

MEMORANDUM

January 13, 1976

To: Ron Robinson

From: Allen Moore

Subject: Heart O' the Hills Campground STP

A grab sample was taken from the National Park's Heart O' the Hills Campground tertiary treatment plant on July 28, 1975. The plant had been on line long enough for attainment of adequate treatment. The sample results showed a very poor effluent except for bacteria levels. A check with Clifford Tate, the plant operator, revealed that several days before, someone must have dumped his recreational vehicle holding tank into the STP lines. The inhibitors, either formaldehyde or copper sulfate must have killed the bugs in the extended aeration chamber. It took a number of days before there was any detectable oxygen in the chamber. Also very high values of ammonia (90 ppm) and ortho-phosphate (8.2 ppm) were found in the effluent. The receiving stream was only about 2 feet wide and an inch or two deep giving very little dilution to the effluent. Fecal coliform counts showed that the effluent was much better (10 colonies/100 ml) than the upstream sample (86 colonies/100 ml) or the downstream sample (1400 colonies/100 ml). It is hard to point a finger on the source of bacterial contamination. Perhaps shortly after the plant got back to normal operation the downstream bacteria counts became much better.

AWM:ee

STP Survey Report Form

U.S. National Parks  
Heart O' the Hills

Efficiency Study

City Campground STP Plant Type Tertiary Pop. Served Variable Design Capacity \_\_\_\_\_

Receiving Water \_\_\_\_\_ Perennial  Intermittent \_\_\_\_\_

Date 28 July 75 Survey Period Grab 1750 Survey Personnel Allen Moore, Darrel Anders

Comp. Sampling Frequency \_\_\_\_\_ Sampling Alequot \_\_\_\_\_

Weather Conditions (24 hr) warm, dry Are facilities provided for complete bypass of raw sewage?  Yes  No/Frequency of bypass \_\_\_\_\_

Reason for bypass \_\_\_\_\_ Is bypass chlorinated?  Yes  No

Was DOE Notified? \_\_\_\_\_ Discharge - Intermittent \_\_\_\_\_ Continuous \_\_\_\_\_

Plant Operation

Total flow \_\_\_\_\_ How measured \_\_\_\_\_

Maximum flow \_\_\_\_\_ Time of Max. \_\_\_\_\_

Minimum flow \_\_\_\_\_ Time of Min. \_\_\_\_\_

Pre Cl<sub>2</sub> \_\_\_\_\_ #/day Post Cl<sub>2</sub> six quarts 15% hypochlorite #/day

Field Results

Influent

Effluent

<u>Determinations</u>	<u>Max.</u>	<u>Min.</u>	<u>Mean</u>	<u>Median</u>	<u>Max.</u>	<u>Min.</u>	<u>Mean</u>	<u>Median</u>
Temp °C								
pH (Units)								
Conductivity (µmhos/cm <sup>2</sup> )								
Settleable Solids (mls/l)								

Laboratory Results on Composites

	<u>Influent</u>	<u>Effluent</u>	<u>% Reduction</u>
Laboratory No.	_____	<u>75-3226</u>	
5-Day BOD ppm	_____	<u>&lt;30</u>	
COD ppm	_____	<u>132</u>	
T.S. ppm	_____	<u>367</u>	
T.N.V.S. ppm	_____	<u>263</u>	
T.S.S. ppm	_____	<u>8</u>	
N.V.S.S. ppm	_____	<u>&lt;1</u>	
pH (Units)	_____	<u>8.1</u>	
Conductivity (µmhos/cm <sup>2</sup> )	_____	<u>1150</u>	
Turbidity (JTU's)	_____	<u>15</u>	

Laboratory Bacteriological Results

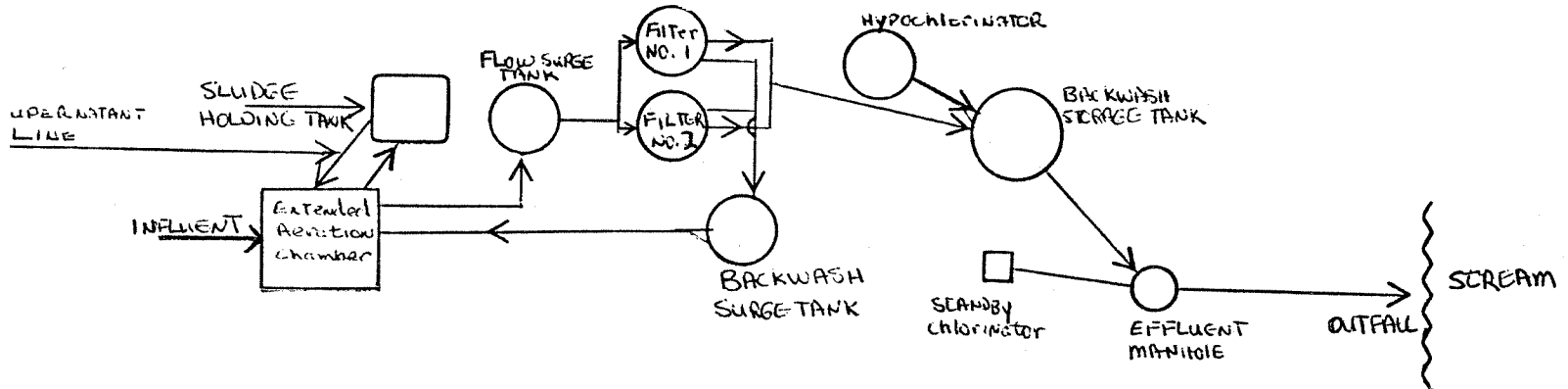
Lab No.	Sampling Time	Colonies/100 ml (MF)			Cl <sub>2</sub> Residual
		Total Coliform	Fecal Coliform	Fecal Strep	
75-3227	Effluent	200 est.	< 10		
75-3228	Upstream	760	86		
75-3229	Downstream	9500	1400		

Additional Laboratory Results

NO <sub>3</sub> -N ppm	-	N.D.
NO <sub>2</sub> -N ppm	-	N.D.
NH <sub>3</sub> -N ppm	-	90.
T. Kjeldahl-N ppm	-	106
O-PO <sub>4</sub> -P ppm	-	8.2
T-PO <sub>4</sub> -P ppm	-	10.6

Operator's Name Clifford Tate Phone No. 457-0565

Furnish a flow diagram with sequence and relative size and points of chlorination.



Type of Collection System

Combined  Separate  Both

Estimate flow contributed by surface or ground water (infiltration)

\_\_\_\_\_ MGD

Plant Loading Information

Annual average daily flow rate (mgd)

Peak flow rate (mgd)

Dry \_\_\_\_\_

Dry \_\_\_\_\_

Wet \_\_\_\_\_

Wet \_\_\_\_\_

COMMENTS: \_\_\_\_\_

STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

WATER QUALITY LABORATORY

ORIGINAL TO:  
A.W.M. ....  
COPIES TO:  
.....  
.....  
LAB FILES .....

DATA SUMMARY

Source <sup>HILLS</sup> HEART OF ~~THE~~ CAMPGROUND STP

Collected By A. Moore

Date Collected 7-28-75

Goal, Pro./Obj. \_\_\_\_\_

Log Number:	75- 3226	27	28	29							STORET
Station:	1750	EFF 1750	UPST. 1750	DNST 1750							
pH	8.1										00403
Turbidity (JTU)	15.										00070
Conductivity (umhos/cm)@25°C	1150.										00095
COD	132.										00340
BOD (5 day)	<30.										00310
Total Coliform (Col./100ml)		EST 200	760	EST 9500							31504
Fecal Coliform (Col./100ml)		<10	86	EST 1400							31616
NO3-N (Filtered)	N.D.										00620
NO2-N (Filtered)	N.D.										00615
NH3-N (Unfiltered)	90.										00610
T. Kjeldahl-N (Unfiltered)	106.										00625
O-PO4-P (Filtered)	8.2										00671
Total Phos.-P (Unfiltered)	10.6										00665
Total Solids	367										00500
Total Non Vol. Solids	263										
Total Suspended Solids	8.										00530
Total Sus. Non Vol. Solids	<1.										

Note: All results are in PPM unless otherwise specified. ND is "None Detected"  
Convert those marked with a \* to PPB (PPM X 10<sup>3</sup>) prior to entry into STORET

Summary By Stephen D. Roll Date 8-12-75