PROGRESS REPORT TECHNICAL SERVICES DEPT. – W. G. KRUMMRICH PLANT	JOB NO. 1716:246	REPORT NO. 103	DATE 11, 22, 68

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• TO RECEIVE DETAIL SECTION

TITLE: AROCLOR AND AROCLOR BLENDS: PROCESS IMPROVEMENT PLAN - SIX MONTH STATUS

PERSONNEL: P. J. Verna (T. E. Greenman)

PROBLEM: This is a report on the status of the Aroclor PIP of Feb. 21, 1968.

SUMMARY

Two projects increased Aroclor capacity yielding cost improvements of $27,800 and new earnings of $87,000 YTD.

	CI		NE	
	Actual	Target	Actual	Target
Still Pre-heater	$ 3,800	$14,000	$12,000	$45,000
6" Cl_2 Line	$24,000	-0-	$75,000	-0-

The design capacity for Dept. 246 before installation of the pre-heater and 6" Cl_2 line was 2.6 M lbs/Mo. Six out of the first ten months in 1968 showed rates higher than 2.6.

The start-up demonstration of the new continuous chlorination system is near completion and well ahead of schedule. No major problems were encountered. Electrical properties of Aroclor 1242 are excellent, and TCC levels average 0.15 PPM (Divisional Goal is 0.10 PPM maximum).

TSD Process Job List on following page.

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DSW 311644

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FORM WGK 300 REV. 2/68

TSD PROCESS JOB LIST

Job	Capital	Savings/Benefits	Status
Install heat exchanger, Project 5334	$8,000	Meet 1968 sales needs; insure $25,000 rate savings in 1968.	Heater installed 3/18/68 but was shut down 6/10/68 due to leakage.
Coordinate quality tests in conjunction with PR & D	0	Protect $5M Market	Tested I_2 co-catalyst, plant Cl_2 sources, & bromine effects on Aroclor quality. Testing continuous process Aroclor quality.
Make nitrogen blanket system operable	$1,000	Quality	All blanketing systems are operating properly except #9 storage tank; #9 will be repaired. EDC 12/1/68
Determine Biphenyl Losses	0	Quality; minimize losses	All Biphenyl vapor losses will be recovered in the new off-gas condensate tank.
Fume Removal System	$12,500	Safety	Installation is 80% complete.
Improve Blend Operation	0	1) Increase Blend 2) $1000/yr in lab costs 3) Raw material savings	Project 1800 provides: 1)TTCB storage tank, 2) #3 mix tank, and 3) Blend component metering facilities.
Still Operation Below 40 MM	0	Quality	No justification for work.
Instrumentation Changes	$4,500	Process Control	Packages submitted for: 1) Chlorine Interlock System, 2) LRC for #2 Still and 3) LI for product tanks.
Liquid N_2 Supply System	$8,100	$17,400/Yr. in decreased	Airco N_2 station installation completed 11/14/68. System is now in operation.

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TSD PROCESS JOB LIST

Job	Capital	Savings/Benefits	Status
Automatic Drum Flush	$200-300M	$20,000/yr labor savings and quality improvement.	No work.
Horizontal pump and boildown facilities for #1 Still	$15,000	Increase Still Capacity by 5M Lbs/Yr.	No work.

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DETAILS:

1. HEAT EXCHANGER

The spiral heat exchanger, Project 5334, increases still capacity 10% by pre-heating the still feed from the blow tank. It was installed 3/18/68 and operated properly from 4/18/68 to 6/10/68 when it was shut down due to leaking gaskets. The heater was opened up and inspected by a factory representative; no faults in workmanship were detected. The gaskets were replaced 9/17/68, but a faulty steam trap and flow restrictions in the inlet line prevented proper operation. These problems were corrected and the heater worked successfully for a few days, but catalyst plugged the inlet line once again. The catalyst will be removed. However, twith the addition of #3 and #4 stills, the increased capacity provided by the heat exchanger is not needed (yet).

2. QUALITY

Because samples of Aroclor from foreign competitors were analyzed to be of higher quality than Monsanto's, a concentrated effort was begun in 1967 to improve the stability of our own Aroclor. A goal of 0.10 maximum thermal chemical chlorides was set for 1242 Aroclor. Normal batch operation produced TCC levels of 0.50 average.

Based on lab findings that iodine co-catalyst reduces TCC level, four demonstrations were run in the plant batch equipment using iodine. Unfortunately the lab results could not be reproduced in the plant.

PR & D then tested all plant sources of chlorine in the lab chlorinator. Except for Hooker chlorine, all sources produced Aroclor equal in quality to plant-produced Aroclor although poorer in quality to that produced using the lab's "bottled" chlorine. Aroclor made from Hooker chlorine yielded much higher TCC levels.

Because bromine levels are higher in Esterhazy KCL, the bromine content of the snift gas is being monitored weekly. Bromine concentrations over 200 PPM are suspected of increasing Aroclor instability. Whenever the BR_2 concentration reaches 200 PPM, the chlorination temperature is raised to 195°C which nullifies BR_2's detrimental effect.

PR & D's quality efforts are now centered on Aroclor (1242) produced in the continuous process. Initial results indicate that this process produces Aroclor with TCC levels around 0.20.

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3. MAKE NITROGEN BLANKET OPERABLE

Due to malfunctioning instruments on #9, 10 and 11 storage tanks, a nitrogen blanket could not be maintained over the finished Aroclor, protecting its quality. The nitrogen blanketing systems were to be checked and corrected before installation of the Airco liquid N_2 supply system. On 7/24/68 plant air was connected to the system in order to detect the malfunctioning instruments. The problem was diagnosed as three faulty Varec vents. Functioning properly, the vents relieve tank pressure above 5 inches of water or below 2 oz. vacuum. These vents were stuck open. They were repaired and replaced by the instrument shop 10/4/68. Except for #9 storage tank, all blanketing systems are operating properly.

4. DETERMINE BIPHENYL LOSSES

Biphenyl losses in the Aroclor process result mainly from vapor loss in the off-gas. Brinks demisters eliminate most of the entrainment but material losses approach $30,000/yr when chlorination temperature is raised to 195°C. This loss was nearly eliminated when the off-gas system from the batch process was tied in to the off-gas condensate tank in the new expansion. The off-gas is cooled and any organic material is condensed and collected in the condensate tank. When sufficient material accumulates, it is reworked in a batch chlorinator. Since tie-in 9/4/68, several batches of 1248 have been produced from the off-gas condensate.

5. FUME REMOVAL SYSTEM

An increase in the intensity of Aroclor and HCl fumes released at the chlorinator sample spots has created the need for a fume removal system. The fume problem is a result of the increased chlorination temperature, Tentative Amendment "D" - Aroclor Process Description. The drumming station is also included in this project.

An Atlac 382 plastic ductwork and blower system was chosen; the fabrication was done by Heil Process Equip. Corp. The blower was oversized to accomodate the sampling spots at the new chlorinators. A $9750 estimate was approved 7/2/68 and the project package was submitted 7/29/68. All Heil equipment was approved and delivery was 10/1/68. A field review was conducted with Planning and installation is scheduled for 11/1/68. A revised estimate ($2750), needed to cover increased labor and the stores overhead on the Heil equipment, is awaiting approval. Installation is 80% complete.

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6. IMPROVE BLENDING OPERATIONS

As part of Project 1800, CED is upgrading and improving Dept. A-246 blending facility. The project includes:

1) Providing a TTCB storage tank.

2) Converting #8 storage tank to #3 mix tank.

3) Providing metering facilities for mix tanks.

These improvements will make TTCB readily available and increase the probability of blending in-spec material on the first try. The operators can now set a Brodimatic meter to stop the flow to a mix tank whenever the proper volume of a component has passed. A chart is available which will indicate the proper blend composition given the specific gravities of the two components to be mixed. Under present operation the operator must eyeball a float and chain type indicator to determine composition. Using this method much time is wasted adjusting the blend to correct specifications.

7. STILL VACUUM AT 40 MM Hg

No justification for work.

8. INSTRUMENTATION CHANGES

Three project packages for instrumentation changes have been submitted by R. Hydzik.

1) Chlorine Interlock System - The function of the interlock system is to shut off the chlorine flow to the chlorinator whenever a high temperature is reached in the chlorinator body. At present, the high temperature shut-off is actuated when the air cooler exit temperature is too high. The present system does not account for a recirculating pump failure.

2) Level Recording Controller for #2 still.

3) Level indicator for product tanks.

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9. LIQUID N_2 SYSTEM

To protect Aroclor quality, Dept. 246 uses nitrogen to blenket eight finished product storage tanks and the four new porocel columns. Replacement of compressed N_2 cylinders with an Airco liquid N_2 supply system will save $17,400/yr at a 560,000 SCF/Mo. usage rate. (This includes Dept. 254 at 300,000 SCF/Mo.) A $0.32/100 SCF price differential between revaporized and compressed nitrogen makes this savings possible.

An $8100 estimate for the system was approved 8/12/68. The construction, given to CED as part of Project 1800, was begun 9/3/68 and completed 10/15/68. It consisted of installing a 19' x 12-1/2' x 1' concrete pad, two gas meters and pressure regulators, a 250,000 SCF Airco tank and two air vaporizers, all enclosed by a four foot high fence.

The storage tank was filled with liquid N_2 10/15/68, but due to leakage in the N_2 lines around the meters the system has not yet been tied in. The leaks should be corrected by 11/1/68 and proper operation of the blanketing system will then be demonstrated. Construction for completion of the pipeline connecting Dept. 254 will begin 11/1/68.

10. AUTOMATIC DRUM FLUSH

No work.

11. #1 STILL HORIZONTAL PUMP

No work.

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