A Department of Ecology Report

Washington Waste Hauling and Recycling

Sampling Data Summary

Abstract

This report describes results from the January 15, 1996, sampling of Washington Waste Hauling and Recycling. The purpose of the monitoring was to determine fourth quarter levels of fecal coliform, turbidity, and total suspended solids. The results show turbidity levels increased by an order of magnitude between the inlet and outlet of both the north and south ponds. Total suspended solids levels for the north and south pond outlets were 137 and 86 mg/L respectively. Fecal coliform levels at the south pond outlet did not meet water quality standards.

Introduction

This report transmits the results for the January 15, 1996, sampling of Washington Waste Hauling and Recycling. Sampling was requested by Ecology's Northwest Regional Office (NWRO). The purpose of the sampling was to determine turbidity, fecal coliform (FC), and total suspended solids (TSS) levels.

Washington Waste Hauling and Recycling is located at 35019 West Valley Highway in Algona, Washington. The facility, formerly called Valley Topsoil, has an inactive status NPDES general permit for sand and gravel operations. Currently the site is a retail facility for finished compost and other landscaping material. The site is approximately 8 to 9 acres. It is unpaved, and contains an office building, maintenance facility, and a finished compost stockpile area. Runoff from the office building, maintenance facility, and roadway drain into a detention pond located near the entrance gate (south pond). The stockpile area drains east and northeast into the northern detention pond (north pond).

According to information from Ecology's regional staff, drainage from the facility runs eventually to Mill Creek. Mill Creek and its feeder streams are not specifically classified in the Water Quality Standards, therefore the default classification is Class A (WAC 173-201A-120(6)).

Class A Standards require that turbidity not exceed 5 NTU over background turbidity when the background turbidity is 50 NTU or less, or have more than a 10 % increase in turbidity when the background turbidity is more that 50 NTU. For FC, not more than 10 % of all samples obtained for calculating the geometric mean should exceed 200#/100 mL, and the geometric mean should not exceed 100#/100 mL.

by Debby Sargeant

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On September 1, 1995, Washington Waste Hauling and Recycling received Notice of Violation (NOV) #DE 95WQ-N259, in relation to the NPDES Permit WAG 50-3211. The facility is under enforcement for violations of FC, turbidity, and TSS based on self-monitoring during the first quarter of 1995. During third quarter monitoring (with dry conditions) the facility met water quality standards for FC and turbidity and permit requirements for TSS. Ecology's NWRO requested that EILS do side-by-side monitoring with the facility's consultants to determine fourth quarter compliance with water quality standards and permit limits.

Methods

Sampling sites are shown in Figure 1. All sampling was conducted as described by the Abbreviated Quality Assurance Project Plan (Sargeant, 1995). An additional sample for turbidity was obtained at a perennial creek that borders the southwestern portion of the property (Figure 1) to determine background turbidity off-site. Sample sites were the same sites that were previously monitored by the facility staff.

Side-by-side sampling was done with the facility's consultants, Tamara Gordy and Brian Doan. Previous 24-hour and 48-hour rainfall accumulations as of 4:00 A.M. at Seatac airport were 0.62" and 0.86" respectively.

Field measurements for temperature, pH, and conductivity were made during the survey at all sites. Laboratory samples for turbidity were collected at all sites. At the north and south pond outlets additional laboratory samples were collected for % Klebsiella, FC (MPN) and (MF), and TSS. Immediately following collection, samples were placed in the dark, on ice. Samples were delivered to Ecology's Manchester Environmental Laboratory for analysis within 24 hours after collection.

During sampling the consultant collected all water samples in a graduated cylinder, washing the cylinder between collection of samples. Samples were then transferring to a sample bottle. For FC samples, Standard Methods (APHA *et al.*, 1992) recommends that samples be collected in bottles that have been cleansed, rinsed, and sterilized. Using the same container may cross-contaminate samples, possibly giving higher than normal levels of FC. This may also be an issue for the TSS and turbidity sampling because leaving solids behind in the cylinder could give lower TSS or turbidity readings.

Collecting clean samples at the outlet of the south pond was difficult due to the nature of the site, because water depth was 3-4" at the outlet. The sample bottle had to be placed carefully to avoid disturbing the sediment. If a small v-notched weir were constructed at this site it would ensure a clean sample. It also may be possible to obtain a better sample just downstream on the other side of the highway, but highway runoff would have to be taken into consideration.

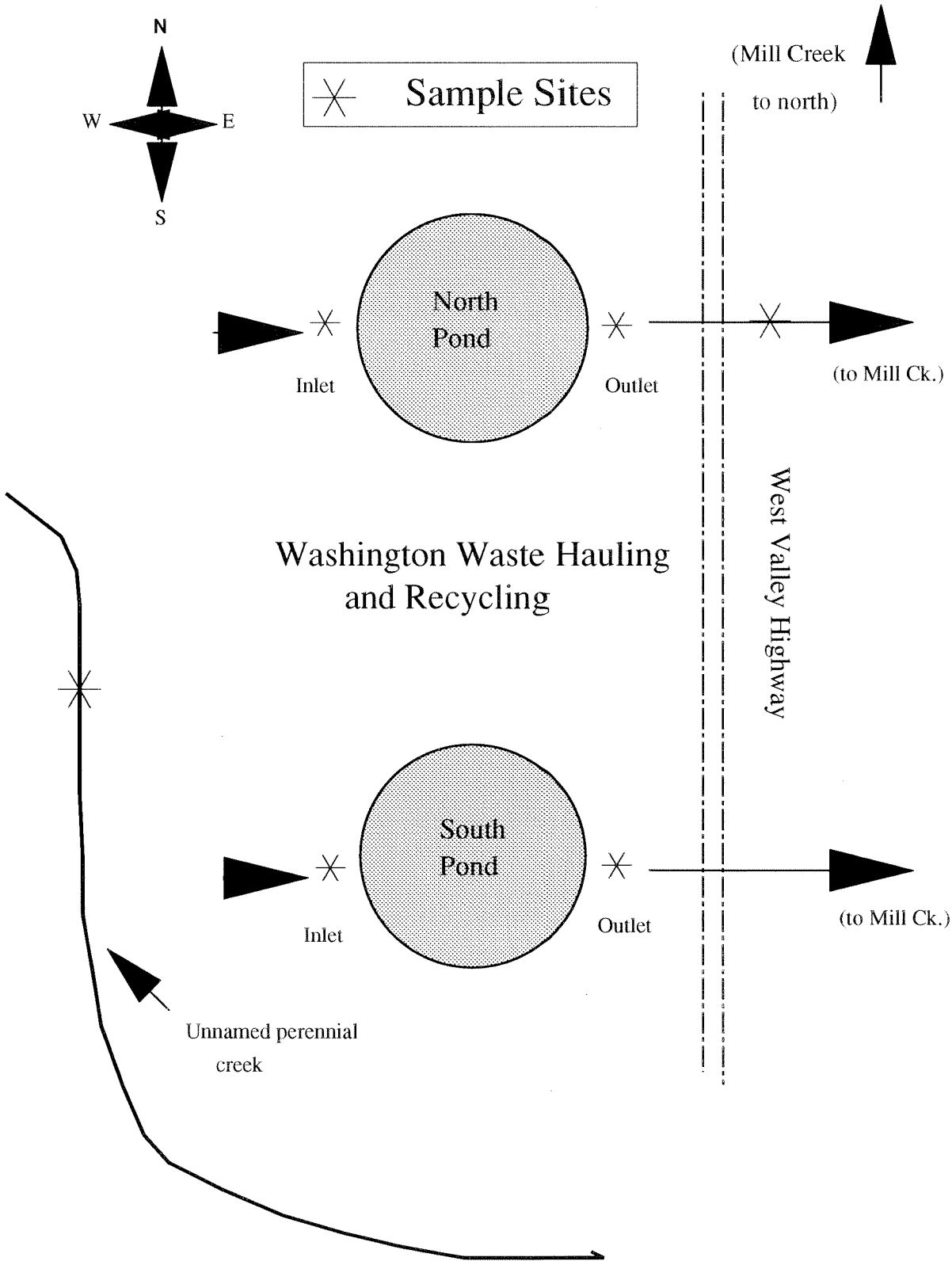

Figure 1. Washington Waste Hauling and Recycling Sample Sites
Drawing not to scale

Turbidity levels at the pond inlets were considered background levels. The source of water at the south pond inlet appeared to be groundwater only. The north pond inlet site was at the property boundary for the facility, where surface water run-off from off-site enters the facility.

Two methods were used to determine fecal coliform densities: the most probable number (MPN) method, which is a statistically based estimate of bacterial density through frequency of gas production in a dilution series of fermentation culture tubes; and the membrane filtration (MF) method, which permits direct counts of bacteria colonies. The statistical reliability of the MF method has been found to be superior to the MPN method (EPA, 1986). However, turbidity can reduce MF counts (EPA, 1986). For both the north and south pond outlet sites the MPN and MF methods of FC analysis were done.

Data Quality

The percent relative standard deviation (%RSD) for water quality parameters is presented in Table 1. The %RSD for all parameters except MPN FC fell within acceptable limits.

At the south pond outlet site, replicate MPN FC samples were 170 and 490 #/100 mL with a mean of 330#/100 mL, and the MF analysis was 250#/100 mL. The precision for the MPN method at this site is 68 %RSD. While this variance is poor, it should be noted that the 95% confidence limits of the MPN measurements overlap (Table 2). Also, the mean of the MPN method is reasonably close to the MF result. Therefore it is reasonable to accept an average of the MPN values (330#/100 mL), even though the %RSD exceeds the requirements of the QAPP.

Results

Field and laboratory results are shown in Table 3. Major water quality findings are as follows:

- Temperature and pH met water quality standards at all sites.
- Turbidity levels increased by 104 NTU between the south pond inlet and outlet; and by 183 NTU between the north pond inlet and outlet.
- Total suspended solids results for the north and south pond outlets were 137 and 86 mg/L respectively.
- Fecal coliform levels at the south pond outlet did not meet water quality standards.
- The low percentage of Klebsiella suggests that bacteria are of a mammalian source, rather than from wood waste (Duncan and Razzell, 1972).

Table 1. Field Precision as Percent Relative Standard Deviation.

Parameter	% RSD	Number of Replicates
Fecal Coliform		
Membrane Filter	26	1
Most Probable Number	68	1
Turbidity	6.7	1
Total Suspended Solids	2.5	1

Table 2. MPN Index and 95% Confidence Limits For Combinations of Positive Results When Five Tubes are used per Dilution (Jensen, 1996).

Combination of Positives	MPN Index/100 mL	95% Confidence Limits	
		Lower	Upper
5-3-0	170	70	480
5-2-0	490	200	1700

Conclusion

The detention ponds at Washington Waste Hauling and Recycling may not be providing adequate treatment of stormwater during runoff events.

Recommendations

Review facility sampling plan to determine if revisions are needed. Implement improvements to sampling, including possibly a v-notched weir at south pond and the use of Standard Methods protocols for sampling. When possible directly fill sample bottles for FC, TSS, and turbidity sampling.

- Continue sampling of site with improved sampling methods.
- Review adequacy of detention pond design and maintenance records.

Table 3. Washington Waste Hauling and Recycling field and laboratory data.

SITE	DATE	TIME	Lab#	Field Data			Laboratory Data								
				Temp ° C	pH	Cond µmho/cm	Cond µmho/cm	Turbidity NTU		TSS mg/L		Fecal Coliform MPN #/100mL		MF #/100mL		%Klebsiella	
Unnamed perennial creek to west	1/15/96	15:36	038188	7.9	8.3	75		160									
South pond inlet	1/15/96	15:20	038187	10.9	7.0	339		5.8									
South pond outlet	1/15/96	15:10	038185	8.9	7.9	110		110		87	84	490	170	240S		8	
North pond inlet	1/15/96	16:20	038184	8.8	8.0	119		7.3									
North pond outlet	1/15/96	16:10	038182	8.8	7.9	205	222	190		137		79		92	63	0	5
Tributary downstream of north pond	1/15/96	15:58	038180/1	8.3	7.9	225		100	110								

S: Spreader, resultant count may be an underestimate.

References

APHA et. al., 1992. Standards Methods for the Examination of Water and Wastewater, 18th Edition. American Public Health Association, American Water Works Association, and Water Environment Federation, Washington, D.C.

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Jensen, N. 1996. Personal Communication from Nancy Jensen, microbiologist with the Manchester Environmental Laboratory, Manchester, Washington.

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