eff – effluent
Sludge – sludge sample
E – Ecology sample

Appendix H – VOA and BNA Scan Tentatively Identified Compounds (TICs)–
Ellensburg, April 1994.

TIC data are presented on the laboratory report sheets that follow. Fractions are identified as volatile organics (VOAs) or semivolatile organics (BNAs). Locations corresponding to the Lab Log # (called Sample No. on the laboratory report sheet) and data qualifiers are summarized on this page.

Location:	Inf–1	Inf–2	Inf–E	Eff–1	Eff–2	Eff–E	Sludge
Type:	grab	grab	comp	grab	grab	comp	grab
Date:	4/19	4/19	4/19–20	4/19	4/19	4/19–20	4/19
Time:	1110	1425	0915–0915	1035	1330	0915–0915	1540
Lab Log #:	168155	168156	168157	168161	168162	168163	168166

Inf – influent sample
Eff – effluent sample
Sludge – sludge sample

grab – grab sample
comp – composite sample
E – Ecology sample

J – The associated numerical result is an estimated quantity.
JN – There is evidence that the analyte is present. The associated numerical result is an estimate.

1E

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

168155

Lab Name: WEYERHAEUSER Contract: 046-5751

Lab Code: WEYER Case No.: 14637 SAS No.: SDG No.: 168155

Matrix: (soil/water) WATER Lab Sample ID: 27224

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B2755

Level: (low/med) LOW Date Received: 04/21/94

% Moisture: not dec. Date Analyzed: 04/26/94

GC Column: CAP ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Number TICs found: 2

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 541059	HEXAMETHYLCYCLOTRISILOXANE	22.14	17	JN
2. 556672	Cyclotetrasiloxane, octameth	29.00	31	JN

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

168156

Lab Name: WEYERHAEUSER Contract: 046-5751

Lab Code: WEYER Case No.: 14637 SAS No.: SDG No.: 168155

Matrix: (soil/water) WATER Lab Sample ID: 27225

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B2756

Level: (low/med) LOW Date Received: 04/21/94

% Moisture: not dec. Date Analyzed: 04/26/94

GC Column: CAP ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Number TICs found: 2 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 556672	Cyclotetrasiloxane, octameth	28.94	16	JN
2. 138863	Limonene	31.28	11	JN

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

168161

Lab Name: WEYERHAEUSER Contract: 046-5751

Lab Code: WEYER Case No.: 14637 SAS No.: SDG No.: 168155

Matrix: (soil/water) WATER Lab Sample ID: 27226

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B2757

Level: (low/med) LOW Date Received: 04/21/94

% Moisture: not dec. Date Analyzed: 04/26/94

GC Column: CAP ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Number TICs found: 1 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 556672	Cyclotetrasiloxane, octameth	28.96	13	JN

000066

1E

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

168162

Lab Name: WEYERHAEUSER Contract: 046-5751

Lab Code: WEYER Case No.: 14637 SAS No.: SDG No.: 168155

Matrix: (soil/water) WATER Lab Sample ID: 27227

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: B2758

Level: (low/med) LOW Date Received: 04/21/94

% Moisture: not dec. Date Analyzed: 04/26/94

GC Column: CAP ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Number TICs found: 2 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 541059	HEXAMETHYLCYCLOTRISILOXANE	22.10	7	JN
2. 556672	Cyclotetrasiloxane, octameth	28.91	19	JN

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

168166

Lab Name: WEYERHAEUSER Contract: 046-5751

Lab Code: WEYER Case No.: 14637 SAS No.: SDG No.: 168155

Matrix: (soil/water) SOIL Lab Sample ID: 27223

Sample wt/vol: 2.5 (g/mL) G Lab File ID: A6768

Level: (low/med) LOW Date Received: 04/21/94

% Moisture: not dec. 40 Date Analyzed: 04/28/94

GC Column: CAP ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Number TICs found: 10 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q	
1.	107391	1-Pentene, 2,4,4-trimethyl-	23.04	33	JN	
2.	556672	Cyclotetrasiloxane, octameth	27.05	60	JN	
3.	~~62016142~~	~~Octane, 2,5,6-trimethyl-~~	~~28.35~~	17	JN	KF
4.	95498	Benzene, 1-chloro-2-methyl-	28.78	80	JN	
5.	3728572	Cyclopentane, 1-methyl-2-pro	29.64	110	JN	
6.	1071814	Hexane, 2,2,5,5-tetramethyl-	30.90	140	JN	
7.	99876	Benzene, 1-methyl-4-(1-methy	31.43	30	JN	
8.	1120214	Undecane	32.65	87	JN	
9.	55334402	Benzeneacetic acid, .alpha.,	33.26	53	JN	
10.	89827	Pulegone	34.78	27	JN	

3. 55282116 Heneicosane, 11-(1-ethylpropyl)- 28.35 KF

000091

1F

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

168157

Lab Name: WEYERHAEUSER Contract: 8270

Lab Code: WEYER Case No.: 14637 SAS No.: SDG No.: 168155

Matrix: (soil/water) WATER Lab Sample ID: 27228

Sample wt/vol: 1000 (g/mL) ML Lab File ID: BN0503D

Level: (low/med) LOW Date Received: 04/21/94

% Moisture: decanted: (Y/N) Date Extracted: 04/26/94

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 05/04/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.4

Number TICs found: 20 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	10482-56-1	3-CYCLOHEXENE-1-METHANOL, .A	10.79	29	JN
2.		UNKNOWN	14.10	15	J
3.	143-07-7	DODECANOIC ACID	17.30	16	JN
4.		UNKNOWN	21.09	10	J
5.	58-08-2	1H-PURINE-2,6-DIONE, 3,7-DIH	21.17	14	JN
6.	1002-84-2	PENTADECANOIC ACID	21.49	13	JN
7.	109-29-5	OXACYCLOHEPTADECAN-2-ONE	22.65	120	JN
8.	57-10-3	HEXADECANOIC ACID	23.27	490	JN
9.		UNKNOWN FATTY ACID	23.64	16	J
10.		UNKNOWN FATTY ACID	23.67	11	J
11.	506-12-7	HEPTADECANOIC ACID	24.12	10	JN
12.		UNKNOWN	25.52	1100	J
13.	57-11-4	OCTADECANOIC ACID	25.76	270	JN
14.		UNKNOWN	25.84	22	J
15.	60-33-3	9,12-OCTADECADIENOIC ACID (Z	26.16	12	JN
16.		UNKNOWN	27.31	16	J
17.	506-30-9	EICOSANOIC ACID	27.56	6	JN
18.	111-02-4	2,6,10,14,18,22-TETRACOSAHEX	32.04	20	JN
19.		UNKNOWN	34.72	41	J
20.	57-88-5	CHOLEST-5-EN-3-OL (3.BETA.)-	35.06	33	JN

1F

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

168163

Lab Name: WEYERHAEUSER Contract: 8270

Lab Code: WEYER Case No.: 14637 SAS No.: SDG No.: 168155

Matrix: (soil/water) WATER Lab Sample ID: 27229

Sample wt/vol: 1000 (g/mL) ML Lab File ID: BN0503E

Level: (low/med) LOW Date Received: 04/21/94

% Moisture: decanted: (Y/N) Date Extracted: 04/26/94

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 05/04/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.5

Number TICs found: 8 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	112-34-5	ETHANOL, 2-(2-BUTOXYETHOXY)-	10.64	15	JN
2.	2091-29-4	9-HEXADECENOIC ACID	22.45	4	JN
3.	57-10-3	HEXADECANOIC ACID	22.75	11	JN
4.	16695-40-2	7-DODECENOL	24.82	3	JN
5.		UNKNOWN	24.92	9	J
6.		UNKNOWN	24.97	4	J
7.		UNKNOWN	25.02	2	J
8.	57-11-4	OCTADECANOIC ACID	25.21	4	JN

1F

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

168166

Lab Name: WEYERHAEUSER Contract: 8270

Lab Code: WEYER Case No.: 14637 SAS No.: SDG No.: 168155

Matrix: (soil/water) SOIL Lab Sample ID: 27223

Sample wt/vol: 30.3 (g/mL) G Lab File ID: 2SV40427I

Level: (low/med) LOW Date Received: 04/21/94

% Moisture: 40 decanted: (Y/N) N Date Extracted: 04/22/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 04/27/94

Injection Volume: 2.0(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 7.5

Number TICs found: 21

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
~~1.~~	~~123-42-2~~	~~3-PENTANONE, 4-HYDROXY-4-MET~~	~~4.05~~	~~24000~~	~~BJNA~~ KF
2.		UNKNOWN	19.07	18000	J
3.	629-78-7	HEPTADECANE	19.14	24000	JN
4.		UNKNOWN	19.20	21000	J
5.		UNKNOWN	19.32	30000	J
6.		UNKNOWN	19.47	19000	J
7.	25154-52-3	PHENOL, NONYL-	19.74	24000	JN
8.	140-66-9	PHENOL, 4-(1,1,3,3-TETRAMETH	19.89	25000	JN
9.		UNKNOWN	31.49	40000	J
10.	7683-64-9	2,6,10,14,18,22-TETRACOSAHEX	32.02	84000	JN
11.	630-03-5	NONACOSANE	32.86	76000	JN
12.	28338-69-4	CHOLEST-3-ENE, (5.ALPHA.)-	34.94	330000	JN
13.		UNKNOWN	35.31	430000	J
14.	18769-46-5	CHOLESTAN-3-OL, (3.ALPHA.)-	35.37	160000	JN
15.	50657-31-3	ERGOSTA-5,8,22-TRIEN-3-OL, (	35.61	90000	JN
16.		UNKNOWN	36.16	80000	J
17.	601-54-7	CHOLEST-5-EN-3-ONE	36.34	92000	JN
18.		UNKNOWN	36.51	110000	J
19.		UNKNOWN	36.82	45000	J
20.	79-62-9	LANOST-8-EN-3-OL, (3.BETA.)-	36.97	41000	JN
21.		UNKNOWN	37.21	150000	J

Appendix I - Glossary of Terms - Ellensburg, April 1994.

BOD - biochemical oxygen demand
BOD INH - biochemical oxygen demand with inhibited nitrogenous demand
BNA - base-neutral acids (semivolatile organics)
Clar - clarifier
COD - chemical oxygen demand
comp - composite sample
dry wt - dry weight
est. - estimated concentration
E - Department of Ecology
Eff - effluent
EPA - United States Environmental Protection Agency
F-coli - fecal coliform bacteria
g - gram
grab - grab sample
grab-comp - grab-composite sample
Inf - influent
L - Ellensburg
LC50 - concentration which is lethal to 50% of the test organisms
MF - membrane filter
mg - milligram
mg/L - milligram per liter
MPN - most probable number
NOEC - no observable effect concentration
NPDES - National Pollutant Discharge Elimination System
P - phosphorus
pH - hydrogen ion concentration
QA - quality assurance
QC - quality control
T-coli - total coliform bacteria
TIC - tentatively identified compound
TNVS - total nonvolatile solids
TNVSS - total nonvolatile suspended solids
TOC - total organic carbon
TS - total solids
TSS - total suspended solids
μg - microgram
VOA - volatile organic acid