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PROGRESS REPORT
TECHNICAL SERVICES DEPARTMENT
ANNISTON, ALABAMA PLANT

JOB NO. 370:740 **REPORT NO.** 2 **DATE** 7/23/69

TITLE: Aroclor and HCl Department Waste Audits

OBJECTIVE: To identify the sources of waste in the Aroclor and HCl Departments and to quantify these losses.

PERSONNEL: E. G. Wright (W. F. Taffee)

REPORTED BY: E. G. Wright

SUMMARY: The major sources of organic (primarily Aroclors but with smaller amounts of Biphenyl, Santowax and HB-40) and acid waste in the Aroclor and HCl departments have been identified and quantified. The average total losses of organic material from these departments is approximately 27#/day. The new warehouse drumming and flaking area accounts for almost half of the organic losses with an average daily loss of 11#/day. The remainder of these organic losses comes from the Aroclor still room sewer (2#/day), the chlorinator sewer (8#/day) and the HCl department (6#/day). The acid losses from these departments came from two sources. The chlorinator sewer and the HCl department sewer. The chlorinator sewer showed an average loss of 1,100#HCl/day and the HCl department losses were an average of 15,500#/day.

To provide facts on the effects of P.C.B. in plant effluent water, Snow's Creek and Choccolocco Creek were investigated, Snow's Creek was checked visually for two phase systems (i.e. Aroclor and water). None was noted more than one block from the plant boundaries. Six samples of mud and water were collected downstream from the plant (see attached map for locations of sampling points). These samples are now being analyzed by organic research. The results of these samples will be communicated as soon as they are received.

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FUTURE WORK

1. Continue to monitor organic losses periodically on the total plant outflow.

2. A decision will be made on continuing to sample on Choccolocco and Snow's Creek as soon as the results from the first set of samples are received.

3. Collect one set of fish samples from Choccolocco Creek and have these analyzed for P.C.B. levels.

4. Continue to look for a better method to collect samples from two phase (i.e. Aroclor and Water) systems.

5. Conduct a correlation study between the organic research method for P.C.B. and the Anniston method for total organics.

E. G. Wright

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Technical Services Department

jw

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DETAILS

1. Sampling and Analysis

All samples taken during this audit were 24 hour composite samples with the exception of the "grab" samples taken from Snow's and Choccolocco Creeks. Two very definite two phase systems were noted during this audit. These were located in the warehouse sewer and in Snow's Creek about one block below the plant outfall. Sampling this two phase system has proven to be very difficult. We tried two methods. The first method was the slow peristaltic (Randolph type) pump. We then tried a high speed peristaltic pump. Both of these were unsatisfactory. We are presently trying to trap the Aroclor phase in a sump located at the corner of the warehouse. This sump is being measured everyday and should provide a much better estimate of the volume of the second phase than we now have.

The samples which were collected in the plant were analyzed for total organics by a method which was developed by the Anniston plant laboratory. The six sets of samples which were collected in Snow's and Choccolocco Creeks will be analyzed specifically for P.C.B. by Organic Research. There were two reasons for doing these analyses differently. The first reason was that the laboratory at Anniston did not have the proper facilities such as a "clean room" and also that they did not have the correct type of election capture detector which was specific for P.C.B. To purchase this detector and provide "clean room" (Aroclor free) working space would have cost approximately $16,000. The second reason was the time element involved. The P.C.B. method in the P.P.B. range required approximately 2-3 hours per sample. It was felt that running total organics on the in-plant samples would be sufficient for determining exactly where the losses were originating.

2. Flow Measurements

The flow from the HCl department was measured by the Lithium chloride dilution method. This flow was verified by actual physical measurement. The flows from the Aroclor still room and the warehouse were determined by physical measurement. These flows were measured twice during the time which the waste audit was being conducted.

HCl Department Audit

The HCl department receives anhydrous HCl from the chlorinators in the Aroclor department. This gas passes through a falling film type absorber where it is absorbed in water to form Muriatic Acid. The HCl gas stream during the past has contained entrained organics which have caused problems in the production of Water White, organic free Muriatic Acid. During 1968 approximately one-third of the production was sewered in an attempt to solve this organics problem. This amounted to approximately 30 M #/day of HCl. In mid-1969 a catch tank and a membrane type coalescer were installed to trap out and remove these organics. These two units are operating satisfactorily and the plant is now producing Water White Muriatic Acid. The

STLCOPCB4099855

HCl Department Audit (Cont'd)

organic material is composed of Biphenyl, Santowax and the lower chlorinated Biphenyls. This material is presently being drummed out and sent to the toxic dump.

Sample Data

These samples were collected for a period of 26 days. They were analyzed for pH, % HCl and organics. Listed below are the daily high and low and an average value for the 26 day period. A complete list of all of the data is on the attached data sheets. The sampling point is noted on the attached process sewer map.

	HCl #/day	Orgaincs #/day
Daily High	31,200 #	24 #
Daily Low	1,200 #	.1 #
Average	15,500 #	6.0 #

Average Flow = 100 G.P.M.

Warehouse Audit

This sewer collects the wastes from the Aroclor drumming and flaking area in the new warehouse. It was found to be the largest singular contributor of organics to the sewer with an average daily loss of approximately 11.0 #/day of dissolved organics. The 2nd (organic) phase of this sewer is presently being trapped in a sump located at the north-east corner of the warehouse. During a one week period we collected approximately 2.5 gallons of organics or 27# for the 7 day period. This average 3.8 #/day plus the 11 #/day of dissolved material brings the total from this source to 14.8 #/day. We will continue to monitor this sump to gather long term data. These organics came from two major sources. These are the wet scrubber which was installed to scrub the vents from the Biphenyl and Aroclor flakers. The organic material and water is drained from the scrubber once per day. It is drained by dropping the material into a drum and allowing the aqueous layer to overflow to the sewer. The other major sources are leaks and spills which are washed directly to the sewer when the floor is steam cleaned in the warehouse.

Sample Data

These samples were collected for a period of 28 days. They were analyzed for pH, % HCl, and organics. When it was found that the samples were neutral, pH and % HCl was discontinued. Listed below are the daily high and low values and an average daily value for the sampling period. A complete list of the data is on the attached data sheets. The sample point is noted on the attached process sewer map.

Sample Data (Cont'd)

	Organics #/day	Organic 2nd Phase #/day
High	65#	
Low	2.2#	
Average	11.0#	3.8#

Average Flow = 90 G.P.M.

Chlorinator Sewer

This sewer catches the cooling water from the chlorinator and also the water from the drowning jets on the vents of the crude Aroclor blowing tanks. The major source of organics in this sewer are pump leaks from the circulating pumps on the chlorinators. The primary sources of HCl are the drowning jets on the blowing tanks.

Sample Data

These samples were collected for only 13 days because repairs were being made on this sewer when the audits were begun in the other parts of the Aroclor department. They were analyzed for pH, % HCl and organics. Daily highs and lows and a daily average are listed below. A complete list of all data is shown on the attached data sheet. The sampling point is noted on the attached process sewer map.

	Organics #/day	HCl #/day
High	32.8 #	3,000 #
Low	3.3 #	300 #
Average Daily	8 #	1,100 #

Average Flow = 250 G.P.M.

Aroclor Still Room Sewer

This sewer receives all of the water used on the jets on the Aroclor stills. These samples were also analyzed for pH, % HCl and organics. The pH and HCl were discontinued when there was no HCl detected in a number of samples.

Sample Data

These samples were collected for a period of 14 days. The average daily organics loss from this sewer was only 2 #/day. Listed below are the daily highs and lows as well as the average daily loss for the sampling period. A complete list of the data is located on the attached data sheet. The sampling point is noted on the attached process sewer map.

DSW 378605

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Sample Data (Cont'd)

	Organics #/day
High	8.9 #
Low	1.6 #
Average Daily	2 #

Average Flow = 65 G.P.M.

Choccolocco and Snow's Creek

Due to the recent developments concerning P.C.B. in water and its effects upon wildlife, we decided to begin sampling the streams which receive our waste water from the Aroclor Manufacturing Process. We began sampling by first checking Snow's Creek for definite globules of Aroclor lying in the bottom of the creek. We were only able to detect this a distance of about 1 block from the plant boundaries. Other points further downstream were checked but no Aroclor layer was found. Samples were collected at six points downstream from the Anniston plant. One sample was caught upstream from the confluence of Snow's and Choccolocco Creeks. This sample is to be used as a blank. Both mud and water samples were caught at each of these locations. The exact locations where these samples were collected are shown on the attached map of the Choccolocco Creek watershed. The data from these samples will be published as soon as it is received.

During September of 1968 two sets of samples (mud and water) were collected from Snow's Creek. These samples were analyzed for P.C.B. by organic research. Listed below are the results from these samples.

Sample Location	Sediment	Water
Plant Outfall	0.20 ± 0.02%	58 ± 2 P.P.B.
1 Block Below Plant Outfall	1.64 ± 0.04%	Sample Broken

Calculation of the above data into #/day yields a value of approximately 1 #/day of P.C.B. which is actually lost to Snow's Creek. The probable reason for the difference between 27#/day which we lose in the plant and the 1#/day which shows up in Snow's Creek is that the analytical method used to measure losses in the plant measures total organics losses. The losses in Snow's Creek were measured using the Organic Research method which is specific for P.C.B.

WASTE AUDIT DATA SHEET

Department Aroclor Department — Sampling Point Aroclor Still Room Sewer

Date	pH	%HCl	PPM Organics	#Organics/day	Flow	Prod. Rate	Comments
6/3	6.6	NDA	2.0	1.6	65 GPM.		
6/4	6.7	NDA	11.3	8.9	-		
6/5	6.7	NDA	2.5	2.0	-		
6/6	7.2	NDA	5.5	4.2	-		
6/7	6.3	NDA	6.0	4.7	-		
6/8	6.2	NDA	NDA	-	-		
6/9	6.3	NDA	NDA	-	-		
6/10	6.2	NDA	NDA	-	-		
6/11	6.3	NDA	NDA	-	-		
6/12	7.1	NDA	NDA	-	-		
6/13	7.1	NDA	NDA	-	-		
6/14	7.1	NDA	NDA	-	-		
6/15	7.4	NDA	NDA	-	-		
6/16	7.5	NDA	7.5	5.8	-		
			AVERAGE #/DAY =	2			

DSW 378607

STLCOPCB4099859

WASTE AUDIT DATA SHEET

Department Aroclor Department — Sampling Point Chlorinator Sewer

Date	pH	%HCl	PPM Organics			#HCl /day	#Organics /day		Flow	Prod. Rate	Comments
6/4	3.2	.10	2.4			3,000	7.2		250 GPM		
6/5	6.2	NDA	NDA			-	-		-		
6/6	10.8	NDA	1.1			-	3.3		-		
6/7	3.6	.09	1.8			2,800	5.3		-		
6/8	4.1	.10	10.9			3,000	32.8		-		
6/9	2.7	.01	8.0			300	24.0		-		
6/10	3.7	NDA	2.0			-	6.0		-		
6/11	5.7	NDA	8.5			-	25.5		-		
6/12	3.5	.04	NDA			1,200	-		-		
6/13	3.5	.04	NDA			1,200	-		-		
6/14	3.5	.04	NDA			1,200	-		-		
6/15	4.1	NDA	NDA			-	-		-		
6/16	2.7	.05	NDA			1,500	-		-		
			AVERAGE #/DAY =			1,100	8.0				

DSW 378608

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WASTE AUDIT DATA SHEET

Department HCl Department

Sampling Point HCl Sewer

Date	pH	% HCl	PPM Organics			#Organics /Day	#HCl /day		Flow	Prod. Rate	Comments
5/20	.9	1.1	NDA			-	13,200		100 GPM		
5/21	.7	1.7	.5			.6	20,400		-		
5/22	.9	1.2	NDA			-	14,400		-		
5/23	.8	1.4	.5			.6	16,800		-		
5/24	.8	2.6	2			2.5	31,200		-		
5/25	.8	2.6	2			2.5	31,200		-		
5/26	2.0	.1	4.0			4.8	1,200		-		
5/27	2.4	.1	5.9			7.1	1,200		-		
5/28	1.5	.3	2.5			3.0	3,600		-		
5/29	1.0	.6	12			14.4	7,200		-		
5/30	1.2	.6	7.3			8.8	7,200		-		
6/2	.4	2.3	.1			.10	27,600		-		
6/3	.8	1.9	3.3			4.0	22,800		-		
6/4	1.1	.7	20			24.0	8,400		-		
6/5	.8	1.3	4.6			5.5	15,600		-		
6/6	.8	2.2	8.6			10.3	26,400		-		
6/7	.7	2.1	5.7			6.9	25,200		-		
6/8	.9	1.3	5.7			6.9	15,600		-		

DSW 378609

STLCOPCB4099861

WASTE AUDIT DATA SHEET

Department HCl Department

Sampling Point HCl Sewer

Date	pH	% HCl	PPm Organics			#Organics /Day	#HCl /day		Flow	Prod. Rate	Comments
6/9	.8	1.4	NDA			-	16,800		100GPM		
6/10	1.1	.5	5.0			6.0	6,000		-		
6/11	.8	1.2	6.0			7.2	14,400		-		
6/12	.7	1.2	4.5			5.4	14,400		-		
6/13	.7	1.2	4.5			5.4	14,400		-		
6/14	.7	1.2	4.5			5.4	14,400		-		
6/15	.8	.8	5.0			6.0	9,600		-		
6/16	.2	2.1	1.5			1.8	25,200		-		
			AVERAGE #/DAY =			6.0	15,000				

DSW 378610

STLCOPCB4099862

WASTE AUDIT DATA SHEET

Department Aroclor Department

Sampling Point Warehouse Sewer

Date	pH	%HCl	PPM Organics			#Organics /day			Flow	Prod. Rate	Comments
5/20	-	-	32			35.0			90 GPM		
5/21	-	-	11			12.0			-		
5/22	-	-	NDA			-			-		
5/23	-	-	7.2			7.8			-		
5/24	-	-	NDA			-			-		
5/25	-	-	NDA			-			-		
5/26	-	-	25			27.0			-		
5/27	-	-	7.5			8.1			-		
5/28	-	-	8.0			8.7			-		
5/29	-	-	2.7			29.2			-		
5/30	-	-	4.0			4.3			-		
5/31	-	-	4.0			4.3			-		
6/1	-	-	4.0			4.3			-		
6/2	-	-	2.0			2.2			-		
6/3	5.8	NDA	NDA			-			-		
6/4	6.4	NDA	15			16.2			-		
6/5	6.7	NDA	10			11.0			-		
6/6	7.2	NDA	13.3			14.4			-		

DSW 378611

WASTE AUDIT DATA SHEET

Department Aroclor Department

Sampling Point Warehouse Sewer

Date	pH	%HCl	PPM Organics	# Organics /day	Flow	Prod. Rate	Comments
6/7	6.4	NDA	32.6	35.2	90 GPM		
6/8	6.2	NDA	12.0	13.0	-		
6/9	-	-	5.0	5.4	-		
6/10	-	-	8.0	8.7	-		
6/11	6.2	NDA	5.0	5.4	-		
6/12	5.6	NDA	NDA	-	-		
6/13	-	-	NDA	-	-		
6/14	-	-	NDA	-	-		
6/15	4.5	NDA	60	65.0	-		
6/16	6.1	NDA	2.5	2.7	-		
			AVERAGE #/DAY =	11.4			

DSW 378612

STLCOPCB4099864