

ALUMINUM COMPANY OF AMERICA (WENATCHEE)
DECEMBER 1992 CLASS II INSPECTION

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ABSTRACT

A Class II Inspection was conducted at the Aluminum Company of America Wenatchee Works (ALCOA) December 1-3, 1992. The sanitary sewage treatment plant (STP) was performing well during the inspection. The STP effluent met permit limits for BOD₅, TSS, fecal coliform, and pH. The 001 discharge (stormwater, non-contact cooling water, and sanitary effluent) was also well within NPDES permit limits. Few organic pollutants were detected in either the STP effluent or the combined 001 outfall. With the exception of acetone, used for laboratory cleaning, all VOA and BNA organic compounds found were in concentrations less than 10 ug/L. Two PAH's were found in the 001 effluent at estimated concentrations of 0.03 ug/L or below. Of the five PP metals found in the 001 effluent, lead (in one of four samples) and cadmium exceeded EPA chronic freshwater water quality criteria and zinc exceeded acute and chronic criteria. Bioassays for *Daphnia magna*, *Ceriodaphnia dubia*, fathead minnow, and rainbow trout showed no adverse effects. The need for a review of ALCOA STP influent sampling; TSS, fluoride, and aluminum analysis; and mercury and nickel sampling and analysis are indicated.

INTRODUCTION

An unannounced Class II Inspection was conducted at the Aluminum Company of America Wenatchee Works (ALCOA) December 1-3, 1992. Conducting the unannounced inspection from the Washington State Department of Ecology (Ecology) were Eric Oie of the Industrial Section and Steven Golding of the Toxics, Compliance and Ground Water Investigations Section. Assisting from ALCOA were J.A. Thompson (Northwest Environmental Manager), Cordell Newby (Environmental Technician), Steve Sparman, and Jeff Cockrum. The Ecology Industrial Section requested the inspection.

The ALCOA primary aluminum smelter is located approximately 10 miles southeast of Wenatchee on the west bank of the Columbia River, 1.8 miles upstream from Rock Island Dam (Figure 1). Associated facilities consist of five pot lines, an anode baking furnace, and casting facilities. The pot lines contain 774 center-worked pre-bake reduction cells.

On-site wells supply potable water. All other water needs (non-contact cooling water and boiler makeup water) are supplied by withdrawal of water from the Columbia River. Stormwater and non-contact cooling water are discharged through Outfall 001. All sanitary wastewater is treated by an extended aeration sewage treatment plant (STP). A redundant extended aeration treatment unit was not in use at the time of the inspection. Plant operation is switched as needed to provide for maintenance. The STP effluent is discharged through Outfall 001 with the stormwater and non-contact cooling water to the Columbia River (Figure 2). The current National Discharge Elimination System (NPDES) permit (WA-000068-0) was issued August 23, 1990, and expires August 23, 1995.

Objectives of the inspection included:

1. verify NPDES permit self monitoring,
2. assess STP effluent and Outfall 001 discharge compliance with NPDES permit limits, and
3. assess Outfall 001 discharge toxicity with priority pollutant scans and bioassays.

PROCEDURES

Ecology collected composite samples at the STP influent (Inf-ES), STP effluent (Eff-ES), and 001 outfall. Ecology Isco composite samplers were set up to collect equal volumes of sample every 30 minutes for 24 hours. Samples of 001 effluent taken at two times comprised the grab-composite sample for bioassay tests. Intake water, 001 effluent, STP influent, and STP effluent grab samples were also taken. Sampler configurations and locations are summarized in Figure 2 and Table 1.

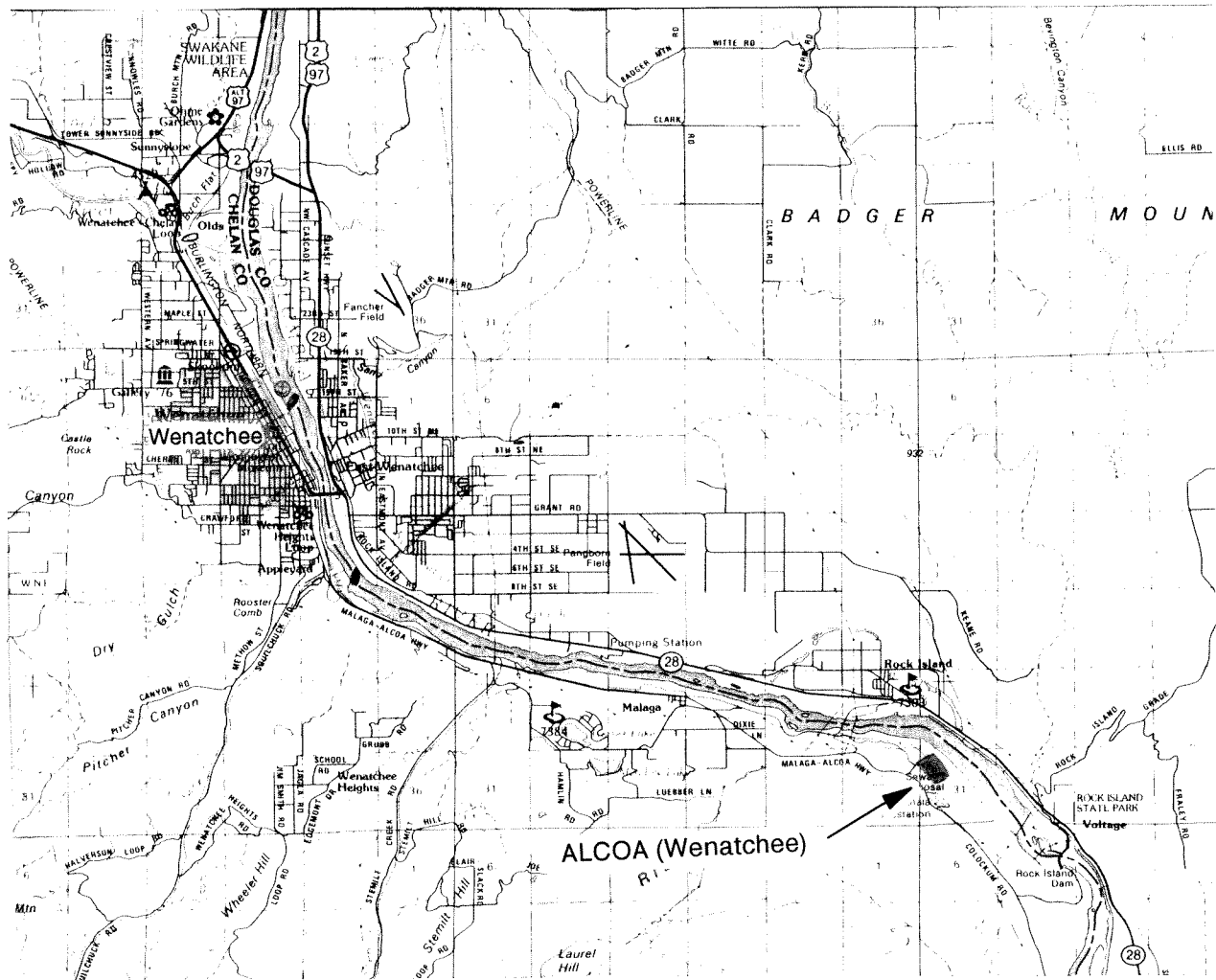
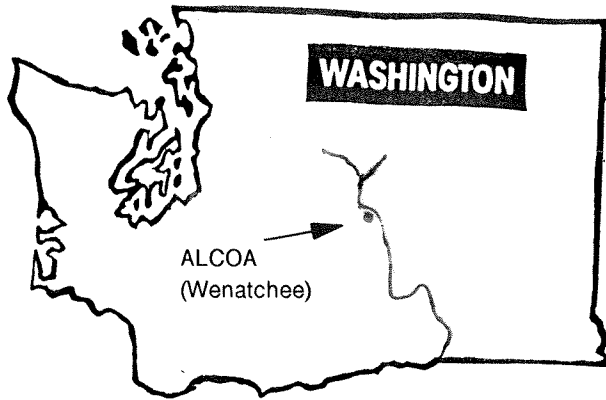


Figure 1 – Location Map – ALCOA (Wenatchee), December 1992.

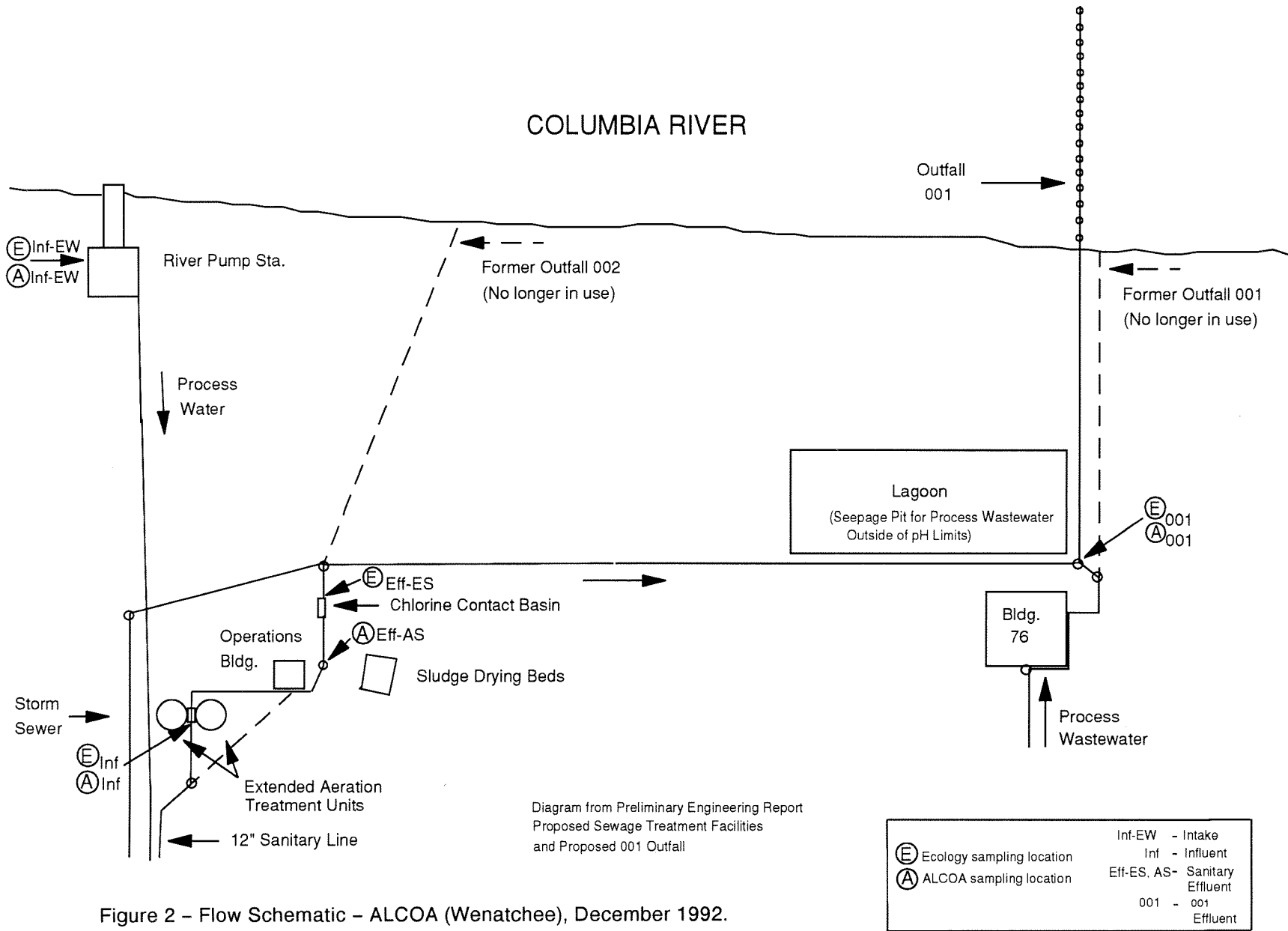


Figure 2 - Flow Schematic - ALCOA (Wenatchee), December 1992.

Table 1 - Sampling Station Descriptions - ALCOA (Wenatchee), December 1992.

Ecology grab water intake samples (Inf-EW)

The samples were collected in the pump house from a tap downstream of the intake pump.

Ecology STP influent sample (Inf-S, Inf-ES)

The grab and composite samples were collected from a comminutor from which the influent flows into the aeration basin. The composite sampler intake was positioned between the inlet and outlet of the comminutor in a well-mixed area. The intake was secured in place on the bottom of the comminutor, as required by the shallow depth of flow.

ALCOA STP influent sample (Inf-AS)

The composite sampler intake was placed on the bottom of the comminutor.

Ecology STP aeration basin sample (Aer)

Grab samples were collected from the central walkway in a well mixed portion of the basin.

Ecology STP effluent sample (Eff-ES)

The grab and composite samples were collected in front of the outfall pipe in the chlorination basin. The composite sampler intake was suspended inside the basin above the bottom of basin in a highly mixed area.

ALCOA STP effluent sample (Eff-AS)

The composite sample was collected with a submersible pump in a manhole in a well mixed region, before chlorination. Grab samples were collected at the outlet of the chlorination basin.

Ecology 001 effluent sample (001-E)

Composite sampler intake centered in front of outfall pipe downstream from effluent weir.

ALCOA 001 effluent sample (001-A)

Composite sampler intake at outfall pipe.

ALCOA also collected STP influent, STP effluent, and 001 composite samples. The ALCOA STP influent sampler was set to collect equal volumes of sample every 10 minutes for 24 hours. The ALCOA 001 sampler was set to collect equal volumes of sample every two minutes for 24 hours. The ALCOA STP effluent sampler was set to collect flow-proportioned samples.

All composite samples were split for both Ecology and ALCOA laboratory analysis. The sampling schedule, parameters analyzed, and sample splits are included in Appendix A. Ecology analytical methods and laboratories performing the analyses are summarized in Appendix B.

QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

Sampling

Ecology quality assurance procedures for sampling included special cleaning of the sampling equipment prior to the inspection to prevent sample contamination (Appendix C). Chain of custody procedures were followed to assure the security of the samples (Huntamer and Hyre, 1991).

Analyses

Most Ecology laboratory data met Ecology QA/QC guidelines and are considered to be reliable. Those data that did not meet the guidelines are appropriately qualified on the data tables. Comments on specific tests are included in the following paragraphs.

General chemistry results were acceptable other than as qualified.

VOA results were acceptable other than as qualified for methylene chloride and acetone. Methylene chloride was detected in the VOA method blank and in several samples at less than five times the amount detected in the method blank. Likely due to laboratory contamination, the methylene chloride sample results appear with the qualifier "U" to indicate that this analyte was not detected at a level above the suspected laboratory contamination. The percent difference between the initial and continuing calibration standards were within the maximum 25%, with the exception of acetone. Positive results for acetone have been qualified with a "J" (estimated value), and non-detected results have been qualified with a "UJ" (estimated detection limit).

BNA's, Pesticides/PCB's, and Polynuclear Aromatic Hydrocarbons method blanks and surrogate recoveries were reasonable, acceptable, and within QC limits.

The procedural blanks associated with the metals samples showed analytically significant levels of zinc and cadmium. Zinc concentrations above 62 ug/L (within a factor of ten of the concentration found in the procedural blank) are qualified with a "B" (significant blank

contamination). Cadmium results are estimated due to problems with other QA tests. All spike recoveries were within acceptance limits with the exception of cadmium. The QA discrepancies with cadmium are the result of low level contamination during the digestion procedure. The lab has been investigating the source of this contamination. The cadmium results are qualified as estimates ("J").

RESULTS AND DISCUSSION

Flow Measurements

STP

ALCOA measures effluent STP flow with a rectangular weir in the chlorine contact basin. The weir was not readily accessible to Ecology for verification of flow measurements.

Outfall 001

ALCOA flow measurements for the 001 outfall were used to calculate the loading of permitted parameters in lbs/day. Flow is measured at a rectangular weir just upstream of the 001 outfall pipe. An Ecology instantaneous water depth measurement at the weir was 2.5 inches. With a measured weir width of 10' 5 1/16", the corresponding flow was determined to be 2.13 MGD. The ALCOA staff gauge indicated 2.5 inches of depth with a corresponding flow from the ALCOA conversion chart of 2.15 MGD. ALCOA and Ecology flow measurements thus were in agreement. The ALCOA continuous flow meter indicated 2.36 MGD, within 10% of the Ecology flow.

NPDES Permit Compliance/General Chemistry

STP

The STP was performing well during the inspection. The conventional parameters of 5-day biochemical oxygen demand (BOD₅), total suspended solids (TSS), and fecal coliform indicate a high quality effluent (Table 2). The effluent met NPDES permit limits for BOD₅, TSS, total chlorine residual, fecal coliform, and pH (Table 3). TSS percent removal for the 24-hour composite sample was 79% compared with a permitted minimum 30-day average removal of 85%.

There are indications that percent removal was higher than the 79% calculated with the 43 mg/L influent concentration from Inf-ES. Influent TSS concentrations varied considerably, with most of the Ecology and all of the ALCOA analyses yielding an influent TSS concentration of greater than 43 mg/L (Table 4). The Ecology analysis of the ALCOA Inf-AS sample (74 mg/L) results in a TSS removal of 88%.

Table 2 – Ecology General Chemistry Results – ALCOA (Wenatchee), December 1992.

Parameter	Location:	Inf-EW	Inf-S1	Inf-S2	Inf-ES	Inf-AS	Aer-1	Aer-2	Eff-S1	Eff-S2	Eff-ES	Eff-AS	Eff-S3	Eff-S4	
	Type:	grab	grab	grab	E-comp	A-comp	grab	grab	grab	grab	E-comp	A-comp	grab	grab	
	Date:	12/2	12/2	12/2	12/2-3	12/2-3	12/2	12/2	12/2	12/2	12/2-3	12/2-3	12/3	12/3	
	Time:	1420	1030	1430	0800-0800	0800-0800	1040	1440	1100	1510	0800-0800	0800-0800	0800	1300	
	Lab Log #:	498206	498207	498208	498209	498210	498211	498212	498213	498214	498215	498216	498217	498218	
GENERAL CHEMISTRY															
Conductivity (umhos/cm)		139	497	503	400	421			340	353	353	354			
Alkalinity (mg/L CaCO3)		61.5			161	173					69.7	70.5			
Sulfate (mg/L)															
Hardness (mg/L CaCO3)		64.4			113	113					108	111			
Fluoride (total mg/L)		0.12													
TS (mg/L)		126			298	572					296	359			
TNVS (mg/L)		78			171	269					200	93			
TSS (mg/L)		3	61	29	43	74	3900	3950	7	9	9	11			
TNVSS (mg/L)		2			8	1U	1000	1050			1U	1U			
BOD5 (mg/L)					59	95					4	3			
COD (mg/L)					56	87					10U	10U			
TOC (water mg/L)			34.7	40.5	28.9	41.7			10.7	5.7	6.0	5.2			
NH3-N (mg/L)			8.5	13	7.7	8.6			0.01U	0.02	0.11	0.04			
NO2+NO3-N (mg/L)			0.45	0.41	0.57	0.47			9.8	11	11	12			
Total-P (mg/L)			4.9	3.3	3.4	3.4			1.4	2.4	2.0	1.9			
Oil and Grease (mg/L)															
F-Coliform MF (#/100mL)													2	1U	
Cyanide (wk & dis-mg/L)															
FIELD OBSERVATIONS															
Temperature (C)			16.8	18.4					14.0	13.9			14.2	16.5	
Temp-cooled (C)					7.5						6.3				
pH			7.9	8.1	8.4	8.5			7.6	7.0	7.8	7.8	7.7	7.2	
Total Residual Chlorine (mg/L)										0.5			0.8	1.0	
Sulfide (mg/L)															

Table 2 – (cont'd) – ALCOA (Wenatchee), December 1992.

Parameter	Location:	001-1	001-2	001-E	001-ED	001-A	001-GC
	Type:	grab	grab	E-comp	E-comp	A-comp	grab-comp
	Date:	12/2	12/2	12/2-3	12/2-3	12/2-3	12/2
	Time:	0930	1330	0800-0800	0800-0800	0700-0700	*
	Lab Log #:	498219	498220	498221	498222	498223	498224
GENERAL CHEMISTRY							
Conductivity (umhos/cm)				157		156	154
Alkalinity (mg/L CaCO3)				65.9		65.6	65.8
Sulfate (mg/L)				10.3		10.2	10.3
Hardness (mg/L CaCO3)				70.9		70.9	
Fluoride (total mg/L)		0.17	0.20	0.18		0.19	
TS (mg/L)				139	122	124	
TNVS (mg/L)				83	57	67	
TSS (mg/L)		2	2	1	2	3	
TNVSS (mg/L)				1	2	1	
BOD5 (mg/L)							
COD (mg/L)							
TOC (water mg/L)							
NH3-N (mg/L)				0.02	0.02	0.01U	
NO2+NO3-N (mg/L)				0.43	0.48	0.46	
Total-P (mg/L)				0.097	0.074	0.066	
Oil and Grease (mg/L)		1UJ	1UJ				
F-Coliform MF (#/100mL)							
Cyanide (wk & dis-mg/L)		0.002U	0.002U	0.002U		0.002U	
FIELD OBSERVATIONS							
Temperature (C)		12.9	14.0				
Temp-cooled (C)				4.2			
pH		7.6	8.1	8.0		8.3	
Total Residual Chlorine (mg/L)		<0.1	<0.1	<0.1		<0.1	
Sulfide (mg/L)		<0.1	<0.1	<0.1		<0.1	

∞

Inf - influent
 Aer - aeration basin
 Eff - effluent
 grab - grab sample
 comp - composite sample
 GC - grab-composite sample

* - equal volumes collected on 12/2 at 0930 and 1330
 U - The analyte was not detected at or above the reported result.

E - sample collected by Ecology
 A - sample collected by ALCOA
 grab - grab sample
 comp - composite sample
 W - plant intake water
 S - sanitary wastewater
 001 - combined plant effluent
 D - duplicate taken from Ecology composite sampler

Table 3 – NPDES Permit Limits and Inspection Results – ALCOA (Wenatchee) – December 1992.

Parameter	NPDES Limits		Ecology Inspection Results*	
	Monthly Average	Daily Maximum	Composite Samples	Grab Samples
<u>Outfall 001</u>				
TSS	100 lbs/day	500 lbs/day	18.4 lb/day	
Fluoride	25 lbs/day	150 lbs/day	3.32 lb/day	
Aluminum	15 lbs/day	46 lbs/day	1.11 lb/day (est.)	
Free Cyanide	+	+	0.037 lb/day	
Benzo(a)Pyrene+	+	+	<0.0007 lb/day	
Oil and Grease	50 lbs/day	250 lbs/day	<18.4 lb/day (est.)	
pH	6.0 to 9.0 (continuous)			7.6; 8.1
Temperature	+	+	12.9 C; 14.0 C	
Flow*	+	+	2.21 MGD	
Production	+	+	667 tons/day aluminum**	

* 24 hour effluent flow for 001 was measured by ALCOA.
 ** monthly average for December 1992.
 + There are no permit limitations for these parameters but monitoring is required.

Parameter	NPDES Limits		Ecology Inspection Results*	
	30-day Average	7-day Maximum	Composite Samples	Grab Samples
<u>STP Discharge</u>				
BOD5	25.0 mg/L	45.0 mg/L	4 mg/L	
	19.0 lbs/day	34.0 lbs/day	1.7 lbs/day	
	85% removal		93% removal	
TSS	30.0 mg/L	45.0 mg/L	9 mg/L	
	22.0 lbs/day	34.0 lbs/day	3.8 lbs/day	
	85% removal		79% removal+	
Total Chlorine Residual	0.5 mg/L to 2.0 mg/L		0.5; 0.8; 1.0 mg/L	
Fecal Coliform	200/100mL	400/100mL	2; 1U /100 mL	
pH	6.0 to 9.0 at all times		7.6; 7.0; 7.7;7.2	
Flow**	--		51,150 gpd	

*Ecology analysis of Ecology samples

**24-hour effluent flow for the STP was measured by ALCOA.

+TSS removal using ALCOA sampler data was 89%.

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

79% removal+ - The result from the 24-hour composite or grab sample exceeded the 30 day, 7 day, or daily limit.

Table 4 – Split Sample Results Comparison – ALCOA (Wenatchee), December 1992.

Location:	Inf-S1	Inf-S2	Inf-ES	Inf-AS	Eff-S1	Eff-S2	Eff-ES	Eff-AS	Eff-S3	Eff-S4	001-1	001-2	001-E	001-A
Type:	grab	grab	E-comp	A-comp	grab	grab	E-comp	A-comp	grab	grab	grab	grab	E-comp	A-comp
Date:	12/2	12/2	12/2-3	12/2-3	12/2	12/2	12/2-3	12/2-3	12/3	12/3	12/2	12/2	12/2-3	12/2-3
Time:	1030	1430	0800-0800	0800-0800	1100	1510	0800-0800	0800-0800	0800	1300	0930	1330	0800-0800	0700-0700
Lab Log #:	498207	498208	498209	498210	498213	498214	498215	498216	498217	498218	498219	498220	498221	498223
Sampled by:	*	*	Ecology	ALCOA	*	*	Ecology	ALCOA	*	*	*	*	Ecology	ALCOA

Parameter	Analysis by:															
Fluoride (mg/L)	Ecology												0.17	0.20	0.18	0.19
	ALCOA												0.05	0.06	0.06	0.06
TSS (mg/L)	Ecology	61	29	43	74	7	9	9	11				2	2	1	3
	ALCOA		64	81	69	7	8	12	9				1	0	1	0
BOD5 (mg/L)	Ecology			59	95			4	3							
	ALCOA			60	91			<1	4							
Free Cyanide (mg/L)	Ecology												<0.002	<0.002	<0.002	<0.002
	ALCOA												<0.003	<0.003	<0.003	<0.003
Benzo(a)Pyrene (ug/L)	Ecology														<0.04	<0.04
	ALCOA														<1	<1
Oil and Grease (mg/L)	Ecology												1UJ	1UJ		
	ALCOA												0	0		0.7
Fecal Coliform MF (#/100mL)	Ecology												2	<1		
	ALCOA												<2.2	<2.2		
Aluminum (mg/L)	Ecology			0.40				0.20					0.05P	0.07P	0.06P	0.05P
	ALCOA			0.38				0.18					0.05	0.03	0.03	0.03

* grabs collected for analysis by both Ecology and ALCOA

Inf - influent
 Eff - effluent
 S - sanitary wastewater treatment
 001 - combined cooling water and sanitary wastewater effluent

E - Ecology sample
 A - ALCOA sample
 grab - grab sample
 comp - composite sample

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.

Indicators that the plant was operating well within design constraints were effluent BOD₅ (4 mg/L; 1.7 lb/day), TSS (9 mg/L; 3.8 lb/day) compared with permitted BOD₅ (25 mg/L; 19.0 lb/day monthly average) and TSS (30 mg/L; 22.0 lb/day monthly average).

A comparison of ammonia and nitrate-nitrite concentrations in influent versus effluent indicate that the STP was achieving substantial nitrification at the time of the inspection (Table 2). NH₃-N concentrations of approximately 8 mg/L in the influent were reduced to approximately 0.1 mg/L in the effluent, while NO₂ + NO₃-N concentrations increased from approximately 0.6 mg/L in the influent to approximately 11 mg/L in the effluent.

Outfall 001

Discharges through Outfall 001 met all permit requirements during the inspection (Table 3). Discharges of TSS, fluoride, aluminum, and oil & grease were substantially below permitted concentrations. Free cyanide and benzo(a)pyrene, for which monitoring is required by permit, were below detection limits. The pH measured was well within the range of the permit.

Split Sample Results

Samples were split to determine the comparability of Ecology and permittee laboratory results and sampling methods (Table 4). Field temperature measurements found the Ecology composite samples to be slightly warmer than the desired 4°C (Table 2). The ALCOA 001 composite sample is ordinarily refrigerated. To accommodate the larger sample sizes needed for the inspection, the ALCOA sample was unrefrigerated in an unheated shed. The outdoor air temperature was below freezing throughout the sampling period. ALCOA should check their composite sample temperatures monthly to assure the samples are properly cooled.

STP

Comparisons of samples from the same waste stream obtained by ALCOA and Ecology give an indication of whether the sampling method provides representative results. The analyses of influent BOD₅ indicate consistently higher BOD₅ in the ALCOA sample. TOC analyses support this. Sources of the increased BOD₅ should be considered. Sampling equipment and containers should be checked for attached growth.

Comparing the results of two laboratories' analyses of the same sample gives an indication of the differences between laboratory procedures. TSS analyses showed a disparity between Ecology and ALCOA results. ALCOA analyses resulted in approximately two times the TSS concentrations determined by Ecology for two out of three influent samples compared. The analyses for the third sample varied only 7%. Ecology TSS analyses varied considerably between influent samples. ALCOA analyses between influent samples were more consistent.

Effluent TSS analyses by Ecology and ALCOA were in close agreement, yielding results within 4 mg/L. Ecology and ALCOA analyses for all BOD₅ influent and effluent samples were in very close agreement, within 4 mg/L.

Outfall 001

There was little difference between Ecology and ALCOA grab and composite samples of the 001 effluent. All four 001 effluent samples agreed closely for all parameters analyzed (Table 4).

ALCOA TSS results were in close agreement with Ecology results, within 3 mg/L. A comparison of the results of the two laboratory's analyses of the same samples shows that ALCOA fluoride results were one third of Ecology results. ALCOA aluminum results were consistently lower than Ecology's results. Benzo(a)pyrene was undetected by ALCOA and Ecology, but ALCOA's detection limit was 25 times higher than Ecology's. ALCOA used GCMS as required by Ecology while Ecology used the more sensitive but less accurate HPLC method (Oie, 1993). Free cyanide, oil & grease, and fecal coliform results agreed closely.

Laboratory Audit

The ALCOA laboratory was audited by Ecology's Quality Assurance Section, and was accredited by Ecology on October 8, 1992.

Priority Pollutant Scans

STP

Few organic compounds were detected by the priority pollutant scans (Table 5). Most organic compounds detected in the STP effluent were at concentrations less than 10 ug/L. The exception was acetone, with influent concentrations up to 58 ug/L (est.). Acetone is used for sampling apparatus cleaning and in the laboratory, often causing low level sample contamination.

Chloroform, bromodichloromethane, and toluene were the only VOA compounds other than acetone detected in the STP effluent. Di-n-butyl phthalate was the only BNA compound detected in the STP effluent. All of these organic compounds, other than acetone, were found in concentrations below 10 ug/L. All STP influent and effluent organic compound concentrations were below acute and chronic EPA fresh water quality criteria (EPA, 1986).

A complete list of parameters analyzed and analytical results is included in Appendix D. A number of Tentatively Identified Compounds (TICs) were found in the STP influent samples in concentrations up to 720 ug/L (est.). Four unknown TICs were found in STP effluent samples in concentrations up to 7 ug/L (est.) Appendix E summarizes TICs found. Results

Table 5 – Comparison of Organic Compounds and Metals Detected in Effluent to Toxicity Criteria – ALCOA (Wenatchee), December 1992.

		Location:	Inf-S1	Inf-S2	Eff-S1	Eff-S2	001-1	001-2	EPA Water Quality Criteria Summary**	
		Type:	grab	grab	grab	grab	grab	grab	Acute	Chronic
		Date:	12/2	12/2	12/2	12/2	12/2	12/2	Fresh	Fresh
		Time:	1030	1430	1100	1510	0930	1330		
		Lab Log#:	498207	498208	498213	498214	498219	498220		
(Group)	VOA Compounds		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	(ug/L)	(ug/L)
	Acetone		52 J	58 J	27 J	19 J	8.6 J	11 J		
a	Chloroform				7.0	6.2	1.0 U	1.0 U	28,900 *	1,240 *
a	Bromodichloromethane				1.7	1.5	1.0 U	1.0 U	11,000 *(a)	
	Toluene				1.1	1.2 U	1.0 U	1.0 U	17,500 *	
		Inf-ES				Eff-ES	001-E	001-A		
		E-comp				E-comp	E-comp	A-comp		
		12/2-3				12/2-3	12/2-3	12/2-3		
		0800-0800			0800-0800	0800-0800	0800-0800	0700-0700		
		498209			498215	498221	498221	498223		
(Group)	BNA Compounds		ug/L		ug/L	ug/L	ug/L	ug/L		
	Phenol		1.0 J						10,200 *	2,560 *
	1,4-Dichlorobenzene		1.2						1,120 *(h)	763 *(h)
	Benzyl Alcohol		5.2							
	4-Methylphenol		9.9							
	Benzoic Acid		21							
	Diethyl Phthalate		2.9						940 *(i)	3 *(i)
i	Di-n-Butyl Phthalate		2.5		1.2		1.1		940 *(i)	3 *(i)
	Bis(2-Ethylhexyl)Phthalate		2.1						940 *(i)	3 *(i)
<u>PAH's</u>										
	Fluoranthene						0.03 J	0.70 U	3,980 *	
	Pyrene						0.01	0.01 U		
<u>Pesticide/PCB Compounds</u>										
(none detected)										

- acute or chronic criteria exceeded in effluent samples

**EPA, 1986 – EPA, 1988

Table 5 – (cont'd) – ALCOA (Wenatchee), December 1992.

	Location:	Inf-EW	InfE-S	Eff-ES	001-1	001-2	001-E	001-ED	EPA Water Quality Criteria Summary	
	Type:	grab	E-comp	E-comp	grab	grab	E-comp	E-comp	Acute	Chronic
	Date:	12/2	12/2-3	12/2-3	12/2	12/2	12/2-3	12/2-3	Fresh	Fresh
	Time:	1420	0800-0800	0800-0800	0930	1330	0800-0800	0800-0800		
	Lab Log#:	498206	498209	498215	498219	498220	498221	498222		
Metals++		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	(ug/L)	(ug/L)
Aluminum (total)		49 P	401	203	54 P	67 P	60 P	65 P	750	87
Arsenic		1.5 U	1.7 P	2.4 P	1.5 U	1.5 U	1.5 U	1.5 U		
Pentavalent									850 *	48 *
Trivalent									360	190
Cadmium		1.07 J	0.6 J	1.14 J	0.86 J	0.76 J	1.25 J	1.45 J	2.6 +	0.9 +
Chromium		5.0 U	11 P							
Hexavalent									16	11
Trivalent									1,297 +	155 +
Copper		3.0 U	21	18	4.6 P	4.9 P	4.4 P	4.3 P	13 +	9 +
Lead		206 PJ	6.3 J	2.5 PJ	11.7 J	1.2 PJ	1.0 UJ	2.2 PJ	52 +	2.0 +
Mercury (total)		0.050 U	0.20 P	0.16 P	0.050 U	0.050 U	0.050 U	0.050 U	2.4	0.012
Silver		0.50 U	2.2	0.64 P	0.50 U	0.50 U	0.50 U	0.50 U	2.2 +	0.12
Zinc		7.5 PB	72.1	138	34 B	17 PB	96.5	42.3 B	87 +	78 +

¹NOTE: 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.

- U The analyte was not detected at or above the reported result.
- UJ The analyte was not detected at or above the reported estimated result.
- J The analyte was positively identified. The associated numerical result is an estimate.
- B Analyte was found in the analytical method blank, indicating the sample may have been contaminated.
- P The analyte was detected above the instrument detection limit but below the established minimum quantitation limit.
- * Insufficient data to develop criteria. Value presented is the LOEL – Lowest Observed Effect Level.
- + Hardness dependent criteria (70 mg/L used).
- a Total Halomethanes
- h Total Dichlorobenzenes
- i Total Phthalate Esters

++ – total recoverable unless otherwise specified

☐ – acute or chronic criteria exceeded in effluent samples

- Inf – influent
- Eff – effluent
- W – plant intake water
- S – sanitary wastewater treatment
- 001 – combined cooling water and sanitary wastewater effluent
- E – Ecology sample
- A – ALCOA sample
- grab – grab sample
- comp – composite sample

of ALCOA priority pollutant organic scans appear in Appendix F. Detection limits were higher than Ecology's and no compounds were found.

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

Nine priority pollutant metals were detected in the STP influent. Aluminum was found at the highest concentration (401 ug/L). Aluminum in the STP effluent was found at a concentration of 203 ug/L. Aluminum, cadmium, lead, mercury, and silver were found in the STP effluent in concentrations greater than EPA water quality chronic fresh water criteria (EPA, 1986; 1988). Copper and zinc were found in concentrations greater than acute and chronic criteria.

Outfall 001

Acetone was the only VOA compound detected in the 001 effluent (Table 5). Di-n-butyl phthalate (1.1 ug/L), the only BNA compound detected, was found in concentrations less than acute and chronic EPA fresh water quality criteria. Two PAH's were found in the 001 effluent. Fluoranthene (0.03 ug/L est.) was five orders of magnitude less than acute EPA freshwater criteria. Pyrene was found at a concentration of 0.01 ug/L.

No VOA TICs were found in the 001 effluent. A number of unknown BNA TICs in concentrations up to 8 ug/L were found (Appendix E).

No pesticide/PCB compounds were found in the 001 effluent.

Five priority pollutant metals were detected in the 001 effluent. Aluminum and copper were found in concentrations less than acute and chronic EPA fresh water criteria. The estimated cadmium concentration for the composite sample was less than the acute criterion but 39% greater than the chronic criterion. Lead was detected in a concentration five times above the EPA chronic criterion in one grab sample, but below the chronic criterion in two other samples. Zinc concentrations in the composite sample were 11% and 24% greater than the acute and chronic EPA freshwater criteria, respectively.

A comparison was made between Ecology and ALCOA metals analyses of the same samples (Appendix G). Although there was generally good agreement, ALCOA detected mercury and nickel in samples in which Ecology did not. ALCOA detected mercury concentrations several times higher than Ecology's detection limits. ALCOA total nickel concentrations were also several times greater than Ecology's total recoverable nickel detection limits. Also, Ecology detected aluminum in the 001 discharge at concentrations approximately twice those reported by ALCOA.

Bioassays

The bioassays for *Daphnia magna*, *Ceriodaphnia dubia*, fathead minnow, and rainbow trout showed no adverse effects (Table 6).

Table 6 – Effluent Bioassay Results – ALCOA (Wenatchee), December 1992.

Daphnia magna - 48-hour survival test

(*Daphnia magna*)
Sample No. 498224

Sample Concentration	# Tested*	Percent Survival
0 % effluent	20	95
6.25 % effluent	20	100
12.5 % effluent	20	100
25 % effluent	20	95
50 % effluent	20	85
100 % effluent	20	85

NOEC = 100% effluent
LC50 > 100% effluent

* four replicates per concentration, five organisms per replicate

Ceriodaphnia dubia - survival/reproduction test

(*Ceriodaphnia dubia*)
Sample No. 498224

Sample Concentration	# Tested*	# Young Produced/Adult	Percent Survival
Control	10	0.7	70
6.25 %	10	8.5	90
12.5 %	10	12.0	80
25 %	10	6.8	100
50 %	10	7.2	80
100 %	9	18.9	78

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. 498224

Sample Concentration	# Tested*	Percent Survival	Average Dry Weight (mg)
Control	35	85.7	0.58
6.25 % Effluent	35	100.0	0.65
12.5 % Effluent	35	97.1	0.71
25 % Effluent	35	97.1	0.71
50 % Effluent	35	94.3	0.68
100 % Effluent	35	100.0	0.63

Survival
NOEC = 100 % effluent
LC50 > 100 % effluent

Growth
NOEC = 100 % effluent

* five replicates per concentration, seven organisms per replicate

Rainbow Trout - 96 hour survival test

(*Oncorhynchus mykiss*)
Sample No. 498224

Sample Concentration	Number Tested*	Percent Survival
Control	30	100
100 % Effluent	30	100

NOEC = 100 % effluent
LC50 > 100 % effluent

* three replicates per concentration, ten organisms per replicate

RECOMMENDATIONS AND CONCLUSIONS

Flow

The STP effluent weir was not readily accessible to Ecology for verification of flow measurements. ALCOA measured flow at Outfall 001 with a flow meter based on depth at a rectangular weir. The instantaneous flow meter measurement was within 10% of an Ecology instantaneous flow measurement.

NPDES Permit Compliance/General Chemistry

The STP was performing well during the inspection. The effluent met NPDES permit limits. BOD₅ removal was 93%. TSS removal, while uncertain, appears to have been approximately 85%. The STP was achieving substantial nitrification.

Discharges through Outfall 001 met all permit requirements during the inspection.

Split Sample Results

Representative temperatures of ALCOA composite samples could not be determined.

- ALCOA should check their composite sample temperatures monthly to assure the samples are properly cooled.

The ALCOA STP influent sample BOD₅ was higher than the Ecology sample BOD₅.

- Sources of the increased BOD₅ should be considered, including the possibility of attached growth on sampling equipment and containers.

The results of Ecology and ALCOA STP influent sample analyses varied considerably.

- Particular attention should be paid to TSS during the next QA performance evaluation.

Closeness in agreement between results of Outfall 001 samples shows that there was no discernible sampling error.

ALCOA fluoride and aluminum results were consistently less than Ecology results.

- ALCOA fluoride analysis procedures should be checked. Analytical procedures for aluminum should be reviewed.

Priority Pollutant Scans

Few organic compounds were detected in the STP influent or effluent. All STP influent and effluent organic compounds for which there were criteria were found in concentrations below EPA fresh water quality criteria. Eight PP metals were detected in the STP effluent. Aluminum was found in the highest concentration (203 ug/L). Aluminum and six other metals were found in the STP effluent in concentrations greater than acute or chronic EPA fresh water criteria.

Di-n-butyl phthalate and acetone were detected in the 001 effluent. Two PAH's, fluoranthene and pyrene, were also found in low concentrations. Five priority pollutant metals were detected in the 001 effluent. Aluminum and copper were in concentrations below EPA fresh water quality criteria. Cadmium concentrations were greater than EPA chronic criterion but less than acute criterion. With the exception of one grab sample, lead concentrations were below chronic and acute criteria. Zinc concentrations from the composite sample were above acute and chronic criteria.

ALCOA detected mercury in samples in which the metals were undetected by Ecology at several times lower detection limits. ALCOA detected total nickel in the 001 effluent at two to five times the Ecology total recoverable nickel detection limit.

- Sampling and analysis techniques for mercury and nickel should be reviewed by ALCOA.

Bioassays

All four bioassays for *Daphnia magna*, *Ceriodaphnia dubia*, fathead minnow, and rainbow trout showed no adverse effects.

REFERENCES

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APPENDICES

Appendix A – Sampling Schedule – ALCOA (Wenatchee), December 1992.

Parameter	Location:	Inf-EW	Inf-S1	Inf-S2	Inf-ES	Inf-AS	Aer-1	Aer-2	Eff-S1	Eff-S2	Eff-ES	Eff-AS	Eff-S3	Eff-S4
	Type:	grab	grab	grab	E-comp	A-comp	grab	grab	grab	grab	E-comp	A-comp	grab	grab
	Date:	12/2	12/2	12/2	12/2-3	12/2-3	12/2	12/2	12/2	12/2	12/2-3	12/2-3	12/3	12/3
	Time:	1420	1030	1430	0800-0800	0800-0800	1040	1440	1100	1510	0800-0800	0800-0800	0800	1300
	Lab Log #:	498206	498207	498208	498209	498210	498211	498212	498213	498214	498215	498216	498217	498218
GENERAL CHEMISTRY														
Conductivity		E	E	E	E	E			E	E	E	E		
Alkalinity		E			E	E					E	E		
Sulfate														
Hardness		E			E	E					E	E		
Fluoride		E												
TS		E			E	E					E	E		
TNVS		E			E	E					E	E		
TSS		E	E	EA	EA	EA	E	E	EA	EA	EA	EA		
TNVSS		E			E	E	E	E			E	E		
BOD5					EA	EA					EA	EA		
COD					E	E					E	E		
TOC (water)			E	E	E	E			E	E	E	E		
NH3-N			E	E	E	E			E	E	E	E		
NO2+NO3-N			E	E	E	E			E	E	E	E		
Total-P			E	E	E	E			E	E	E	E		
Oil and Grease (water)														
F-Coliform MF													EA	EA
Cyanide (wk & dis)														
ORGANICS														
VOC (water)			E	E					E	E				
BNAs (water)					EA						EA			
Pest/PCB (water)					EA									
PAH (water)														
METALS														
PP Metals (water)		E			EA						EA			
Aluminum		E			EA						EA			
BIOASSAYS														
Salmonid (acute 100%)														
Daphnia magna (acute)														
Ceriodaphnia (chronic)														
Fathead Minnow (chronic)														
FIELD OBSERVATIONS														
Temperature			E	E					E	E			E	E
Temp-cooled					E	E					E	E		
pH			E	E	E	E			E	E	E	E	E	E
Chlorine													E	E
Sulfide														

E - Ecology analysis
A - ALCOA analysis

Inf - influent
Aer - aeration basin
Eff - effluent
E-comp - composite sample collected by Ecology
A-comp - composite sample collected by ALCOA
grab - grab composite sample

comp - composite sample
GC - grab-composite sample
W - plant intake water
S - sanitary wastewater
001 - combined plant effluent
D - duplicate sample

Appendix A - (cont'd) - ALCOA (Wenatchee), December 1992.

Parameter	Location:	001-1	001-2	001-E	001-ED	001-A	001-GC
	Type:	grab	grab	E-comp	E-comp	A-comp	grab-comp
	Date:	12/2	12/2	12/2-3	12/2-3	12/2-3	12/2
	Time:	0930	1330	0800-0800	0800-0800	0700-0700	*
	Lab Log #:	498219	498220	498221	498222	498223	498224
GENERAL CHEMISTRY							
Conductivity				E		E	E
Alkalinity				E		E	E
Sulfate				E		E	E
Hardness				E		E	
Fluoride		EA	EA	EA		EA	
TS				E	E	E	
TNVS				E	E	E	
TSS		EA	EA	EA	E	EA	
TNVSS				E	E	E	
BOD5							
COD							
TOC (water)					E		
NH3-N				E	E	E	
NO2+NO3-N				E	E	E	
Total-P				E	E	E	
Oil and Grease (water)		EA	EA			A	
F-Coliform MF							
Cyanide (wk & dis)		EA	EA	EA		EA	
ORGANICS							
VOC (water)		E	E				
BNAs (water)				EA			
Pest/PCB (water)							
PAH (water)				EA		EA	
METALS							
PP Metals (water)		EA	EA	EA	E	EA	
Aluminum		EA	EA	EA	E	EA	
BIOASSAYS							
Salmonid (acute 100%)							E
Daphnia magna (acute)							E
Ceriodaphnia (chronic)							E
Fathead Minnow (chronic)							E
FIELD OBSERVATIONS							
Temperature							
Temp-cooled				E	E	E	
pH		E	E	E	E	E	
Chlorine		E	E				
Sulfide		E	E	E	E	E	

* - equal volumes collected on 12/2 at 0930 and 1330

Appendix B – Ecology Analytical Methods – ALCOA (Wenatchee), December 1992.

Laboratory Analysis	Method Used for Ecology Analysis	Laboratory Performing Analysis
Conductivity	EPA, Revised 1983: 120.1	Ecology Manchester Laboratory
Alkalinity	EPA, Revised 1983: 310.1	Ecology Manchester Laboratory
Sulfate	EPA, Revised 1991: 300.0	Ecology Manchester Laboratory
Hardness	EPA, Revised 1983: 130.2	Ecology Manchester Laboratory
Fluoride	EPA, Revised 1983: 340.3	Ecology Manchester Laboratory
TS	EPA, Revised 1983: 160.3	Ecology Manchester Laboratory
TNVS	EPA, Revised 1983: 160.3	Ecology Manchester Laboratory
TSS	EPA, Revised 1983: 160.2	Ecology Manchester Laboratory
TNVSS	EPA, Revised 1983: 160.2	Ecology Manchester Laboratory
BOD5	EPA, Revised 1983: 405.1	Ecology Manchester Laboratory
COD	EPA, Revised 1983: 410.1	Laucks Testing Laboratories
TOC (water)	EPA, Revised 1983: 415.1	Ecology Manchester Laboratory
NH3-N	EPA, Revised 1983: 350.1	Laucks Testing Laboratories
NO2+NO3-N	EPA, Revised 1983: 353.2	Laucks Testing Laboratories
Total-P	EPA, Revised 1983: 365.3	Laucks Testing Laboratories
Oil and Grease (water)	EPA, Revised 1983: 413.1	Ecology Manchester Laboratory
F-Coliform MF	APHA, 1992: 9222D.	Ecology Manchester Laboratory
Cyanide (wk & dis)	APHA, 1992: 4500-CNI.	Ecology Manchester Laboratory
VOC (water)	EPA, 1986: 8260	Analytical Resources Incorporated
BNAs (water)	EPA, 1986: 8270	Analytical Resources Incorporated
Pest/PCB (water)	EPA, 1986: 8080	Analytical Resources Incorporated
PAH (water)	EPA, 1986: 8310	Analytical Resources Incorporated
PP Metals (water)	EPA, Revised 1983: 200-299	Ecology Manchester Laboratory
Aluminum (total)	EPA, Revised 1983: 200.7/6010	Ecology Manchester Laboratory
Salmonid (acute 100%)	Ecology, 1991.	Ecology Manchester Laboratory
Daphnia magna (acute)	EPA 1985	Ecology Manchester Laboratory
Ceriodaphnia (chronic)	EPA 1989: 1002.0	Ecology Manchester Laboratory
Fathead Minnow (chronic)	EPA 1989	Ecology Manchester Laboratory

METHOD BIBLIOGRAPHY

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Appendix C - Priority Pollutant Cleaning Procedures -
ALCOA (Wenatchee), December 1991.

PRIORITY POLLUTANT SAMPLING EQUIPMENT CLEANING PROCEDURES

1. Wash with laboratory detergent
2. Rinse several times with tap water
3. Rinse with 10% HNO₃ 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 D (cont'd) – ALCOA (Wenatchee), December 1992.

BNA Compounds (Group)		Inf-ES E-comp 12/2-3 0800-0800 498209 ug/L	Eff-ES E-comp 12/2-3 0800-0800 498215 ug/L	001-E E-comp 12/2-3 0800-0800 498221 ug/L
	Phenol	1.0 J	2 U	2 U
j	Bis(2-Chloroethyl)Ether	1 U	1 U	1 U
	2-Chlorophenol	1 U	1 U	1 U
h	1,3-Dichlorobenzene	1 U	1 U	1 U
h	1,4-Dichlorobenzene	1.2	1 U	1 U
	Benzyl Alcohol	5.2	5 U	5 U
h	1,2-Dichlorobenzene	1 U	1 U	1 U
	2-Methylphenol	1 U	1 U	1 U
	2,2-Oxybis(1-Chloropropane)	1 U	1 U	1 U
	4-Methylphenol	9.9	1 U	1 U
k	N-Nitroso-di-n-Propylamine	1 U	1 U	1 U
	Hexachloroethane	2 U	2 U	2 U
	Nitrobenzene	1 U	1 U	1 U
	Isophorone	1 U	1 U	1 U
l	2-Nitrophenol	5 U	5 U	5 U
	2,4-Dimethylphenol	2 U	2 U	2 U
	Benzoic Acid	21	10 U	10 U
j	Bis(2-Chloroethoxy)Methane	1 U	1 U	1 U
	2,4-Dichlorophenol	3 U	3 U	3 U
g	1,2,4-Trichlorobenzene	1 U	1 U	1 U
n	Naphthalene	1 U	1 U	1 U
	4-Chloroaniline	3 U	3 U	3 U
	Hexachlorobutadiene	2 U	2 U	2 U
	4-Chloro-3-Methylphenol	2 U	2 U	2 U
	2-Methylnaphthalene	1 U	1 U	1 U
	Hexachlorocyclopentadiene	5 U	5 U	5 U
	2,4,6-Trichlorophenol	5 U	5 U	5 U
	2,4,5-Trichlorophenol	5 U	5 U	5 U
m	2-Chloronaphthalene	1 U	1 U	1 U
	2-Nitroaniline	5 U	5 U	5 U
l	Dimethyl Phthalate	1 U	1 U	1 U
n	Acenaphthylene	1 U	1 U	1 U
	3-Nitroaniline	5 U	5 U	5 U
n	Acenaphthene	1 U	1 U	1 U
l	2,4-Dinitrophenol	10 U	10 U	10 U
l	4-Nitrophenol	5 U	5 U	5 U
	Dibenzofuran	1 U	1 U	1 U
o	2,6-Dinitrotoluene	5 U	5 U	5 U
o	2,4-Dinitrotoluene	5 U	5 U	5 U
l	Diethyl Phthalate	2.9	1 U	1 U
p	4-Chlorophenyl Phenylether	1 U	1 U	1 U
n	Fluorene	1 U	1 U	1 U
	4-Nitroaniline	5 U	5 U	5 U
l	4,6-Dinitro-2-Methylphenol	10 U	10 U	10 U
k	N-Nitrosodiphenylamine	1 U	1 U	1 U
p	4-Bromophenyl Phenylether	1 U	1 U	1 U
g	Hexachlorobenzene	1 U	1 U	1 U

Appendix D – (cont'd) – ALCOA (Wenatchee), December 1992.

		Inf-ES E-comp 12/2-3 0800-0800 498209 ug/L	Eff-ES E-comp 12/2-3 0800-0800 498215 ug/L	001-E E-comp 12/2-3 0800-0800 498221 ug/L		001-E E-comp 12/2-3 0800-0800 498221 ug/L	001-A A-comp 12/2-3 0700-0700 498223 ug/L
BNA Compounds (cont'd)							
(Group)							
n	Pentachlorophenol	5 U	5 U	5 U			
n	Phenanthrene	1 U	1 U	1 U			
n	Carbazole	1 U	1 U	1 U			
n	Anthracene	1 U	1 U	1 U			
l	Di-n-Butyl Phthalate	2.5	1.2	1.1			
n	Fluoranthene	1 U	1 U	1 U			
n	Pyrene	1 U	1 U	1 U			
l	Butylbenzyl Phthalate	1 U	1 U	1 U			
n	3,3'-Dichlorobenzidine	5 U	5 U	5 U			
n	Benzo(a)Anthracene	1 U	1 U	1 U			
l	Bis(2-Ethylhexyl)Phthalate	2.1	1 U	1 U			
n	Chrysene	1 U	1 U	1 U			
n	Di-n-Octyl Phthalate	1 U	1 U	1 U			
n	Benzo(b)Fluoranthene	1 U	1 U	1 U			
n	Benzo(k)Fluoranthene	1 U	1 U	1 U			
n	Benzo(a)Pyrene	1 U	1 U	1 U			
n	Indeno(1,2,3-cd)Pyrene	1 U	1 U	1 U			
n	Dibenzo(a,h)Anthracene	1 U	1 U	1 U			
n	Benzo(g,h,i)Perylene	1 U	1 U	1 U			
PAH's							
	Naphthalene			0.50 U		0.50 U	
	Acenaphthylene			0.70 U		0.70 U	
	Acenaphthene			1.00 U		1.00 U	
	Fluorene			0.05 U		0.05 U	
	Phenanthrene			0.04 U		0.04 U	
	Anthracene			0.04 U		0.04 U	
	Fluoranthene			0.03 J		0.70 U	
	Pyrene			0.01		0.01 U	
	Benzo(a)Anthracene			0.03 U		0.03 U	
	Chrysene			0.03 U		0.03 U	
	Benzo(b)Fluoranthene			0.04 U		0.04 U	
	Benzo(k)Fluoranthene			0.02 U		0.02 U	
	Benzo(a)Pyrene			0.04 U		0.04 U	
	Dibenzo(a,h)Anthracene			0.05 U		0.05 U	
	Benzo(ghi)Perylene			0.02 U		0.02 U	
	Ideno(1,2,3-cd)Pyrene			0.03 U		0.03 U	

Appendix D (cont'd) – ALCOA (Wenatchee), December 1992.

Pesticide/PCB Compounds (Group)		Inf-ES E-comp 12/2-3 0800-0800 498209 ug/L
q	alpha-BHC	0.05 U
q	beta-BHC	0.05 U
q	delta-BHC	0.05 U
q	gamma-BHC (Lindane)	0.05 U
r	Heptachlor	0.05 U
	Aldrin	0.05 U
r	Heptachlor Epoxide	0.05 U
s	Endosulfan I	0.05 U
	Dieldrin	0.10 U
u	4,4'-DDE	0.10 U
t	Endrin	0.10 U
s	Endosulfan II	0.10 U
u	4,4'-DDD	0.10 U
s	Endosulfan Sulfate	0.10 U
u	4,4'-DDT	0.10 U
	Methoxychlor	0.50 U
t	Endrin Ketone	0.10 U
t	Endrin Aldehyde	0.10 U
v	gamma-Chlordane	0.05 U
v	alpha-Chlordane	0.05 U
	Toxaphene	5.00 U
w	Aroclor-1242/1016	1.00 U
w	Aroclor-1248	1.00 U
w	Aroclor-1254	1.00 U
w	Aroclor-1260	1.00 U
w	Aroclor-1221	2.00 U
w	Aroclor-1232	1.00 U

Appendix D – (cont'd) – ALCOA (Wenatchee), December 1992.

	Inf-EW grab 12/2 1420 498206 ug/L	Inf-ES E-comp 12/2-3 0800-0800 498209 ug/L	Eff-ES E-comp 12/2-3 0800-0800 498215 ug/L	001-1 grab 12/2 0930 498219 ug/L	001-2 grab 12/2 1330 498220 ug/L	001-E E-comp 12/2-3 0800-0800 498221 ug/L	001-ED E-comp 12/2-3 1010 498222 ug/L	001-A A-comp 12/2-3 0700-0700 498223 ug/L
Aluminum (total)	49 P	401	203	54 P	67 P	60 P	65 P	50 P
Antimony	30 U	30 U	30 U	30 U	30 U	30 U	30 U	30 U
Arsenic	1.5 U	1.7 P	2.4 P	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
Beryllium	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Cadmium	1.07 J	0.60 J	1.14 J	0.86 J	0.76 J	1.25 J	1.45 J	0.99 J
Chromium	5.0 U	11 P	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Copper	3.0 U	21	18	4.6 P	4.9 P	4.4 P	4.3 P	4.4 P
Lead	2.6 PJ	6.3 J	2.5 PJ	11.7 J	1.2 PJ	1.0 UJ	2.2 PJ	1.0 UJ
Mercury (total)	0.050 U	0.20 P	0.16 P	0.050 U	0.050 U	0.05 U	0.050 U	0.050 U
Nickel	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Selenium	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Silver	0.50 U	2.2	0.64 P	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Thallium	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Zinc	7.5 PB	72.1	138	34 B	17 PB	96.5	42.3 B	19 PB

- U The analyte was not detected at or above the reported result.
- UJ The analyte was not detected at or above the reported estimated result.
- J The analyte was positively identified. The associated numerical result is an estimate.
- B Analyte was found in the analytical method blank, indicating the sample may have been contaminated.
- P The analyte was detected above the instrument detection limit but below the established minimum quantitation limit.

** total recoverable unless otherwise specified

- detected analyte
- E - Ecology analysis
- A - ALCOA analysis
- Inf - influent
- Eff - effluent

- | | | |
|---|---|--|
| a Total Halomethanes | m Total Chlorinated Naphthalenes | grab - grab composite sample |
| b Total Dichloroethenes | n Total Polynuclear Aromatic Hydrocarbons | comp - composite sample |
| c Total Trichloroethanes | o Total Dinitrotoluenes | E-comp - composite sample collected by Ecology |
| d Total Dichloropropanes | p Total Haloethers | A-comp - composite sample collected by ALCOA |
| e Total Dichloropropenes | q Total BHCs | GC - grab-composite sample |
| f Total Tetrachloroethanes | r Heptachlor | W - plant intake water |
| g Total Chlorinated Benzenes (excluding Dichlorobenzenes) | s Endosulfan | S - sanitary wastewater |
| h Total Dichlorobenzenes | t Endrin | 001 - combined plant effluent |
| i Total Phthalate Esters | u DDT plus metabolites | D - duplicate sample |
| j Total Chloroalkyl Ethers | v Total Chlordane | |
| k Total Nitrosamines | w Total Aroclors (PCBs) | |
| l Total Nitrophenols | | |

Appendix E – VOA and BNA Scan Tentatively Identified Compounds (TICs)-
ALCOA (Wenatchee), December 1992.

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

Location:	Inf-S1	Inf-S2	Inf-ES	Eff-S1	Eff-S2	Eff-ES	001-1	001-2	001-E
Type:	grab	grab	E-comp	grab	grab	E-comp	grab	grab	E-comp
Date:	12/2	12/2	12/2-3	12/2	12/2	12/2-3	12/2	12/2	12/2-3
Time:	1030	1430	0800-0800	1100	1510	0800-0800	0930	1330	0800-0800
Lab Log #:	498207	498208	498209	498213	498214	498215	498219	498220	498221

Inf - Influent sample	E - Ecology sample
Eff - Effluent sample	A - Alcoa sample
grab - grab sample	S - STP
comp - composite sample	001 - 001 effluent

NJ - There is evidence that the analyte is present. The associated numerical result is an estimate.



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ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Sample No: 498207

Lab ID: C401F
Matrix: Waters

QC Report No: C401-WDOE
Project No: Alcoa
Wenatchee

Date Received: 12/04/92

Data Release Authorized: *[Signature]*
Report prepared: 12/15/92 - MAC:C pat

CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/L)
1	-	VOA	1118	14 <i>JNJ</i> KF
2				
3				
4				
5				
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ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Sample No: 498208

Lab ID: C401G
Matrix: Waters

QC Report No: C401-WDOE
Project No: Alcoa
Wenatchee

Date Received: 12/04/92

Data Release Authorized: 
Report prepared: 12/15/92 - MAC:C pat

CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/L)
1	-	VOA	1118	77 µg/L KF
2				
3				
4				
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ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Sample No: 498213

Lab ID: C401H
Matrix: Waters

QC Report No: C401-WDOE
Project No: Alcoa
Wenatchee

Data Release Authorized: 
Report prepared: 12/15/92 - MAC:C pat

Date Received: 12/04/92

CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/L)
1	-	No Unknown peaks > 10% IS peak height	VOA	-
2				
3				
4				
5				
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ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Sample No: 498214

Lab ID: C4011
Matrix: Waters

QC Report No: C401-WDOE
Project No: Alcoa
Wenatchee

Data Release Authorized: *Don H. Baker*
Report prepared: 12/15/92 - MAC:C pat

Date Received: 12/04/92

CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/L)
1	-	No Unknown peaks >10% IS peak height	VOA	-
2				
3				
4				
5				
6				
7				
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ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Sample No: 498219

Lab ID: C401D
Matrix: Waters

QC Report No: C401-WDOE
Project No: Alcoa
Wenatchee

Data Release Authorized: *[Signature]*
Report prepared: 12/15/92 - MAC:C pat

Date Received: 12/04/92

CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/L)
1	-	VOA	-	-
2				
3				
4				
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ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Sample No: 498220

Lab ID: C401E
Matrix: Waters

QC Report No: C401-WDOE
Project No: Alcoa
Wenatchee
Date Received: 12/04/92

Data Release Authorized: *Dr. M. Decker*
Report prepared: 12/15/92 - MAC:C pat

CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/L)
1	-	VOA	-	-
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
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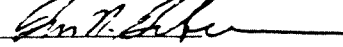
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ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Sample No: 498209

Lab ID: C401C
Matrix: Waters

QC Report No: C401-WDOE
Project No: Alcoa
Wenatchee

Data Release Authorized: 
Report prepared: 12/16/92 - MAC:C pat

Date Received: 12/04/92

CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/L)	
1	-	Unknown (bp m/e 57)	ABN 466	72 J	
2	-	Unknown (bp m/e 68)	" 627	42 J	
3	-	(2-Butoxyethoxy)-ethanol Isomer (bp m/e 45)	" 818	720 J NJ	KF
4	-	Unknown (bp m/e 58)	" 1121	25 J	
5	-	Unknown (bp m/e 44)	" 1141	25 J	
6	-	Unknown (bp m/e 73)	" 1172	43 J	
7	-	Unknown (bp m/e 44)	" 1310	29 J	
8	544-63-8	Tetradecanoic acid	" 1337	90 J NJ	KF
9	36653-82-4	1-Hexadecanol	" 1427	30 J NJ	KF
10	57-10-3	Hexadecanoic acid	" 1492	590 J	
11	-	Unknown (bp m/e 69)	" 1617	590 J	
12	-	Octadecanoic acid coelute (bp m/e 57)	" 1633	500 J NJ	KF
13	-	Unknown (bp m/e 45)	" 1698	32 J	
14	-	Unknown (bp m/e 45)	" 1784	42 J	
15	-	Unknown (bp m/e 74)	" 1806	68 J	
16	-	Unknown (bp m/e 45)	" 1863	67 J	
17	-	Unknown (bp m/e 45)	" 2013	47 J	
18	-	Unknown (bp m/e 69)	" 2019	160 J	
19	-	Unknown (bp m/e 55)	" 2200	140 J	
20	-	Unknown (bp m/e 57)	" 2216	160 J	
21	-	Sterol Isomer coelute (bp m/e 43)	" 2232	170 J NJ	KF
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ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Sample No: 498215

Lab ID: C401A
Matrix: Waters

QC Report No: C401-WDOE
Project No: Alcoa
Wenatchee

Date Received: 12/04/92

Data Release Authorized: *Chris P. Decker*
Report prepared: 12/16/92 - MAC:C pat

CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/L)	
1	-	Unknown (bp m/e 59)	ABN	317	2 J
2	-	Unknown (bp m/e 59)	.	503	3 J
3	-	Unknown (bp m/e 45)	.	515	5 J
4	-	Unknown (bp m/e 57)	.	1784	7 J
5	Unknown hydrocarbon (bp m/e 57)	.	1943	3 JB	
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ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Sample No: 498221

Lab ID: C401B
Matrix: Waters

QC Report No: C401-WDOE
Project No: Alcoa
Wenatchee

Data Release Authorized: *[Signature]*
Report prepared: 12/16/92 - MAC:C pat

Date Received: 12/04/92

CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/L)
1	Unknown (bp m/e 57)	ABN	463	8 JNS KF
2	Unknown (bp m/e 69)	*	1429	2 J
3	Unknown hydrocarbon (bp m/e 57)	*	1489	2 J
4	Unknown hydrocarbon (bp m/e 57)	*	1517	4 J
5	Unknown (bp m/e 55)	*	1544	5 J
6	Unknown (bp m/e 69)	*	1554	2 J
7	Unknown hydrocarbon (bp m/e 57)	*	1565	2 J
8	Unknown (bp m/e 55)	*	1572	2 J
9	Unknown hydrocarbon (bp m/e 57)	*	1582	8 J
10	Unknown (bp m/e 69)	*	1608	3 J
11	Unknown (bp m/e 69)	*	1621	4 J
12	Unknown (bp m/e 55)	*	1635	2 J
13	Unknown hydrocarbon (bp m/e 57)	*	1648	4 J
14	Unknown hydrocarbon (bp m/e 57)	*	1672	5 J
15	Unknown (bp m/e 69)	*	1682	3 J
16	Unknown (bp m/e 55)	*	1687	5 J
17	Unknown (bp m/e 69)	*	1702	3 J
18	Unknown (bp m/e 55)	*	1713	3 J
19	Unknown (bp m/e 69)	*	1737	4 J ✓
20	Unknown hydrocarbon (bp m/e 57)	*	1831	2 JB KF
21	Unknown hydrocarbon (bp m/e 57)	*	1943	4 JB KF
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Appendix F – ALCOA PAH, BNA, and Pesticides/PCB Scan Results – ALCOA, December 1992

Samples Analyzed:
001-E (Eco Lab Log# 498221)
001-A (Eco Lab Log# 498223)
(ug/L)

PAH Compounds		
Naphthalene	1	U
Acenaphthylene	1	U
Acenaphthene	1	U
Fluorene	1	U
Phenanthrene	1	U
Anthracene	1	U
Fluoranthene	1	U
Pyrene	1	U
Benzo(a)Anthracene	1	U
Chrysene	1	U
Benzo(b)Fluoranthene	1	U
Benzo(k) Fluoranthene	1	U
Benzo(a)Pyrene	1	U
Indeno(1,2,3-cd)Pyrene	1	U
Dibenz(a,h)Anthracene	1	U
Benzo(g,h,i)Perylene	1	U

Samples Analyzed:
INF-ES (Eco Lab Log#: 498209)
001-E (Eco Lab Log# 498221)
(ug/L)

BNA Compounds		
Phenol	10	U
Bis(2-Chloroethyl)Ether	10	U
2-Chlorophenol	10	U
1,3-Dichlorobenzene	10	U
1,4-Dichlorobenzene	10	U
1,2-Dichlorobenzene	10	U
2-Methylphenol	10	U
2,2'-Oxybis(1-Chloropropane)	10	U
4-Methylphenol	10	U
N-Nitroso-Di-n-Propylamine	10	U
Hexachloroethane	10	U
Nitrobenzene	10	U
Isophorone	10	U
2-Nitrophenol	10	U
2,4-Dimethylphenol	10	U
Bis(2-Chloroethoxy)Methane	10	U
2,4-Dichlorophenol	10	U
1,2,4-Trichlorobenzene	20	U
Naphthalene	10	U
4-Chloroaniline	10	U
Hexachlorobutadiene	10	U
4-Chloro-3-Methyl Phenol	10	U
2-Methylnaphthalene	10	U
Hexachlorocyclopentadiene	10	U
2,4,6-Trichlorophenol	10	U
2,4,5-Trichlorophenol	10	U
2-Chloronaphthalene	10	U
2-Nitroaniline	10	U
Dimethyl Phthalate	10	U

Samples Analyzed:
INF-ES (Eco Lab Log# 498209)
001-E (Eco Lab Log# 498221)
(ug/L)

BNA Compounds (cont'd)		
Acenaphthylene	10	U
2,6-Dinitrotoluene	10	U
3-Nitroaniline	10	U
Acenaphthene	10	U
2,4-Dinitrophenol	10	U
4-Nitrophenol	10	U
Dibenzofuran	10	U
2,4-Dinitrotoluene	10	U
Diethylphthalate	10	U
4-Chlorophenyl-Phenylether	10	U
Fluorene	10	U
4-Nitroaniline	10	U
4,6-Dinitro-2-Methylphenol	10	U
N-Nitrosodiphenylamine	10	U
4-Bromophenyl-Phenylether	10	U
Hexachlorobenzene	10	U
Pentachlorophenol	10	U
Phenanthrene	10	U
Anthracene	10	U
Carbazole	10	U
Di-n-Butylphthalate	10	U
Fluoranthene	10	U
Pyrene	10	U
Butylbenzylphthalate	10	U
3,3'-Dichlorobenzidine	10	U
Benzo(a)anthracene	10	U
Chrysene	10	U
Bis(2-ethylhexyl)Phthalate	10	U
Di-n-Octyl Phthalate	10	U
Benzo(b)Fluoranthene	10	U
Benzo(k)Fluoranthene	10	U
Benzo(a)Pyrene	10	U
Indeno(1,2,3-cd)Pyrene	10	U
Dibenzo(a,h)Anthracene	10	U
Benzo(g,h,i)Perylene	10	U

Samples Analyzed:
INF-ES (Eco Lab Log# 498209)
(ug/L)

Pesticides/PCB's		
Aldrin	0.007	U
a-BHC	0.050	U
b-BHC	0.050	U
d-BHC	0.050	U
g-BHC(lindane)	0.003	U
a-Chlordane	0.500	U
g-Chlordane	0.500	U
4,4-DDD	0.100	U
4,4-DDE	0.100	U
4,4-DDT	0.100	U
Dieldrin	0.012	U
Endosulfan-I	0.050	U
Endosulfan-II	0.100	U
Endosulfan Sulfate	0.100	U
Endrin	0.063	U
Endrin Aldehyde	0.100	U
Endrin Ketone	0.100	U
Heptachlor	0.003	U
Heptachlor Epoxide	0.004	U
Methoxychlor	0.956	U
Toxaphene	1.000	U

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

Appendix G – Comparison of ALCOA Metals Analyses with Ecology Analyses– ALCOA (Wenatchee), December 1992.

Location:	Inf-ES	Inf-ES	Eff-ES	Eff-ES	001-1	001-1	001-2	001-2	001-E	001-E	001-A	001-A
Type:	E-comp	E-comp	E-comp	E-comp	grab	grab	grab	grab	E-comp	E-comp	A-comp	A-comp
Date:	12/2-3	12/2-3	12/2-3	12/2-3	12/2	12/2	12/2	12/2	12/2-3	12/2-3	12/2-3	12/2-3
Time:	0800-0800	0800-0800	0800-0800	0800-0800	0930	0930	1330	1330	0800-0800	0800-0800	0700-0700	0700-0700
Lab Log#:	498209	498209	498215	498215	498219	498219	498220	498220	498221	498221	498223	498223
Metals*	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Analysis by:	Ecology	ALCOA	Ecology	ALCOA	Ecology	ALCOA	Ecology	ALCOA	Ecology	ALCOA	Ecology	ALCOA
Aluminum (total)	401	379	203	180	54 P	50	67 P	30	60 P	30	50 P	30
Antimony	30 U	90 U	30 U	90 U	30 U	90 U	30 U	90 U	30 U	90 U	30 U	90 U
Arsenic	1.7 P	2.1 U	2.4 P	2.1 U	1.5 U	2.1 U	1.5 U	2.1 U	1.5 U	2.1 U	1.5 U	2.1 U
Pentavalent												
Trivalent												
Barium		60 U		60 U		60 U		60 U		60 U		60 U
Beryllium	1.0 U	9 U	1.0 U	9 U	1.0 U	9 U	1.0 U	9 U	1.0 U	9 U	1.0 U	9 U
Cadmium	0.60 J	0.9 U	1.14 J	0.9 U	0.86 J	0.9 U	0.76 J	0.9 U	1.25 J	0.9 U	0.99 J	0.9 U
Chromium	11 P	10.6	5.0 U	1.1	5.0 U	0.3 U	5.0 U	0.3 U	5.0 U	0.3 U	5.0 U	0.3 U
Hexavalent												
Trivalent												
Copper	21	16	18	22	4.6 P	8	4.9 P	5 U	4.4 P	5 U	4.4 P	5 U
Lead	6.3 J	4	2.5 PJ	4.9	11.7 J	2.8	1.2 PJ	3.1	1.0 UJ	1.3	1.0 UJ	1.2
Mercury (total)	0.20 P	0.7	0.16 P	1.3	0.050 U	0.5	0.050 U	0.3 U	0.05 U	0.5	0.050 U	1.2
Nickel	10 U	29	10 U	17 U	10 U	51	10 U	52	10 U	32	10 U	25
Selenium	2.0 U	2.5 U	2.0 U	2.5 U	2.0 U	2.5 U	2.0 U	2.5 U	2.0 U	2.5 U	2.0 U	2.5 U
Silver	2.2	0.8	0.64 P	0.4	0.50 U	0.4 U	0.50 U	0.4 U	0.50 U	4 U	0.50 U	0.4 U
Thallium	2.5 U	102 U	2.5 U	102 U	2.5 U	102 U	2.5 U	102 U	2.5 U	102 U	2.5 U	102 U
Zinc	72.1	76	138	140	34 B	17	17 PB	16	96.5	14	19 PB	13

U The analyte was not detected at or above the reported result.
 UJ The analyte was not detected at or above the reported estimated result.
 J The analyte was positively identified. The associated numerical result is an estimate.
 B Analyte was found in the analytical method blank, indicating the sample may have been contaminated.
 P The analyte was detected above the instrument detection limit but below the established minimum quantitation limit.

– metal detected

* Ecology results are total recoverable unless otherwise specified. ALCOA results are total.

E – Ecology analysis
 A – ALCOA analysis
 Inf – influent
 Eff – effluent
 grab – grab composite sample
 comp – composite sample
 E-comp – composite sample collected by Ecology
 A-comp – composite sample collected by ALCOA
 S – sanitary wastewater
 001 – combined plant effluent