MONSANTO COMPANY
ANNISTON PLANT

START-UP OPERATIONS MANUAL
POROCEL COLUMNS

August 1969

CONFIDENTIAL

MONSANTO COMPANY

ORGANIC CHEMICALS DIVISION

ANNISTON, ALABAMA

ANNISTON POROCEL COLUMNS

CEA 2132

START-UP OPERATIONS MANUAL

August 1969

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START-UP OPERATIONS MANUAL

POROCEL COLUMNS

CEA 2132

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START-UP OPERATIONS MANUAL

POROCEL COLUMNS

CEA 2132

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SECTION I

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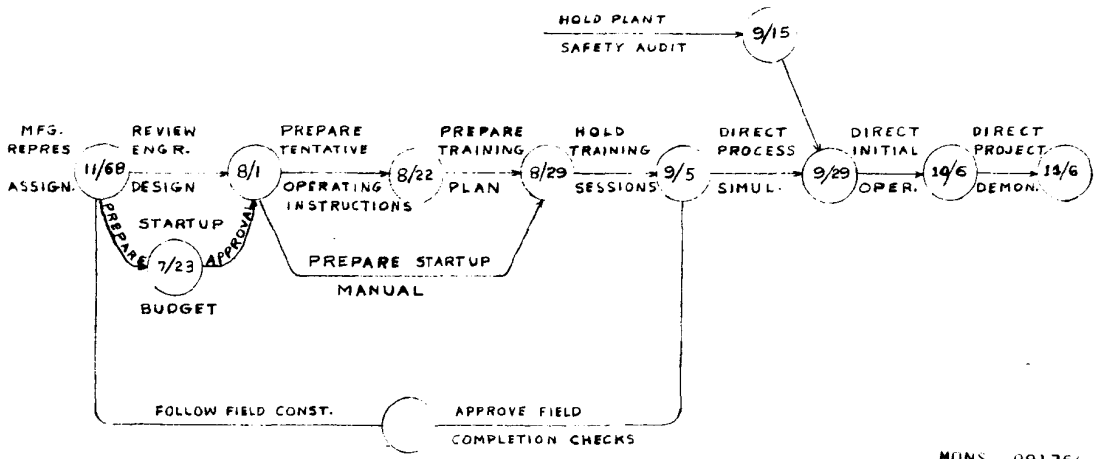
CRITICAL PATH DIAGRAM



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TSD - MONSANTO COMPANY - ANNISTON, ALA.

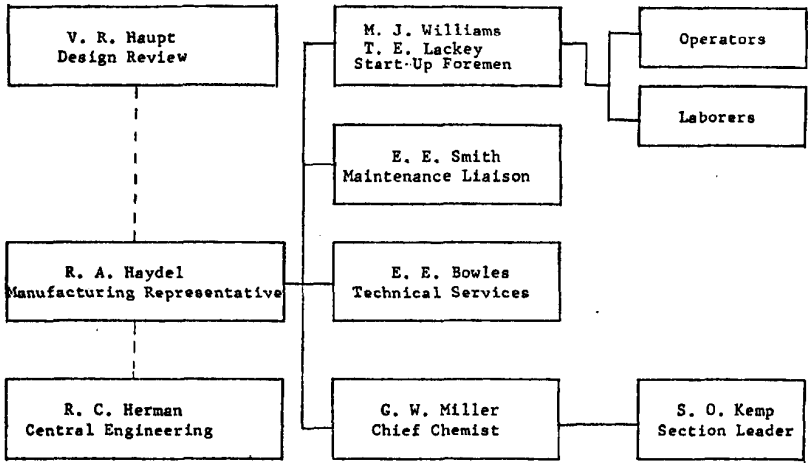
TITLE: ANNISTON POROCEL TREATMENT COLUMNS					AUTH. NO. CEA	
					JOB NO. 2132	
DRAWN BY: R. A. H.	CHECKED	APPROVED	DATE: 8/20/69	SHEET	TS-B	

START-UP OPERATIONS MANUAL

POROCEL COLUMNS

CEA 2132

START-UP ORGANIZATION



DISTRIBUTION OF COMMUNICATIONS

	Organic Administration	Manufacturing	Engineering	Plant
1. Start-up Manual				
Demonstration Plan & Schedule		TPM, MPD	PM	(PLM, MS
Expense - Code of Accounts		TPM		OMS
Operating Instructions			PM	OMS
Training Plan		TPM	PM	OMS
Process Simulation Plan		TPM	PM	OMS
Initial Operations Plan		TPM, DM	PM, SM	PLM, OMS, CC
Project Demonstration Plan		TPM, DM	PM, SM	PLM, OMS
2. Budgets, Cost Standards,)		TPM		PLM, OMS
Variance Predictions)		TPM		DS, PA, TSS
3. Start-up Progress Reports		TPM, MPD	PM	PLM, OMS, DS, TSS
4. Daily Status Reports	BGD	DM, TPM, MPD	PM, SM	PLM, OMS, DS, TSS
5. Engineering Changes		TPM	PM, SM	PLM, OMS, DS, MS, TSS
6. Process Changes		TPM	PM, SM	PLM, OMS, TSS, DS
7. Project Completion Report	BGD	DM, TPM	PM, SM	PLM, OMS, MS

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Maintenance Superintendent	MS
Chief Chemist	CC
Manufacturing Representative	MR
Technical Services Superintendent	TSS
Plant Accountant	PA
Department Supervisor	DS
Organic Administration - Business Group Director	BGD

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SECTION II

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CODE OF ACCOUNTS

505	Purchased Raw Material
526	Raw Material Handling
530	Steam
533	Electricity
539	Water-Purchased
542	Water-Plant
545	Gas
570	Wages
575	Salaries
578	Payroll Overhead
590	Factory Supplies
601	Packing Labor
603	Packaging Overhead
610	Laboratory
614	Clothing & Laundry
618	Production Department Containers
621	Technical Service
641	Rentals-Equipment
644	Start-Up Expense
657	Plant Process Research
694	Mechanical Expense
698	Depreciation
715	Consultant Fees
760	Factory Indirect Expense
798	Meetings & Conferences

824	Plant Trucks
855	Sundries
864	Office Supplies
880	Communications
883	Travel

Monsanto

FROM (NAME & LOCATION) Anniston, Alabama

DATE : July 23, 1969

SUBJECT : CEA-2132 START-UP BUDGET

REFERENCE

TO : W. A. Kuhn
ST. LOUIS

cc: W. B. Papageorge
H. L. Williams
C. A. Rose
J. C. Landwehr
E. E. Smith
C. K. Eastman

Attached is the start-up budget for the Porocel Column project (CEA-2132) at Anniston. Charges are being collected on plant account 916.54. The preparation phase is $15,250 and the operation phase is $6,412. The total start-up expenses amount to $21,266 which is 8% of current estimated capital expenditure of $267,500.

Basic assumptions in this start-up budget are:

1. Present CED construction schedule hold. Targeted project construction completion date is currently latter part of September.

2. The plant start-up account 916.54 will remain open until the project premises have been achieved for one calendar month.

3. All hourly training will be done on overtime, since present department must operate while crews are trained.

4. Extra hourly labor used for start-up will be overtime.

5. The "All Others" item in the start-up preparation budget includes manufacturing travel, meetings and conferences, stationery and printing, process research charges, lab charges, etc. as indicated in Organic Division Guide for Plant Start-ups, Third Edition.

6. Start-up Operation costs include raw material, total direct, and total indirects as indicated in the Organic Division Guide for Plant Start-ups.

R. A. Haydel

:md
Att.

MONS 091761

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CEA-2132
AROCLOR PURIFICATION - ANNISTON
START-UP BUDGET - PREPARATION PHASE

Item	June 1969	July	August	September	Total
Salaries	--	300	1,000	1,000	2,300
Salary O.H. (18%)	--	54	180	180	414
Labor	--	--	500	2,000	2,500
Labor O.H. (16%)	--	--	80	320	400
Raw Materials	--	--	--	2,500	2,500
Mechanical Expense	--	--	1,000	2,500	3,500
Factory Supplies	--	--	500	800	1,300
TSD	--	--	500	700	1,200
Dept. Containers	--	--	200	300	500
All Others	136	--	--	500	636
TOTAL	136	354	3,960	10,800	15,250

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CEA-2132
AROCLOR PURIFICATION - ANNISTON
START-UP BUDGET - OPERATIONS PHASE

Predicted Negative Variances

Raw Materials	October	November	Total
Bauxite	250	--	250
Biphenyl	600	--	600
Chlorine	400	--	400
Nitrogen	150	--	150
Total Raw Materials	1,400		1,400
Directs			
Wages	500	200	700
Payroll Overhead (16%)	80	32	112
Supplies	500	200	700
Packing Labor	400	--	400
Packing Overhead	100	--	100
Prod. Dept. Containers	500	--	500
Plt. Process Research	200	--	200
Mech. Expense	1,500	500	2,000
Total Directs	3,780	932	4,712
Indirects			
Dep.	--	--	--
FIE	200	100	300
Total Indirects	200	100	300
Grand Totals	5,380	1,032	6,412

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SECTION III

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START-UP OPERATIONS MANUAL

POROCEL COLUMNS

CEA 2132

TENTATIVE OPERATING INSTRUCTIONS

A. SYNOPSIS OF PROCESS

Electrical grade Aroclors 1242, 1254, and 1260 are treated to upgrade electrical properties by passage through stainless steel columns packed with porocel (activated bauxite). There is one new column for each Aroclor still train (3 total), plus the one original porocel column installed in 1967. Operations will normally be two columns on 1242 with one of the other two for 1254 and the other for 1260.

The distilled Aroclors are pumped by positive displacement pumps from the blend tanks under controlled flow conditions through a temperature controlled spiral heat exchanger to bring the specific Aroclor to proper temperature. The temperature control medium is either steam or cooling tower water depending on whether heating or cooling of the Aroclor is required. From the heat exchangers, the product enters the top of the porocel columns and passes through the porocel bed which upgrades the electrical properties. The product discharges out the bottom of the column and passes through a polishing filter and on to storage.

A side stream from any of the four columns can be diverted by a selector through an in-line analyzer which monitors the power factor of the particular Aroclor going through it.

Periodically, the porocel beds have to be dumped and recharged with fresh bauxite when the bed is depleted. A fresh charge of bauxite is dried by circulating hot Therminol through the carbon steel jacket of the column while simultaneously blowing the charge with nitrogen. When dried, the column is put back on line.

In addition to the Aroclor treatment columns described above, there are two carbon steel columns located in the Aroclor tank farm for treatment of TCB and TTCB which are raw materials used in the manufacture of several Aroclor blends. These columns are similar to the Aroclor columns except they are smaller and do not have the flow or temperature control features. Also, steam is used in drying the bauxite rather than Therminol.

The TCB or TTCB is pumped directly from a tank car through the porocel columns. By splitting the total flow between two columns, a tank car may be unloaded in about a shift. Pumping the material through one column would increase the car unloading time proportionally.

The material from the cars enters the top of the column, exits at the bottom, goes through a polishing filter, and then on to storage.

B. HAZARDOUS PROPERTIES OF MATERIALS

Chlorinated Biphenyls (Aroclors) are not normally skin irritants, however, their solvent action can remove natural protective oils and fats, and may dry and crack the skin. Also, continuous or repeated skin contact with Aroclor should be avoided because of the possible occurrence of a condition called "chloracne".

Since sampling presents primary exposure to the skin to Aroclor, gloves are to be used when sampling.

TCB and TTCB are toxic if their vapors are breathed for a prolonged time period. Wear fume mask if exposed to vapors for long periods.

Thermal burns are possible since the Aroclors are processed at high temperatures (65-135°C). Also, contact with hot Therminol or steam lines is possible. For this reason, gloves and long sleeves are to be worn while operating to minimize burns.

Bauxite presents no particular hazard except that its dust is irritating to the mucous membrane and respiratory tract. For this reason, a dust mask should be worn when there is possibility of being exposed to dust as when charging columns.

C. DETAILED OPERATING INSTRUCTIONS

I. AROCLOR TREATMENT COLUMNS

1. Start-Up from Complete Shutdown

a. Charging Column(s) with Porocel

a-1) Check bottom nozzle valves to insure that they are closed.

a-2) Remove manhole on top of column. Insure that bauxite discharge manhole at bottom of column is securely bolted closed.

a-3) Inspect inside of column through top to insure that bottom support is not damaged and that interior of column is not dirty or rusted.

a-4) Obtain about 12 drums of porocel from storage (400 lb. drums - 20-60 mesh).

a-5) Place one drum in drum hoist and lift to top of column.

a-6) Leaving drum in hoist, remove cover lid and pour porocel into the column.

a-7) Lower empty drum to ground and repeat a-5, a-6, and a-7 until column is filled.

a-8) Actuate the column vibrators to pack the porocel bed.

a-9) Have manhole cover reinstalled on top of column.

b. Aroclor Porocel Columns Therminol System

b-1) Check out lines from Therminol header to column jacket to Therminol tank.

b-2) Close all manual valves on column jackets except the valves on column jacket inlet and outlet of column which is to be dried and the Therminol tank fill valve after exiting the column jacket.

b-3) Open the by-pass valve around the Therminol temperature control valve (TCV 691.1) to allow Therminol to fill the Therminol tank.

b-4) Close by-pass valve when Therminol tank is 75% full.

b-5) Open the Therminol valves to and from the plate coil jacket of the Therminol tank.

b-6) The Therminol heating system is now ready to use to dry the porocel bed in the specific column in question.

c. Drying the Aroclor Treating Column Porocel Bed

c-1) Close all inlet and outlet product valves on Aroclor column to be dried.

c-2) Line up nitrogen supply line leaving the valve nearest the column closed.

c-3) Close column vent valve on top of column.

c-4) Slowly open nitrogen purge valve. Do not bump porocel bed. Leave valve wide open.

c-5) Open slowly vent valve on top of column. Nitrogen is now flowing thru porocel bed.

c-6) Line up valves to allow Therminol to flow from Therminol tank, through pump, through column jacket, and back to Therminol tank.

c-7) Start Therminol circulating pump.

c-8) Set Therminol temperature controller (TIC 691.2)at top of scale.

c-9) Open block valves around Therminol temperature control valve (TCV 691.1). Close by-pass valve.

c-10) Hot therminol should now be circulating through the column jacket and nitrogen should be blowing through the porocel bed. After four (4) hours of drying, close nitrogen supply valve.

c-11) Sample the porocel by dipping glass rod through the vent valve on top of column.

c-12) Send porocel sample to Lab for moisture analysis. Resume nitrogen purging while waiting for analysis.

c-13) Sample the porocel bed every four hours as above until the moisture analysis is 1,000 ppm or below.

c-14) When the moisture is in spec, close the nitrogen supply valve and column vent valve in that order. Do not leave nitrogen pressure on the column.

c-15) Therminol is left circulating on column after drying. If it is going through the jacket of a 1242 column, reset Therminol temperature control to 65°C. If going through a 1254 or 1260 column, reset temperature to 100°C. When it becomes necessary to dry a different column, divert the Therminol flow to the fresh column by opening inlet and then outlet Therminol valves on the fresh column and then closing inlet and outlet Therminol valves on the previous column.

d. Initial Aroclor Conditioning of New Porocel Column Beds

d-1) After one still batch of 1242, 1254, or 1260 has been pumped to the blend tank, line up to flow from the blend tank to the Viking pump, to the appropriate product heat exchanger, to the appropriate column, on through the filter and then to the No. 3 filtrate receiver. Close vent valve on top of column.

d-2) Set the flow controller at the blend tank (FIC 913.2, 914.2 or 915.2) at 3 gpm.

d-3) Set the product temperature controller(s) at the column(s) to control as follows:

1242 - 65°C
1254 - 100°C
1260 - 125°C

If the blend tank temperature is above this temperature, manually set cooling water to go thru the heat exchanger. If the temperature of blend tank is below the desired temperature, set up valves to put steam into the exchanger.

d-4) Start the positive displacement Viking pump under the appropriate blend tank and pump the blend tank dry through the column.

d-5) When the batch of Aroclor has all been put through the column to the No. 3 receiver, sample the receiver and have checked for resistivity.

d-6) If the resistivity is within spec, pump out receiver to appropriate storage tank.

d-7) If resistivity is below spec, pump back to blend tank and rework through column until resistivity spec is met.

2. Routine Operations of Aroclor Treating Columns

Following are pertinent comments on conditions which will exist on the porocel treatment systems during normal operations.

a. Therminol Heating System

a-1) Therminol tank will be 75% full.

a-2) Therminol temperature controller (TIC 691.2) will be set at 65°C if the Therminol is going through a 1242 column jacket. If it is going through a 1254 or a 1260 column jacket, set-point of controller should be at 100°C.

a-3) Temperature of Therminol entering and leaving the jacket of a column can be read on the temperature recorder in the control room (L&N).

b. Porocel Column

b-1) The Viking feed pumps under each blend tank will be pumping Aroclor from the blend tanks through the appropriate heat exchanger located near each column on the second level, through the individual columns, polishing filters, and on to storage.

b-2) The flow recorder controllers at each blend tank can be set from 0-10 gpm of Aroclor going to the columns. Object is to adjust flow such that there will be a continuous feed to each column when stills are running normally. Flows of around 3 gpm should be normal. In practice, adjust flow rate so that blend tanks are almost empty in time to receive another batch from still receivers. This will involve close watching of still receiver and blend tank levels.

b-3) Each column has a heat exchanger to bring temperature of product going to the columns to desired temperatures. These temperatures are as follows:

Aroclor 1242 - 65°C
Aroclor 1254 - 100°C
Aroclor 1260 - 125°C

These temperatures are automatically controlled with one manual stipulation. If the temperature of product from the blend tank is above these temperatures, cooling water is put on the exchanger manually to bring the temperature down. If the temperature from the blend tank is below the desired temperature, steam is put on the exchanger to bring temperature up. Once the inlet temperature is determined to be above or below the desired temperature and the temperature control medium is manually selected, the temperature recorder controller will maintain desired temperature to column.

b-4) A selector valve and timer makes it possible to put a side stream from any one of the columns through the power factor instrument at the old column. This power factor reading is remoted into the control room. When selecting a stream - allow about one-half hour before taking reading.

b-5) Temperatures into and out of each column are read on temperature recorder in control room (L&N). This same temperature recorder also records temperature of product stream out of power factor instrument.

c. Data Collection

Data to be taken and recorded on data sheet at indicated times is as follows:

c-1) Flow rate through column.

c-2) Blend tank level.

c-3) Still receiver level.

c-4) Temperature of Aroclor entering column.

c-5) Temperature of Aroclor out of column.

c-6) Power factor.

c-7) Therminol temperature.

d. Sampling

During routine operations, quality will be monitored mainly by in-line power factor measurements of product from the columns. On start-ups of the column, initial production will be sampled and lab tested for resistivity to determine whether rework is necessary. Operator will measure and record specific gravity of each batch.

3. Dumping Porocel Beds

a. Porocel in individual columns will be dumped when:

a-1) Resistivity of treated Aroclor drops below 10,000.

a-2) When pressure drop through column becomes so great as to restrict flow to such an extent that it is bottlenecking stills.

a-3) If it becomes necessary to treat a different Aroclor other than the one for which the column is earmarked.

3. Dumping Porocel Beds (Contd.)

b. Stop column feed pump.

c. Close inlet and outlet valves to column.

d. Position dempster-dumpster under manhole near bottom of column.

e. Have top of column opened.

f. Have manhole near bottom of column opened.

g. Rake out porocel - Aroclor mixture from bottom manhole into dumpster.

h. Have bottom manhole cover replaced when column is empty and refill column as per instructions above.

4. Shutdowns

a. Temporary Shutdown

a-1) Stop column feed pump under blend tank.

a-2) Close inlet valve to pump.

a-3) Leave Therminol system as is.

a-4) Start-up when ready as per above instructions.

b. Complete Shutdown

b-1) Stop column feed pump.

b-2) Close inlet valve to pump.

b-3) Stop Therminol circulating pump.

b-4) Close inlet and outlet valves of Therminol circulating pump.

b-5) Close inlet block valve to TCV 691.1 - Therminol temperature control valve.

b-6) Slowly blow out lines and column with nitrogen at blend tank connection.

b-7) Close block valve on column product outlet valve.

b-8) Shut off steam or cooling water valves to product heat exchanger.

b-9) Open vent valve on top of column.

5. Control Loops

a. Aroclor Flow Control FIC 913.2, 914.2 and 915.2

The function of these instrument loops is to control the flow of Aroclor from each blend tank to each porocel column. This is done by setting the desired flow on the flow indicator controller located at the blend tank, measuring the flow stream to a column with an orifice and regulating this forward stream by automatically throttling of a control valve on a recycle line which recycles the excess Aroclor back to the blend tank. The range of these instruments are 0-10 gpm.

b. Therminol Temperature Controller TIC 691.2

The function of this loop is to maintain a constant Therminol temperature to dry out a fresh porocel charge in any one of the four Aroclor treatment columns. It does this by regulating the flow of hot Therminol from the main header to the plate coil jacket on the Therminol tank. Control valve TCV 691.1 is throttled by TIC 691.2 as needed to maintain the Therminol temperature at the desired set point in the surge tank.

c. Aroclor Product Temperature Controller TIC 913.1, 914.1, and 915.1

The function of these loops is to control the temperature of Aroclor going into each column. The TIC's throttle either a cooling water control valve or a steam control valve to maintain a set temperature. The choice of water or steam is made and set up by the operator depending on if temperature of Aroclor from blend tank is above or below desired temperature. Range of instruments are 50-150°C.

6. Comments on Process

a. Column Feed Pumps (Items 910, 911, 912)

The column feed pumps are Viking positive displacement pumps with internal relief valves to prevent over-pressurizing the system. The relief valves are set for 80 psi.

b. Column Pressure Relief

Each column is equipped with a 2-inch rupture disc to prevent damage from over-pressurizing columns. The discs are rated at a bursting pressure of 95 psig and a bursting temperature of 205°C.

6. Comments on Process (Contd.)

c. Product Changeover

In normal operations, each column will be earmarked for a specific Aroclor. If it should become necessary to put a different Aroclor through a particular column other than its normal product, this column will have to be dumped and recharged with fresh bauxite to avoid contamination of the Aroclors. Only electrical grade Aroclors (1242, 1254, 1260) will be column treated.

II. TCB AND TTCB TREATMENT COLUMNS

1. Start-Up From Complete Shutdown

a. Charging columns with Porocel

Follow instructions as for charging the Aroclor columns except you will only need nine (9) drums of Porocel rather than 12.

b. Drying the Porocel Beds

b-1) Follow instructions c-1 thru c-5 of section dealing with drying of Aroclor column porocel beds.

b-2) There is no Therminol system servicing these two columns. Instead, introduce steam flow into the jackets of these columns for heating by manipulating appropriate valves.

b-3) Follow instructions c-10 thru c-15 of section dealing with drying of Aroclor column porocel beds.

b-4) When porocel is dried, discontinue steam flow to column jackets.

c. Routine Operation of Columns

The TCB or TTCB will be unloaded directly from the tank cars or trucks through the porocel columns, thru the polishing filter, and then to storage. The flow from the unloading pump will be split to go through both columns in order to unload in a reasonable length of time.

c-1) Set up car, pump and unloading line for unloading material.

c-2) Open inlet product valves to both columns. Insure that the by-pass valve enabling by-passing of material around columns is closed.

c-3) Open discharge valves on product lines out of column.

c-4) Open valve to either TCB or TTCB storage tank depending on which product is to be unloaded. Be sure correct valve to correct tank is opened.

c-5) Start unloading pump and pump all material out of car to storage tank.

c-6) When all material is unloaded, stop pump and disconnect and secure car.

c-7) Blow out line from unloading dock, thru columns and to storage tank to rid the lines and treatment system of material.

c-8) Close valves on storage tank and on porocel columns.

c-9) There are no automatic flow or temperature control loops on these columns. Local pressure and temperature gauges allow for trouble-shooting and monitoring the unloading procedures.

d. Dumping Porocel Beds

Follow procedures c thru f of instructions for dumping Aroclor column beds.

D. EMERGENCY PROCEDURES

This is the plan for departmental action in the event a hazardous situation or injuries warrant emergency action either in the Aroclor Department or within the Anniston Plant.

1. Hazardous Situations which might occur are:

   a. Operational Accidents or difficulties, such as explosions, fires, release of toxic fumes, etc.

   b. Forces of Nature - hurricanes, tornadoes, floods, lightning, etc.

   c. Deliberate Damage - malicious actions, sabotage, direct enemy action.

2. The Primary considerations in the event of a disaster are:

   a. The care of injured individuals and evacuation of personnel to safe areas.

   b. Measures to prevent any, or further, property or equipment damage.

   c. Measures to provide accurate and thorough information so that other plant personnel and the community can be informed, if necessary.

   d. Prompt restoration of affected facilities and resumption of uninterrupted operations.

3. Responsibility

   The areas of responsibility and overall department organization for disaster control are as follows:

   a. Chief Operator:

      Responsible for continuing or closing down production facilities as conditions permit; for directing fire fighting and damage control activities in the department area; keeping department supervision fully informed of conditions within the department.

   b. Operators:

      Responsible for evacuation of all personnel from danger area; for directing and assisting in first aid and rescue missions; reporting to and keeping Chief Operator informed of conditions within his area of responsibility.

      NOTE: All actions of the Fire Brigade are coordinated with the Chief Operator.

4. Details of Plan:

a. In the event of an emergency, personnel must be accounted for. The first assembly area for the department is the open area south of the HB-40 Plant near the ladder rack, the second or alternate assembly area is East of the Aroclor-Biphenyl building in the road.

It is very important to know where people are in an emergency or before action is taken to correct an emergency. If the alternate area has to be used, take whatever safety equipment you can from the department to the assembly area.

b. If assistance is needed, pertinent phone numbers of plant personnel to be contacted are as follows:

T. E. Lackey	358-4284 Munford
M. J. Williams	237-1952
R. A. Haydel	831-4924
H. L. Williams	236-3835
W. B. Papageorge	237-7974
C. K. Eastman	236-3025
J. C. Landwehr	237-0546
J. G. Thorne	237-7652
T. D. Tucker	237-3927
P. K. Ward	236-5218
Dr. J. C. Francis	237-5612 (Home)
Main Gate	236-2961 (308 or 317)

c. In the event of a plant disaster, the Plant Manager's Office is the Control Center. The alternate Control Center is the Guard Room at the Service Building. The Medical Center is the Plant Dispensary. The alternate Medical Center is the Service Building.

d. If the emergency or disaster occurs before or after the day shift, or on a weekend, the department Chief Operator shall notify the Guard on duty and the Guard will be responsible for notifying plant supervision.

e. Immediately upon discovering a fire, or a current or imminent disaster condition, turn in an alarm. Dial 211 and tell where and what the emergency is.

f. On day shift, Monday through Friday, Dial operator - state location and type emergency and need for outside help.

g. On "off-shifts", contact Guard.

MONS 091777

Detail of Plan (Contd.)

h. If the Guard cannot be contacted and the local Fire Department is needed, call them at 237-3541, giving them location, material burning, size of area involved, etc. Then call the department supervision.

NOTE: Chief Operator may designate this job to one of the operators.

i. The Plant Primary Assembly Area, should the emergency be so widespread that the major portion of the plant is affected, is West of HCl Neutralization Pit (Secondary is Guard Gate No. 4 West of Niran).

j. The Off-Site Primary Assembly Area, should complete plant evacuation be necessary, is REA Terminal, Highway 202 (Secondary is Rescue Squad Headquarters, 1313 Walnut Avenue, South side of Building). To signify complete evacuation, the plant fire alarm will be activated and the sound repeated two-second blasts at one-second intervals - for several minutes. At this signal, leave the plant by the most expedious means and route available and reassemble at the off-site assembly point and report to the Personnel Superintendent for head count.

5. Emergency Situations:

The following emergencies are possible at the Aroclor Department:

Emergency	Action
a. Fire Handling Biphenyl	a. Turn in alarm - Dial 211. b. Remove injured from fire area-take care of them. c. Proceed under Chief Operator to extinguish the fire: (1) Dry powder extinguisher. (2) Fire truck, dry powder, and water. (3) Water. d. Pull power on all motors. e. Cut off gas to Aroclor and Biphenyl stills at main cut-off at northwest corner of blowing tank area. f. Shut down Department - Notify Chlorine Plant shutdown is necessary.

Emergency Situations (Contd.)

Emergency	Action
b. Chlorine Release Tank Car-Chlorine Plant	a. Obtain help and turn in alarm if necessary-Notify Chief Operator. b. Obtain gas mask or Scott Air Pak. c. Shut off source of Chlorine. d. Notify Chlorine Plant if shutdown is necessary. e. Disconnect Cl_2 connection at car if necessary. f. If vaporizer is full of liquid chlorine, vent to the chlorine car, then shut off car. g. Notify Department Supervision as soon as possible.
c. HCl Release	a. Obtain help and turn in alarm if necessary-Notify Chief Operator. b. Obtain gas mask or Scott Air Pak. c. Shut off source of HCl gas. d. Notify Chlorine Plant if shutdown is necessary. e. Notify Department Supervision as soon as possible.
d. Fire or explosion at HB-40, Santowax, or Biphenyl Depts.	a. Turn in alarm, shut down Aroclor Dept. Notify Chlorine Plant. Obtain gas mask, go to an assembly point, be prepared to assist in stopping the fire as directed by Chief Operator.
e. Emergency in the Plant	a. Prepare to shut down on orders.
f. Equipment failure creating hazard	a. Notify Chief Operator or Department Supervision. b. Take appropriate action.

Emergency Situations (Contd.)

f. Injuries and Treatment

a. Obtain help.

b. Prevent further injuries to person involved.

c. Make comfortable.

d. Know your first aid:

(1) Mouth-to-mouth resuscitation.

(2) How to use a resuscitator.

(3) How to remove from electrical contact.

(4) Action for a heat stroke.

(5) Chest massage for heart failure.

(6) Emergency action in case of burns.

(7) Location of stretcher, blanket, oxygen.

(8) Know equipment available from the dispensary.

e. Contact Plant Physician as soon as possible, if necessary. Make contact through Plant Guard or Department Supervision.

COLD WATER TREATMENT OF BURNS
(Thermal & Chemical)

Thermal Burn - The type of burn you would get by:

1. Direct exposure to flame.
2. Skin make contact with hot surface.
3. Hot materials, such as molten Santowax, solidify when it touches the skin, thereby holding the heat in the skin.

Chemical Burn - The type of burn you would get by:

1. Contact with Muriatic or Sulfuric Acid.
2. Contact with Potassium or Sodium Hydroxide.
3. Contact with any acid or strong alkali material.

Treatment - Thermal Burns

If possible, submerge burn area in container of cold water (50°F). The container may be a drum, water pail, wash basin - anything that will hold the water. Follow these steps:

1. Put water in container to desired depth.
2. Try to obtain a water temperature of 50°F. by adding ice cubes.
3. Submerge burn area below the surface of the water.
4. Transport injured person to the doctor, keeping burned surface submerged in water.

If burn is in area that cannot be submerged in water, it is a good practice to take the cleanest cloth or toweling that you can obtain, soak it in cold water (wringing out excess water), and place on the burned area. This would be an area such as the back, shoulders, or stomach. UNDER NO CIRCUMSTANCES SHOULD A PERSON SUFFERING FROM THERMAL BURNS BE PLACED UNDER RUNNING WATER. There is a danger of the small droplets of water striking the burned area, causing pain to such an extent as to result in shock.

Treatment - Chemical Burns

1. Place injured person under safety shower or some other method of washing with large amounts of water.
2. Remove contaminated clothing while under the shower.
3. If goggles are worn, keep in place until all the chemical has been washed from the body.

General

In our dispensary, we have an ointment labeled Sulfathizole. This material is used in the treatment of burns, both thermal and chemical. It allows an injury to heal from the inside out, which is usually the situation with a burn injury.

AROCLOR DEPARTMENT
EMERGENCY PROCEDURES

ALARM METHODS

To Activate Plant Disaster System

1. Dial 211 - State location and type emergency (alternate method - sound signal 1-4 on alarm button at tubular unit).

2. On-Shifts - Dial "0" - State location and type emergency and need for outside aid.

   Off-Shifts - Dial 317 - State location and type emergency and need for outside aid.

3. If 317 does not answer - Get outside aid directly.

Signal for Complete Plant Evacuation to "Off-Site" Assembly Area

Plant fire alarm will sound two-second blasts at one-second intervals for several minutes.

ASSEMBLY AREAS

1. Department

   a. Primary - Open area South of HB-40 Plant.

   b. Secondary - Road East of Biphenyl-Aroclor Building.

2. Plant

   a. Primary - West of HCl Neutralization Pit.

   b. Secondary - Guard Gate No. 4 (West of Niran).

3. Off-Site

   a. Primary - REA Terminal - Highway 202.

   b. Secondary - Rescue Squad Hdq., 1313 Walnut Avenue (South side of Bldg.).

PRIORITY OF ACTIONS

1. Care for injured.

2. Account for all personnel.

3. Property Safety.

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LOCATION OF EMERGENCY EQUIPMENT:

1. Stretcher - In Biphenyl-Aroclor Building North of old Biphenyl Control Room.
2. Blankets - In Tubular Unit Control Room.
3. Burn Treatment Equipment - Box north of old Santowax R Plant.
4. Gas Masks - East and West wall outside Aroclor Control Room.
5. Scott Air Paks - South of Air Blowers in Aroclor and old Biphenyl Control Room.
6. Emerson Resuscitator - In Dispensary.
7. Emergency Oxygen - In old Biphenyl Control Room.

SECTION IV

MONS 091784

OVERALL TRAINING PLAN

TOPICS	SEPTEMBER				
	1	2	3	4	5
General Orientation Cost, Timing		Group 1 & 2	Group 3	Group 4	
Power Factor - In-Line Analyzer		1 & 2	3	4	
Equipment and Instrumentation		1 & 2	3	4	
Process Flow and Operating Procedures		1 & 2	3	4	

NOTE

Group 1 - One (1) Chief and four (4) Operators

Group 2 - Three (3) Chiefs and four (4) Operators

Group 3 - One (1) Chief and five (5) Operators

Group 4 - Two (2) Chiefs and four (4) Operators

ANNISTON POROCEL COLUMNS
CEA 2132

DETAILED OPERATOR TRAINING PROGRAM

Tuesday - September 2 - Group 1

Time	Topic	Instructor
7:00 - 7:15 A.M.	Indoctrination, Timing, Cost	R. A. Haydel
7:15 - 8:15 A.M.	Power Factor - In-Line Measurement	W. H. Howard
8:15 - 9:15 A.M.	Equipment & Instrumentation	E. E. Bowles
9:15 - 11:00 A.M.	Process Flow & Operating Procedures	R. A. Haydel

Tuesday - September 2 - Group 2

Time	Topic	Instructor
3:00 - 3:15 P.M.	Indoctrination, Timing, Cost	R. A. Haydel
3:15 - 4:15 P.M.	Power Factor- In-Line Measurement	W. H. Howard
4:15 - 5:15 P.M.	Equipment & Instrumentation	E. E. Bowles
5:15 - 7:00 P.M.	Process Flow & Operating Procedures	R. A. Haydel

DETAILED OPERATOR TRAINING PROGRAM

Wednesday - September 3 - Group 3

Time	Topic	Instructor
11:00 - 11:15 A.M.	Indoctrination, Timing, Cost	R. A. Haydel
11:15 - 12:15 P.M.	Power Factor - In-Line Measurement	W. H. Howard
12:15 - 1:15 P.M.	Equipment & Instrumentation	E. E. Bowles
1:15 - 3:00 P.M.	Process Flow & Operating Procedures	R. A. Haydel

Thursday - September 4 - Group 4

Time	Topic	Instructor
11:00 - 11:15 A.M.	Indoctrination, Timing, Cost	R. A. Haydel
11:15 - 12:15 P.M.	Power Factor - In-Line Measurement	W. H. Howard
12:15 - 1:15 P.M.	Equipment & Instrumentation	E. E. Bowles
1:15 - 3:00 P.M.	Process Flow & Operating Procedures	R. A. Haydel

SECTION V

SECTION V - OBJECTIVES - OPERATIONS PLAN AND PROCEDURES

GENERAL

Included in the CEA 2132 project are three stainless steel columns for porocel treatment of electrical grade Aroclors 1242, 1254, and 1260. Also included are two carbon steel columns for porocel treatment of Trichlorobenzene (TCB) and Tetratrichlorobenzene (TTCB) which are constituents of several of the Aroclor blends.

The start-up of the columns will be accomplished in September. Check-out of electrical circuits, instruments, control loops, and equipment installation will be completed by CED prior to the preparation and simulation phases of the project. Manufacturing will assist in the check-outs following which the equipment items will be accepted by Manufacturing.

Actual materials will be used to clean and flush lines and columns during the preparation and simulation phase. CED will be requested to assist in the analysis and correction of problems.

The initial operations phase will follow after successful completion of the simulation phase. During this time the equipment must perform at design conditions. The process must be operated safely in accordance with the tentative operating instructions and must meet design quality and rate criteria.

A performance demonstration period of a month's duration will follow the initial operations phase of the start-up. This will allow a sufficient period of time to insure ability of the systems to routinely produce high quality Aroclors at rates sufficient so as not to bottleneck the Aroclor distillation system.

A. PROCESS SIMULATION OBJECTIVES

1. To thoroughly clean columns and flush lines with actual materials.
2. To insure that instruments have been properly installed and calibrated.
3. To insure that system is leak-proof by pressure testing system and by observing for leaks during flush-out of piping.
4. To check operability and accessibility of all valves in system.
5. To identify lines (product and utility) with material and direction of flow.
6. To insure operator understanding of system and competence in operating system.

7. To insure operability of pressure and temperature devices.

8. To check for accessibility and safe location of sample points.

9. To verify adequacy of area lighting for nighttime operations.

B. INITIAL OPERATIONS OBJECTIVES

1. To achieve 15 M giga ohm-cm minimum resistivity as presently measured.

2. To insure that temperature control system on Aroclor columns maintains desired column feed temperature.

3. To insure operability of Aroclor flow control systems on column feed under actual operating conditions.

4. To evaluate in-line power factor instrumentation performance on 1254 and 1260 as well as 1242.

5. To determine throughput capacity of columns and auxiliaries.

C. PERFORMANCE DEMONSTRATION OBJECTIVES

1. To operate according to tentative operating instructions (as amended).

2. To demonstrate ability of treatment systems to routinely turn out high quality products.

SECTION VI

MGNS 091791

DRAFT

September 25, 1975

Professor Kiyoshi Tanaka
Department of Public Health
Faculty of Medicine
Kyushu University
Fukuoka, Japan

Dear Professor Tanaka:

I note in newspaper articles appearing in the United States a frequent reference to the statement that 16 deaths have resulted from the Yusho disease of 1968. The articles attribute these deaths to PCB poisoning. I have attached copies of typical articles which appeared recently.

As producers of PCBs, we are very interested in the health effects that these chemicals may have on humans. Can you or any of your colleagues provide us with information regarding the accuracy of this newspaper statement? Your help in this very important matter is sincerely appreciated.

Very truly yours,

George Roush, Jr., M.D.
Director, Medical Department

bcc: J. R. Ourland
Tokyo

MONS 091712

7. Flush out of Aroclor columns and product lines.

   a) Remove filter cartridge from Alsop filter. Remove any debris from filter shell and button up shell.

   b) Remove manhole from side of columns and inspect. Remove any debris, inspect screen, button up manhole.

   c) Product lines will be flushed by pumping treated 1242 through each system. The 1242 will be earth treated as normal and collected in the blend tank of the particular system to be flushed.

   d) Line up to pump Aroclor from blend tank, through column feed pump, through column feed heat exchanger, through column, through Alsop polishing filter, and out discharge line. Will need to pump about 200 gallons through each system for flushout.

   e) Set up empty drums at junction city to receive flush material from columns. Will need about four (4) drums per column.

   f) Note action of pressure gauges and temperature readings during flush out to insure operability. Discontinue pumping when 200 gallons have been pumped as denoted by blend tank level and flow indicator.

   g) Blow out system with N_2 to force 1242 from column out discharge lines at junction city. Collect in empty drums.

   h) Vent column to depressurize system, open top manhole and mop out each column thoroughly and completely with 1242.

   i) Open Alsop filter, clean out as necessary and replace filter cartridge.

   j) Charge columns and dry out porocel as per operating instructions.

8. Mark following lines with direction of flow and material:

   a) Steam to each heat exchanger

   b) Water to each heat exchanger

   c) Nitrogen lines to columns

   d) Therminol lines to and from jacket of columns

   e) Product lines at junction city

   f) Product lines into columns.

INITIAL OPERATIONS

First blend tank batch of Aroclor through each column will be recycled back to No. 3 filtrate receiver for sampling and quality analyses prior to pumping to storage.

1. Set up to pump Aroclor from blend tank through heat exchanger, column, filter, and then to No. 3 filtrate receiver.

2. Start pumping Aroclor at a 3 gpm rate as indicated on the flow indicator controller. Compare this setting with actual pumping rate as calculated from blend tank level charge.

3. Set individual temperature controllers on feed to column as outlined in operating instructions for specific Aroclors. Note if desired temperature is maintained by control system.

4. Move temperature set point 10°C and note time of response to achieve new temperature. Reset to original temperature.

5. Increase feed rate to 6 gpm through column and note following:

   a) Temperature of feed to column still being maintained by control system?

   b) Does power factor reading indicate change in quality with faster rate of throughput?

   c) Note pressure readings at all gauges at both rates of flow.

   d) How does calculated flow rate compare with indicated flow rate?

6. After all of batch has been put through porocel column, sample and have Lab check electrical properties. If ok, pump to storage. If not, rework through column.

PERFORMANCE DEMONSTRATION

After initial operations are over, columns will be operated routinely as per operating instructions. The performance of the columns for a month's span of time will be closely scrutinized to insure that desired performance from a quality,quantity, and mechanical standpoint is achieved. Daily logs will be kept on operating conditions and quality checks. Labor and in-line instrumentation will be made to evaluate performance.

SECTION VII

MONS 091795

RELIEF VALVES AND RUPTURE DISCS

Item	Location	Description
RV-920.1	Steam line to tank farm columns	Mfr. & Model No. - Consolidated 1541D Set pressure - 100 psig Body material - Bronze
RD-901.1 RD-902.2 RD-903.2 RD-907.1 RD-908.1	North Aroclor Column Center Aroclor Column South Aroclor Column West tank farm column East tank farm column	Mfr. & Model No. - B.S. & B. #7R Size - 2" Type - DV Top section material - 316 SS Lower section material - 7X Teflon Vacuum support material - 316 SS Burst pressure - 95 psig Burst Temperature - 205°C

Viking positive displacement column feed pumps have internal pressure relief valves set for 80 psig.

STILL NO	AROCLOR	OPERATORS 1 2 3	LOT	RUN	DATE
REWORKED	DRUMS MONTAR	LAST LOT NO.	LIME ADDED		SP. GR.

CLOCK	AM PM																							
STILL LEVEL																								
VACUUM	STILL																							
	REC.																							
	JET																							
GAS (CFH)																								
PUMP (GPM)																								
TEMP.	COLUMN																							
	PRODUCT																							
	COIL IN																							
	COIL OUT																							
		15 30 45	15 30 45	15 30 45	15 30 45	15 30 45	15 30 45	15 30 45	15 30 45	15 30 45	15 30 45	15 30 45	15 30 45	15 30 45	15 30 45	15 30 45	15 30 45	15 30 45	15 30 45	15 30 45	15 30 45	15 30 45	15 30 45	15 30 45
OLD LOT OFF																								
DIST. OVER																								
DOWN TIME																								
VACUUM OFF.																								
REC. LEVEL																								
BLEND TANK LEVEL																								

REMARKS

MONS 091797

POROCEL LOT NO.	OPERATORS 1. 2. 3.																							
CLOCK	AM PM																							
COLUMN	INLET	TEMP																						
		PRESS																						
	OUTLET	TEMP																						
		PRESS																						
COLUMN JACKET	INLET	TEMP																						
		PRESS																						
	OUTLET	TEMP																						
		PRESS																						
THERM JACK TEMP																								
THERM TANK TEMP																								
FLOW (GPM)																								
[illegible]																								

STORAGE	TANK NO.	LEVEL BEFORE PUMPING	LEVEL AF	PUMPING

ANN 82609-01 11/68