



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

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TO: Dave Nunnallee
THROUGH: Lynn Singleton *JS*
FROM: Barbara Carey
SUBJECT: Survey of Metals and Organics in the Skagit River Below the
Burlington Wastewater Treatment Plant

In response to your concern about human health effects from the Burlington Wastewater Treatment Plant (WTP) effluent on the downstream City of Anacortes Water Treatment Plant, Environmental Investigations Surface Water Investigations and Compliance Monitoring Sections cooperated in a survey of the effluent and receiving water on March 28 - 29, 1989.

Grab samples were collected upstream of the WTP at the Highway 1A bridge just below Sedro Wooley and at the City of Anacortes Water Treatment Plant intake. Two 24-hour WTP effluent composites and two grab samples were analyzed. Priority pollutant metals were analyzed at all three sites as well as other parameters for which drinking water standards exist. The effluent was also analyzed for pesticides and PCB's; volatile organics; and acid extractables/base neutrals. Field blanks were likewise submitted to the laboratory for priority pollutant metals and all organic analyses. Samples were iced and shipped to Ecology's Manchester laboratory. From there, samples were transported to a contract laboratory for analysis.

The mean river flow during the survey was 12,100 cubic feet/second (cfs) at the USGS gaging station near Mount Vernon (Gage No. 12200500). Despite the fact that WTP flow during the survey (3.1 cfs) exceeded the 2.5 cfs design capacity for the plant, dilution was 4,000. Dilution at design capacity and the 7-day, 10-year (7Q10) low river flow is still quite good at 1900.

Concentrations for all primary drinking water parameters were below the maximum Contaminant Levels (MCL's) (Health, 1989) even prior to mixing (Table 1). After mixing at the observed ratio of 4,000 or the 7Q10 design ratio of 1,900, loading of these constituents to the river is insignificant.

The secondary drinking water parameters, iron and manganese, exceeded standards in the effluent. However, total loading to the river was insufficient to cause a significant increase in downstream concentrations. Indeed iron exceeded the drinking water standard at both the upstream site and

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the downstream drinking water intake, while manganese was well below the standard at both upstream and downstream sites.

Chloroform was detected in both the morning and evening effluent grab samples collected on March 28 (Appendix). The observed concentrations of 7.9 and 8.7 ug/L are below the 10^{-6} health risk criteria even before a worst case dilution of 1,900 (Nash, 1989). Since chloroform is a volatile compound, a portion of that discharged to the river would be lost before reaching the Anacortes Water Treatment plant. Nevertheless, as a known carcinogen, chloroform at any level is undesirable.

A suspected carcinogen, bis(2-ethylhexyl)phthalate, was also detected at low levels in the effluent composite sample (2 ug/L). However, both cancer and non-cancer health risks were below 10^{-6} risk at this concentration even before any dilution (Nash, 1989). All other organic compounds analyses were unremarkable.

Although results of this study do not indicate health problems for the Anacortes Water Treatment Plant due to the Burlington WTP in March 1988, seasonal and day-to-day variation in effluent composition likely occurs. Additional sampling requirements could be imposed to further characterize effluent quality. Any sampling should target primary drinking water parameters and organics, attention should be given to quality assurance/quality control, including collection of field blanks and duplicates. If analyses identified any compounds of concern, the Anacortes Water Treatment Plant should be notified immediately.

References

Health, Washington Department of. 1989. Public Water Systems Rules and Regulations. Chapter 248-54.

Nash, D. 1989. Washington Department of Health. Environmental Health Program. Personal communication.

LS:krc

Table 1. Burlington Metals Data (mg/L).

Primary & Secondary Drinking Water Parameters	Upstream	Effluent (Ecology)	Effluent (WTP)	DW Intake	Blank	Primary Drinking Water Standard	Secondary Drinking Water Standards
Antimony	0.0011	0.0011	0.0011	0.0010 L	0.0010 L		
Arsenic	0.0010 L	0.0010 L	0.0010 L	0.0010 L	0.0010 L	0.050	
Barium	0.010	0.020	0.025	0.010	---	1.000	
Beryllium	0.001 L	0.001 L	0.001 L	0.001 L	0.001 L		
Cadmium	0.00020 L	0.00027	0.00104	0.00020 L	0.00028	0.010	
Chromium	0.001	0.008	0.010	0.002	0.001 L	0.050	
Copper	0.003	0.036	0.053	0.006	0.001 L		1.0
Iron	0.324	1.26	1.660	0.476	---		0.30
Lead	0.001 L	0.014	0.0184	0.002	0.002	0.050	
Manganese	0.011	0.200	0.211	0.015	---		0.050
Mercury	0.0001 L	0.0001	0.0002	0.0001 L	0.0001 L	0.002	
Nickel	0.01 L	0.01 L	0.010 L	0.01 L	0.01 L		
Selenium	0.0010 L	0.0010 L	0.001 L	0.0010 L	0.0010 L	0.010	
Silver	0.00020 L	0.00085	0.00138	0.00020 L	0.00020 L	0.050	
Thallium	0.0010 L	0.0010 L	0.0010 L	0.0010 L	0.0010 L		
Zinc	0.009	0.062	1.50	0.007	0.030		5.0

* L = Analyte detected at the reported concentration level.

--- Not Analyzed