

MONSANTO COMPANY

ORGANIC CHEMICALS DIVISION

ANNISTON, ALABAMA

EXPAND AROCLORS AT ANNISTON
(Storage and Packaging)

CEA 1430

START-UP OPERATIONS MANUAL

July 1968

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0284097

TOWOLDMON0044103

TANK FARM START-UP OPERATIONS MANUAL

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ANNISTON AROCLOR STORAGE AND PACKAGING

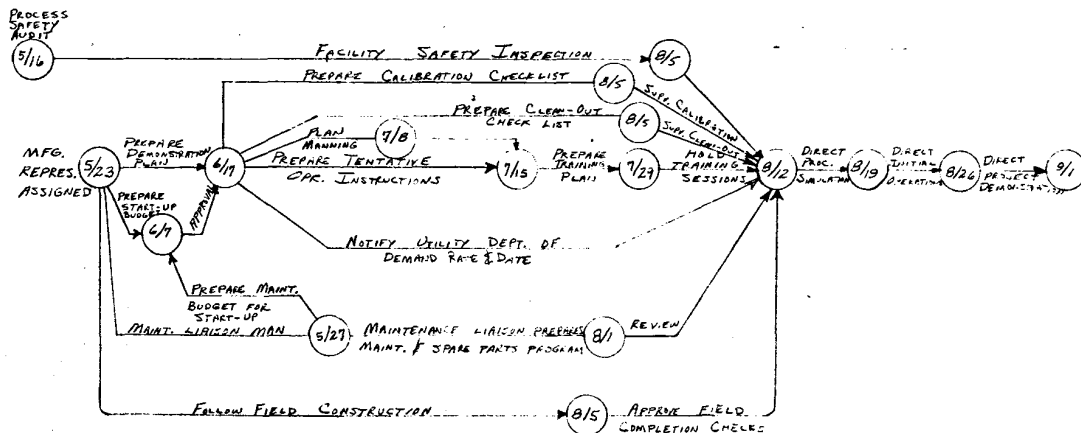
CED PROJECT 1430

START-UP OPERATIONS MANUAL

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TSD - MONSANTO COMPANY - ANNISTON, ALA.

TITLE CRITICAL PATH OF TANK FARM START-UP				AUTH. NO. 1430	
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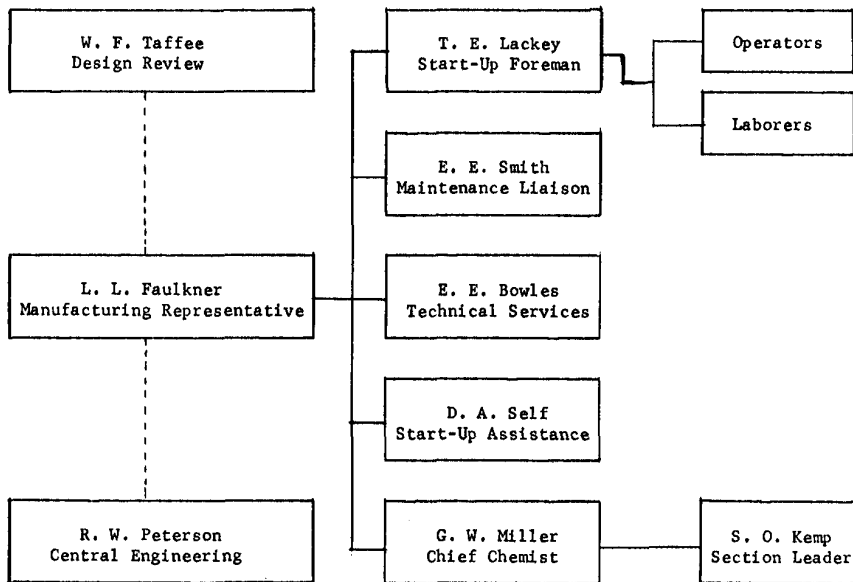
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EXPAND AROCLORS AT ANNISTON

CEA 1430

START-UP ORGANIZATION



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TOWOLDMON0044108

DISTRIBUTION OF COMMUNICATIONS

	Organic <u>Administration</u>	<u>Manufacturing</u>	<u>Engineering</u>	<u>Plant</u>
1. <u>Start-up Manual</u>				
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. <u>Budgets, Cost Standards,)</u> <u>Variance Predictions</u>)		TPM TPM		PLM, OMS DS, PA, TSS
3. <u>Start-up Progress Reports</u>		TPM, MPD	PM	PLM, OMS, DS, TSS
4. <u>Daily Status Reports</u>	BGD	DM, TPM, MPD	PM, SM	PLM, OMS, DS, TSS
5. <u>Engineering Changes</u>		TPM	PM, SM	PLM, OMS, DS, MS, TSS
6. <u>Process Changes</u>		TPM	PM, SM	PLM, OMS, TSS, DS
7. <u>Project Completion Report</u>	BGD	DM, TPM	PM, SM	PLM, OMS, MS

DISTRIBUTION OF COMMUNICATIONS

(Cont'd)

Distribution Code

Manufacturing - Technical Production Manager	TFM
Manager, Production Planning & Distribution	MPD
Director of Manufacturing	DM
Engineering - Project Manager	PM
Section Manager	SM
Plant - Plant Manager	PLM
Organic Manufacturing Superintendent	OMS
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 44

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TOWOLDMON0044111

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
621	Technical Service
641	Rentals-Equipment
644	Start-up Expense
694	Mechanical Expense
698	Depreciation
715	Consultant Fees
760	Factory Indirect Expense
798	Meetings & Conferences
855	Sundries
864	Office Supplies
880	Communications
883	Travel

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TOWOLDMON0044112

CEA 1430 - Aroclor, Anniston
Startup - Preparation 5/20/68

Item	Dec. 1967	Jan. 1968	Feb.	March	April	May	June	July	August	Sept.	Total
Salaries	-	\$250	\$400	\$440	\$500	\$1250	\$1600	\$1700	\$1700	\$2500	\$10,340
Salary O'head (18%)	-	45	70	75	90	225	290	310	310	450	1,865
Labor	-	-	-	-	-	210	850	12,550	425	8,325	22,360
Labor O'head (16%)	-	-	-	-	-	35	135	2,010	70	1,330	3,580
Raw Materials	-	-	-	-	-	-	-	2,800	-	1,200	4,000
Mechanical Expense	-	-	-	-	-	-	-	5,000	2,000	1,275	8,275
Supplies, Factory	7	-	-	-	-	-	623	500	-	800	1,930
All Others	2713	1792	1565	910	1690	2215	2665	2635	1345	3245	20,775
Total - Preparation	2720	2087	2035	1425	2280	3935	6163	27505	5850	19125	73,125

C O N F I D E N T I A L

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CEA 1430 - Aroclor, Anniston
Start Up - Operation

CONFIDENTIAL

Predicted Negative variances for Products Indicated

<u>Raw Materials</u>	August	September	October	November	Total
Liquid Aroclor - 826.08	\$1500	-	\$1000	-	\$2500
Solid Aroclor - 826.17	-	-	2500	1000	3500
Biphenyl - 826.01	-	-	500	-	500
Nitrogen	350	150	-	-	500
TOTAL Raw Materials	1850	150	4000	1000	7000
<u>Directs</u>					
Steam	500	-	250	-	750
Electricity	100	-	100	-	200
Gas	-	-	-	-	-
H ₂ O Plant	-	-	-	-	-
H ₂ O Purchased	-	-	-	-	-
Packing Labor	-	-	2230	1150	3380
Packing Overhead	-	-	360	185	545
Labor	400	-	200	-	600
Salaries	-	-	1800	1800	3600
Payroll O'head (16%)	65	-	30	-	95
Salary O'head (18%)	-	-	320	320	640
Factory Supplies	1000	250	1500	500	3250
Laboratory	500	200	200	100	1000
Clothing & Laundry	-	-	-	-	-
Prod. Dept. Cont. Exp.	750	-	-	2125	2875
TSD	500	-	500	500	1500
Mechanical Expense	6000	1100	7000	1100	15200
Tank Car Storage	600	600	-	-	1200
PR&D	-	-	-	-	--
TOTAL Directs	10415	2150	14490	7780	34835
<u>Indirects</u>					0284108
Depreciation	-	-	-	-	-
FIE	400	200	200	100	900
TOTAL Indirects	400	200	200	100	900
<u>Performance Volume</u>	-	-	3000	1000	4000
Total - Operation	12665	2500	21690	9880	46735

TOWOLDMON0044114

SECTION ALL

0284109

TOWOLDMON0044115

TENTATIVE OPERATING INSTRUCTIONS

A. Synopsis of Process

Aroclor is a trade name used to designate the chlorination products of Biphenyl and/or Terphenyls. Aroclors are produced in the chlorinators, air blown, distilled, earth treated, filtered, and stored.

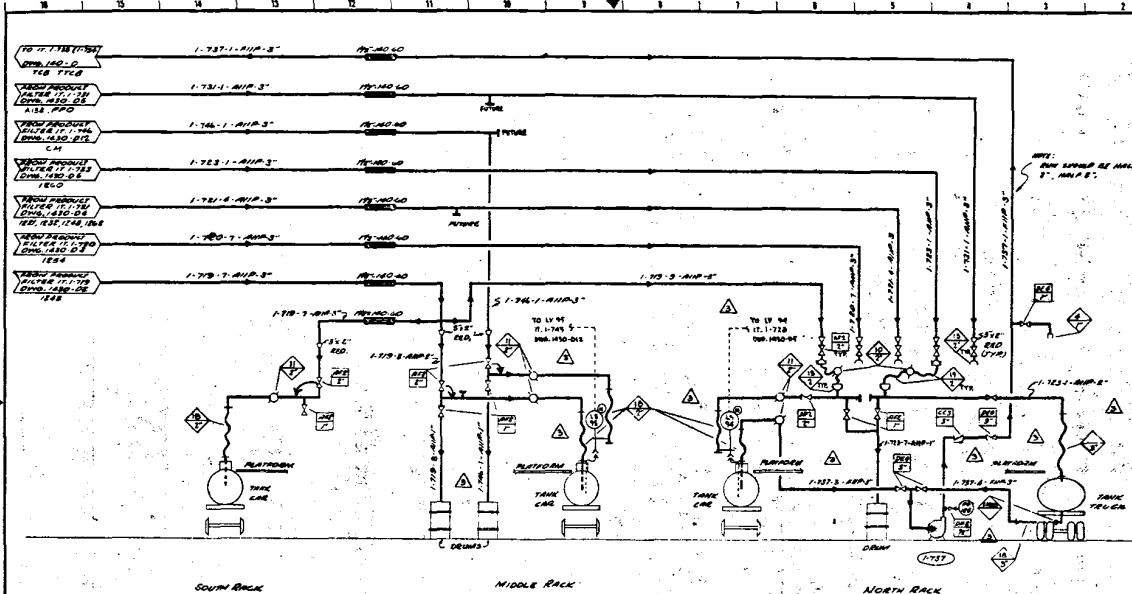
Facilities provided by this expansion will not affect the Aroclor Manufacturing Process. This project provides blending, storage, and product packaging facilities. Aroclors (Liquids and Solids) will be transferred from the still receivers to the tank farm. The existing (4) horizontal Aroclor storage tanks will be removed. Expansion facilities include nine (9) vertical storage tanks for Aroclor, one (1) 12,000 gallon agitated blend tank, and two (2) storage tanks for TCB and TTCB.

Product packaging facilities include a flaker for Solid Aroclors, a flaker for Biphenyl or Santowax R, and a bagger for both products. Also, a drumming station for Liquid Aroclors, Solid Aroclors and HB-40 will be located in the south end of the new warehouse (CEA 1452).

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TOWOLDMON0044116





SOUTH PACIFIC

MIDDLE RACK

NORTH RACK

10. STYLE #10 CHICKEN JANT ALUMINUM, FLAMED
BOTH ENDS. VJON A VACUUMS WITH STAINLESS
SWAP-IN BALL RACE RINGS AND BALLS
PURCHASED BY CED ST. LOUIS.
11. SEE DWG 430-02
12. ANALOGUE C711-PMW-PFW-4-4-5 FLEXIBLE
BRANDED HOME WITH PERFORATE PART D ALUMINUM
SUPPORTS. C711-PMW-PFW-4-4-5 FLEXIBLE
EQUIP-PMW WITH DUST PLOW ATTACHED BY
BLAYS CHAIN TO COUPLER HOME LENGTH TO BE 4'-0"
DOWN AND CONNECTIONS.

NOTES:

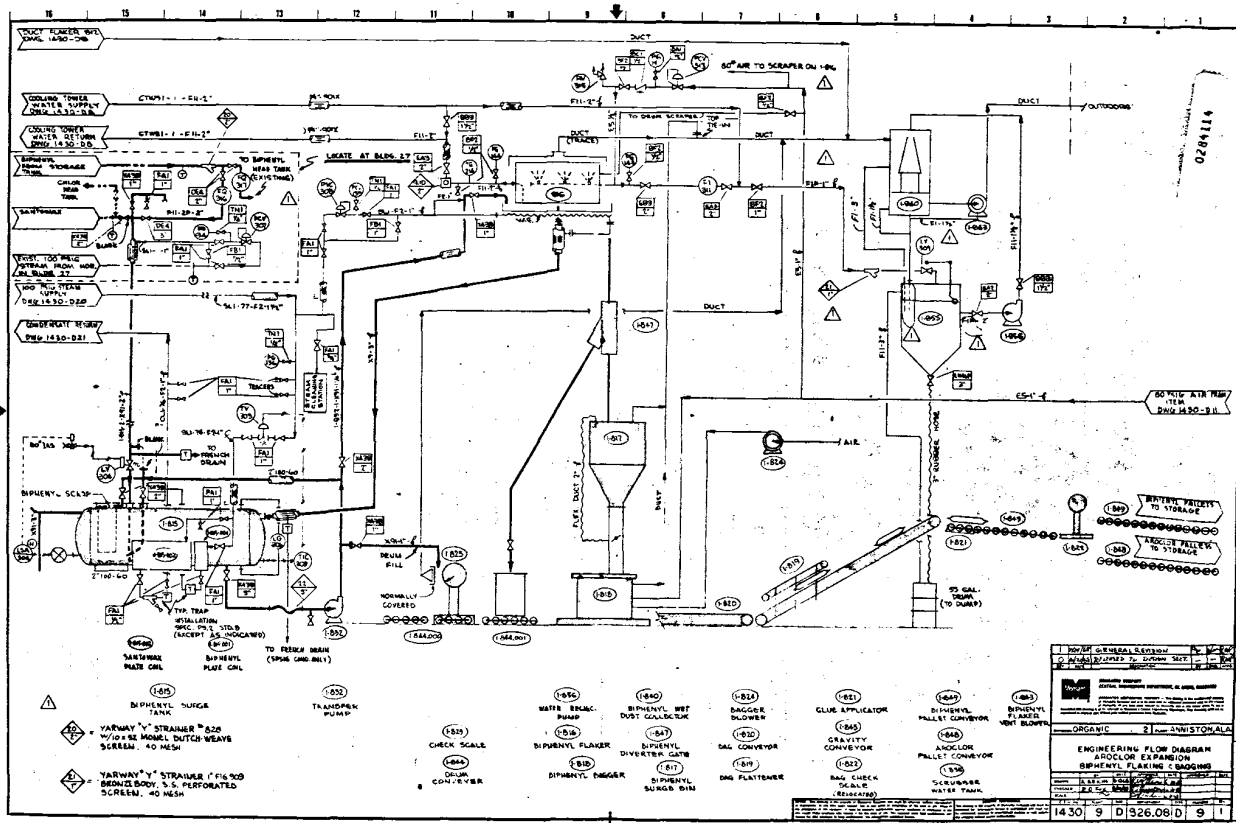
1. FOR NOTES, SYMBOLS AND REFERENCE DRAWINGS SEE DWG. 1430-D1.
2.  RICHIESSAN JOINT, FLANGED BOTH ENDS PURCH. BY CED. ST. LOUIS.
3.  FLEXIBLE HOSE, STANDARD CT-71-10 674-16 IS OR EQUAL ON EACH END LENGTH TO BE DETERMINED PURCHASED BY CED. ST. LOUIS.

1-21

UNCLAS

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B. Hazardous Properties of Materials

Health Factors

Although the chlorinated Biphenyls are not normally skin irritants, their solvent action can remove natural protective oils and fats, and lead to drying and cracking of the skin. Also, continuous or repeated skin contact with chlorinated Biphenyls should be avoided because of the possible occurrence of a condition called "chloracne."

Primary exposure to Aroclor results from sampling. Gloves are to be used to minimize skin contact and burns.

Inhalation of Biphenyl fumes is not recommended, since it can cause a drugged effect on the person. Also, vapors of Santowax R are irritating to the mucous membranes and bronchial tract.

PPO is toxic, avoid contact with skin and eyes. If any is splashed in eyes, wash with water and report to dispensary. Wash off any spills on skin with alcohol and follow with soap and water. Wear goggle-shield and gloves when handling.

Thermal Burns

The equipment provided by this project will be used for transfer and storage of material from 85°C. Gloves and long sleeve shirts with the sleeves rolled down must be worn when operating. This protective apparel can make the difference between first and second degree burns.

Particular care must be taken during sampling.

Fires

Flammable materials handled include:

- Biphenyl
- Santowax R
- Toluene
- Xylene
- HB-40

Areas for particular caution include the Biphenyl Flaking and Bagging areas. An ejector is being installed to minimize dust leaks and possible explosions. Mix area in the tank farm will be classed a fire hazard location, because of the presence of flammable materials, toluene and xylene.

C. Detailed Operating Instructions

Facilities provided by the project include:

Storage Tanks
 Mix Tanks for Blends
 Provisions for Loading of Tank Cars and Tank Trucks
 Provisions for Unloading Raw Materials (TCB & TTCE) from Tank Cars
 Flakers & Baggers for Biphenyl and Solid Aroclors

Below is a list of equipment by item number:

<u>Item Number</u>	<u>Use</u>	<u>Description</u>
700	1254 Day Tk.	(Existing) 11,500 Gal. Al.
701	Transfer Pump	(Existing) 150 GPM @ 120'
702	1242 Day Tk.	(Existing) 11,500 Gal. Al.
703	Transfer Pump	(Existing) 150 GPM @ 120'
704	1242 Storage	27,000 Gal. Al. (13'D. X 28')
705	1242 Storage	27,000 Gal. Al. (13'D. X 28')
707	1242 or 1254 Storage	27,000 Gal. Al. (13'D. X 28')
708	1254 Storage	27,000 Gal. Al. (13'D. X 28')
709	1248 Storage	18,000 Gal. Al. (12'D. X 22')
710	1221 or 1232 Storage	18,000 Gal. Al. (12'D. X 22')
711	1260 Storage	18,000 Gal. Al. (12'D. X 22')
712	1262 Storage	18,000 Gal. Al. (12'D. X 22')
713	1242 Transfer Pump	3 x 2-10/10 160 GPM @ 94'
713-001	1242 Pump Motor	15 HP 1750 RPM Encap.
714	1254 Transfer Pump	Same as 713
714-001	1254 Pump Motor	Same as 713-001
715	Transfer Pump 1248, 1221, 1232, 1262	Same as 713
715-001	Motor for Item 715	Same as 713-001
717	1260 Transfer Pump	Same as 713
717-001	1260 Pump Motor	Same as 713-001
719	1242 Product Filters	2-Cuno Model PT 184 Cuno-pore filters of 316 S.S. w/asbestos-cellulose filter media
720	1254 Product Filters	Same as 719
721	Filters for Item 715	Same as 719
723	1262 Product Filters	Same as 719
725	Mix Tank	11,000 Gal. Al. (11'D. X 18' with 15' slope bottom)

Item Numbers (Cont'd)

<u>Item Number</u>	<u>Use</u>	<u>Description</u>
725-002	Mix Tank Agitator	208-RSES-15-Propeller Type w/shut-off for seal repair
725-003	Agitator Motor	Same as 713-001
726	"CM" Storage	18,000 Gal. A1. (12'D. X 22')
727	Blend Tank	(Relocated) 2,000 Gal. 316 S.S.
728	Item 725 Trans- fer Pump	Same as 713
728-001	Item 728 Pump Motor	Same as 713-001
730	Item 727 Transfer Pump	Same as 713
730-001	Item 727 Pump Motor	Same as 713-001
731	Filters for Item 725	Same as 719
732	Filters for Item 727	Same as 719
733	TCB Storage	12,000 Gal. A1. (11'D. X 18')
734	TTCB Storage	12,000 Gal. A1. (11'D. X 18')
735	TCB or TTCB Transfer Pump	3 X 2-10/8 120 GPM @ 43.5'
735-001	TCB or TTCB Trans. Pump Motor	7-1/2 HP 1750 RPM Encap.
737	TCB or TTCB Unloading Pump	3 X 2-10/9-1/2 120 @ 80'
737-001	TCB or TTCB Unloading Pump Motor	10 HP 1750 RPM Encap.
739(605)	#2 Filt. Rec. Pump	(Existing)
740(603)	#1 Filt. Rec. Pump	(Existing)
741(601)	Pump Blend Tanks	(Existing)
742		Motor Control Center
743	Clay Slurry Pot	Clay addition to 725
743-001	Clay Slurry Pot Agitator	N 33-50
743-002	Clay Slurry Agitator Motor	1/2 HP TEFC
744	Scavenger Pump (PPO)	3 GPM @ 30'
744-001	Scavenger Pump Motor	1/2 HP 1800 RPM
745	CM Transfer Pumps	Same as 713
746	CM Product Filters	Same as 719
747	Toluene or Xylene Drum Pump	186 PM @ 30'
747-001	Toluene or Xylene Pump Motor	1/2 HP 1200 RPM
750	Condensate Pig	3' D X 6' steel
751	Nitrogen Filter	PK 31.20 Cuno

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Tentative operating instructions include:

1. Raw Materials Handling
2. Transfers to Storage Tanks
3. Loading of Tank Cars and Tank Trucks
4. Blending
5. Tank Farm and Bulk Shipment Sampling
6. Therminol System
7. Transfers to Packaging Facilities
8. Drumming
9. Flaking
10. Bagging and Palletizing
11. Finished Goods Storage
12. Emergency Situations
 - a. Tank Farm
 - b. Packaging

1. Raw Materials Handling

a. TCB and TTCB Unloading

Unloading of TCB and TTCB is being relocated to the north dock of the new railroad spur located immediately west of the new warehouse. (Unloading pump is Item 735.) TCB and TTCB are received in 8000 gallon tank cars and 3000 to 4000 gallon tank trucks.

1. Prior to connecting rail car, place blue flag about 10 feet north of car and chock each end of car. (For trucks be sure hand brakes are set.)
2. Maximum levels prior to unloading are:

If 8000 gallon car ----- 30%
If 4000 gallon truck --- 65%
If 3000 gallon truck --- 70%
(Gauges located at tanks and in control room.)
3. Open dome of car to Vent during unloading.
4. Take sample (2-1/2 gallon) to Lab for complete analysis.
5. TCB will be stored in Item 733, a 12,000 gallon carbon steel tank located in the middle of east row of tanks.
6. TTCB will be stored in Item 734, a 12,000 gallon carbon steel tank located on north end of east row of tanks.
7. Upon approval of sample by Lab, proceed to unload by opening valve (to proper tank) at upper level between Items 733 and 734.
8. For tank cars remove plug from valve under car. Connect unloading line to bottom of car and pump suction line.

9. Connect ground cable.
10. Open valve on bottom of car.
11. Open valve on suction side of pump and valve on discharge of unloading pump.
12. Turn on pump. (Approximate unloading time will be 1 hour.) Record level prior to and after unloading.
13. When tank level ceases to increase, inspect car through dome to be sure tank car is empty.
14. If empty, close valve on bottom of tank car and valve on pump suction.
15. Cut off pump and close valve on discharge of pump.
16. Disconnect unloading line. Note: During this operation, goggle-shield must be worn to protect eyes during disconnect operation.
17. Disconnect ground cable.
18. Close dome on car. Return unloading ramp to upright position.
19. Notify supervision that car is empty.
20. Remove chocks and blue flag when railroad switches.
21. Above operations are almost identical for unloading tank trucks.

b. Xylene, Toluene, and Scavenger (PPO)

Xylene, Toluene, and PPO are used from 55 gallon drums. Drums will be transferred from the warehouse as needed. See operating Details, Section III-C-4 for additives required for particular blends. Item 747, drum pump, will be used to transfer Xylene or Toluene to Item 727, blend tank.

Item 744, scavenger pump, will be used to transfer PPO to the suction side of Item 745, CM transfer pump, and Item 725.

2. Transfer to Storage Tanks

Four existing horizontal storage tanks located north of Building 27 will be dismantled upon successful demonstration of new tank farm. Equipment provided by this project includes:

2-27,000 gallon 1242 storage
 1-27,000 gallon 1254 storage
 1-27,000 gallon 1242 or 1254 storage
 1-18,000 gallon 1248 storage
 1-18,000 gallon 1221 or 1232 storage
 1-18,000 gallon 1262 storage
 1-18,000 gallon 1260 storage

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Note: A remote gauge and alarm for each tank above is located in Aroclor control room. (Alarms at 90% levels)

Transfer of Liquid Aroclors to the new tanks can be accomplished by either of the following:

1. Transfer from vertical day tanks #5 or #6 existing storage to 1242 or 1254 storage, respectively.
2. Transfer from #1 and #2 filtrate receiver tanks to tank farm.

Two (2) tie-ins on the liquid system were made to provide a line for transfer of distilled material from the continuous chlorinator system and a line for transfer of distilled material produced on the batch chlorinator system. These two lines extend from the #1 and #2 filtrate receivers to the pipe bridge north of building 27. At this point, by flexible hose, either of the two (2) lines can be connected by quick connections to any 1 of 5 individual pipe lines so that the Aroclor is transferred to the prescribed tank. The five (5) lines include one for each of the following:

	<u>Tank Item Nos.</u>
1. Line for 1242	704, 705, 707
2. Line for 1254	707, 708
3. Line for 1260	711
4. Line for 1262	712
5. Line for 1221 or 1248	710 or 709 respectively

a. 1242

1. At present 1242 is the only Aroclor treated in the Porocel column. 1242 to be treated is pumped from either #2 or #3 blend tank through the column and its existing filter to Item 702 (#5 storage tank).
2. Item 703 is used to transfer 1242 from Item 702 to either Item 704, 705 or 707.
3. Prior to transfer, check level in 704, 705 and 707. Level indicating gauge is located at the tank and in the Aroclor control room. (If 704 and 705 are full, be sure 707 is either empty or has been analyzed and verified to contain 1242. If 707 contains 1254, transfer its contents to 708.)
4. Open valve above prescribed tank. Close valves downstream of prescribed tank.
5. Be sure valve at quick connection pipe bridge is closed and dust cap is in place.
6. Open valve in line from 703 below tee.
7. Open valve in recycle line.
8. Start pump.

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9. Open valve to tank farm above 703.
 10. Close valve in recycle line.
 11. If high alarm is energized prior to completion of transfer, change valves in tank farm to transfer material to another tank.
 12. Untreated 1242 will be filtered in existing filter and transferred from #1 or #2 filtrate receiver to the tank farm, using Item 740 or 739, respectively.
 13. See steps 3 and 4.
 14. Be sure flexible hose is hooked to 1242 line. Close valve to Item 703, #5 storage tank pump.
 15. Open valve in new line above Item 739.
 16. Start pump.
 17. Upon completion of transfer, stop pump. Close valve above 739 and tank receiving 1242.
 18. Upon completion of final transfer of 1242, blow out line with Nitrogen to minimize cross-contamination of Liquid Aroclor products.
 19. 1242 can be transferred from filtrate receiver to #5 storage tank (Item 702). Steps 2 through 11 apply to subsequent transfers to tank farm.
- b. Liquid Aroclors (other than 1242)
1. All Liquid Aroclors, other than 1242, are filtered in existing filter and are not treated in Porocel Column.
 2. Transfer of these Aroclors will be made to tank farm from filtrate receivers.
 3. Steps 12 through 18 above apply to these transfers.
 4. Special care should be exercised in transfers of 1221 and 1248 as a single line is to be used for these Aroclors. Be sure valves are lined-up properly.

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3. Loading of Tank Cars and Tank Trucks

This section describes procedures for loading of refined Aroclors into tank cars and tank trucks. Aroclors are shipped to customers in: 4,000, 7,000 or 8,000 gallon tank cars; and 3,000 or 4,000 gallon tank trucks.

This project provides for relocation of Aroclor loading to three (3) loading docks on the new railroad spur located immediately west of the new warehouse. Below is a list of loading stations for each Aroclor:

	<u>North Dock</u>	<u>Middle Dock</u>	<u>South Dock</u>
1242	X	X	X
1254	X		
1221	X		
1232	X		
1248	X		
1262	X		
1260	X		
CM		X	
A13B	X		
PPO	X		

Tank trucks can be loaded at the north dock only. Different Aroclors can be loaded into a tank car and tank truck simultaneously.

a. Spotting Tank Cars

1. Normally the railroad crew will spot cars at the Aroclor loading docks. With three (3) loading docks, it won't be necessary to move a car.
2. Prior to any work on a tank car, check to be sure hand brake is set.
3. Place chock at each end of car.
4. Place blue flag about 10 feet north of outside car.

b. Preparation For Loading of Car or Truck

Aroclors are shipped in lined vessels to protect the electrical properties from contamination. (All electrical grade vessels are lined with aluminum or a zinc-tin lining.)

1. Each car or truck is to be inspected prior to loading.
2. Use an approved tank entry and fire permit when entering a car or truck.
3. Observe safety rules for each permit. A fellow worker must be on top of the car or truck holding the rope harness. Wear the safety belt harness, an air mask, gas test the car, and use a low voltage, explosion-proof light when entering a tank car or truck.

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4. Quick connections are provided for tapping into an air bank at each of the new loading docks.
5. All material in the tank should be removed. Car should be wiped out using lint-free rags. Damaged lining areas should be cleaned of any rust particles and reported on inspection form. (All car cleaning will be done on day shift.)
6. After cleaning, put steam on the car or truck.
7. Verify there is enough material in the storage tank to load a car or truck as required. (See Section VII for storage tank calibrations.)
8. Circulate the material in the storage tank for two (2) hours before sampling. (See Section III-C-5 for details on sampling.)
9. Have Laboratory verify sample is in specification.
10. Connect ground cable to the car.
11. If loading a car at north dock, be sure flexible hoses are hooked to proper lines.
12. For tank trucks place diaper cloth sock over the end of the loading line extension.
13. Loading of tank cars will be made through the 2" dip pipe. Connection will be made by removing any fittings above flange of 2" plug valve. Dome of car should be returned to close position. (Do not seal dome at this time.)
14. Open 1" plug valve so that car can be vented during filling.
15. Loading lines for tank cars and tank trucks are horizontal swing "Chicksan Joints" and aluminum pipe.
16. For CM blend, place LS 95 in the dome of the tank car at the middle dock. This level signal (backpressure) will be transmitted to a valve downstream of pump 728. When high level is attained, valve will be closed and pump will be shut down.
17. For Item 725 blends, place LS 94 in the dome of the tank car at the north dock. As in 16, above, valve is closed and pump (Item 745) is shut down on high level.
18. Set valves in the loading line from the storage tank to the loading dock. Do Not Open valve in the line at the car.

Note: Care should be taken to see that the correct valves are set so only the desired Aroclor enters the loading line. Primary source of error is loading of Aroclors using Item 715. This pump will be used for loading of 1248, 1221/1232, and 1262.

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c. Loading of Car or Truck

The following pumps will be used for loading of Aroclors:

<u>Pump Item No.</u>	<u>Tank Item No.(s)</u>	<u>Aroclor(s)</u>	<u>Dock</u>
713	704, 705, 707	1242	N, M, South
714	707, 708	1254	North
715	709, 710, 712	1248, 1221/1232, 1262	North
717	711	1260	North
728	726	CM Blend	Middle
745	725	A13B, PPO, Etc.	North

Pumps 713, 714, 715, and 717 can be operated in two different modes. The manual mode utilizes the local start-stop pushbutton and is used when the product does not flow through the flow meter, such as in recirculating. The automatic mode is required when the product must go thru the meter, as in pumping to the loading docks.

The sequence of operation for loading using pumps 713, 714, 715, and 717 is as follows:

1. Set in desired gallons on associated flow totalizer as indicated:

Pump 713 - FQ70
 Pump 714 - FQ72
 Pump 715 - FQ71
 Pump 717 - FQ73

2. Depress reset button on flow totalizer.

3. Pump may now be started by depressing a remote start button. The location of these start buttons is as follows:

Pump 713 - North, middle and south docks, inside FQ70
 Pump 714 - North dock and inside FQ72
 Pump 715 - North dock and inside FQ71
 Pump 717 - North dock and inside FQ73

4. When the pump starts the associated flow valve will open and the product will flow to the desired location.
5. Open valve in drain line at the loading dock and allow one drum of Aroclor to flow through the line to flush out the loading line.
6. Close valve in the drain line and open valve in the line to the car. Approximately one (1) hour is required to load a car and 1/2 hour for a tank truck. Fill car or truck one to two feet into the dome.
7. When the amount of product pumped out equals the setting on the flow totalizer the pump will stop and the flow valve will close.

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8. To restart the pump and open the flow valve the reset button on the flow meter must be depressed, then depress one of remote start buttons.
9. To stop the pump before the amount of product pumped equals the flow totalizer setting push any of the stop button (Remote or local) associated with that pump. The flow valve will close when the pump stops. It is not necessary to reset the flow totalizer to restart the pump as the amount of product desired has not flowed thru the meter.
10. For transfers using 715, line to dock must be blown empty as this line is used for 4 products. Connect nitrogen to blowout point immediately downstream of meter. Slowly open valve allowing nitrogen to blow line clear. If the tank car or tank truck is full, blow line clear into drums.
11. Remove loading line from the car or truck. Close valves in loading and vent lines. Replace any fittings received on car.
12. Take samples from the car or truck and send to the Laboratory for final analysis. (See Sampling Details Section III-C-5.)
13. Close and tighten lid on car or truck.
14. Seal car or truck and record seal number and car or truck number in the Aroclor still log book.

The sequence of operation for loading pumps 728 and 745 are the same as above except for the following:

1. A flow meter is not employed in loading operations using pumps 728 and 745.
2. A level probe is placed in the desired tank car to be filled. Install washer at desired cut-off level. Washer is approximately 18" from bottom of pipe.
3. Depress the start button located at the loading dock.
For pump 728 use probe LS:95 located at the middle dock.
For pump 745 use probe LS 94 located at the north dock.
4. When the pump starts the flow valve will open allowing the product to flow to the tank car.
5. When the tank car is full the pump will stop and the flow valve will close.
6. The pump may be stopped before the tank car is full by pushing the stop button located at the loading docks or at the motor.
7. For transfers using 745, loading line must be blown empty as more than one blend will be pumped through this line. Connect nitrogen to blow-out point near pump 745. Be sure all valves are open to dock as high pressure of nitrogen header would damage gaskets, etc. Blowout point should be downstream of automatic cut-off valve.

4. Blending

Below is a listing of Aroclor blends made at the Anniston Plant. The list includes components by percentage and vessel to be used for each blend.

Vessel	Blend	Components	Theory #/cwt.	Standard #/cwt.
725	Inerteen 54201-A6	1242	75.00	75.75
		TCB	25.00	25.25
725	Therminol FR-O	1242	80.00	80.80
		TTCB	20.00	20.20
725	Therminol FR-Lo Temp	1242	50.00	50.50
		TTCB	50.00	50.50
725 (709)	Santicizer 794	1248	50.00	50.50
		1260	50.00	50.50
725 (709)	Aroclor 1242-1248	1242	28.00	28.28
		1248	72.00	72.72
725	Pyranol A13B3B	1260	45.00	45.45
		TTCB	55.00	56.12
		Expoxide 221	--	0.13
725	Inerteen PPO	1260	60.00	60.60
		TCB	40.00	40.82
		Glycidyl Phenyl Ether	--	0.22
725	Inerteen 54201-KA	1254	70.00	70.71
		TCB	30.00	30.61
		Glycidyl Phenyl Ether	--	0.22
726	Inerteen 54201-CM	1242	100.00	100.10
		Glycidyl Phenyl Ether.	--	0.22
727	Aroclor 1254-4465	1254	85.00	85.50
		4465	15.00	15.50
727	Aroclor 1260-5% Toluene	1260	95.00	95.95
		Toluene	5.00	5.05
727	Aroclor 1260-10% Toluene	1260	90.00	90.90
		Toluene	10.00	10.10
727	Aroclor 1254-10% Toluene	1254	90.00	90.90
		Toluene	10.00	10.10
727	Aroclor 1262-10% Toluene	1262	90.00	90.90
		Toluene	10.00	10.10
727	Aroclor 1262-10% Xylene	1262	90.00	90.90
		Xylene	10.00	10.10

a. Inerteen 54201-A6

1. Be sure that tank 725 is empty and bottom valve is closed.
2. Set desired TCB quantity in FQ74.
3. Pump TCB from tank 733.
4. Pump will cut off when desired flow has been transferred.
5. Blow out line with nitrogen so that metered quantity is actually transferred to mix tank. Blow out is made through 1" quick connection above pump discharge. Be sure valve at pump discharge is closed to prevent damage to pump seal.
6. Set desired flow in FQ70.
7. Pump 1242 from either Item 704, 705 or 707.
8. Valve in pump discharge line will close and pump will cut off when desired flow has been transferred.
9. If line is full at start of transfer, do not blow out line.
10. Batch size will be set by supervision. Minimum batch size will be 3100 gallons.
11. Agitate and blow with nitrogen for 2 hours.
12. Clean filter Item 731 while agitating.
13. Circulate thru filter 731 for 30 minutes. Take 3-1/2 gal. samples to Laboratory for complete Inerteen 54201-A-6 analysis.
14. Further handling will be on a blend-by-blend basis. Supervision will supply further instructions for packaging.

b. Therminol FR-O

1. Same as in a-1 above.
2. Follow instructions a-6 through a-9 above.
3. Set desired TCB quantity in FQ74.
4. Pump TCB from tank 734.
5. Follow instructions a-4 and a-5.
6. Follow instructions a-10 through a-12
7. Circulate thru filter 731 for 30 minutes. Take 1/2 gallon sample to Laboratory for specific gravity and viscosity. (Specific gravity should be 1.400-1.421 @ 25°C. and viscosity 10.5-12.5 centipoise.)

8. If out of specs., make necessary adjustment(s).
9. When in spec., take another 1/2 gallon sample to the Lab.
10. Same as a-14 above.

c. Therminol FR-Lo Temp.

This blend is similar to b above.

1. Follow instructions b-1 through b-6 above.
2. Circulate for 30 minutes and take 1/2 gallon sample to Lab. If out of specs., make necessary adjustment, specific gravity should be 1.431-1.452 @ 25°C.
3. Handling of blend batches will be on an individual basis. Supervision will supply necessary packaging instructions.

d. Santicizer 794

1. Be sure that tank 725 is empty and bottom valve is closed.
2. Set desired flow in FQ73.
3. Pump 1260 from Item 711, using pump 717.
4. Valve in pump discharge line will close and pump will cut off when desired flow has been transferred.
5. If line is full at start of transfer, do not blow out line.
6. Pump 1248 from Item 709 using pump 715. Set desired flow in FQ71. Be sure valves to bottom of 710 and 712 are closed.
7. After completion of transfer, blow out line with nitrogen. Connection point is immediately above 715. Be sure pump on discharge of 715 is closed.
8. Agitate for two hours.
9. Take 1/2 gal. sample to Lab. for analysis of Sp.Gr., refractive index, and moisture.

Sp. Gr.	1.488-1.500
Ref. Index	1.6375-1.6395
10. If okay, catch three - 1/2 gal. samples for complete analysis. Await instructions for packaging.

e. Aroclor 1242-1248 Blend

1. Be sure tank 725 is empty and bottom valve is closed.
2. Assuming a batch is required for an 8000 gallon tank car shipment, set FQ71 to transfer 6,000 gals. of 1248 from tank 709 to tank 725. (Specific Gravity of 1248 must be determined to be in spec. prior to transfer.) Pump will shutdown when prescribed quantity has been transferred.
3. Set FQ70 to transfer 2,300 gals. of 1242 from either tank 704, 705 or 707 to tank 725. (Sp. Gr. of 1242 must be determined to be in spec. prior to transfer.) Pump will shutdown when prescribed quantity has been transferred.
4. Circulate tank for 2 hours.
5. Take 1/2 gal. sample to Lab. for 1242-1248 blend.
6. Sp. gr. should be 1.430-1.440 @ 25°C. If out of spec., make adjustment.
7. Take 2 - 1/2 gallon samples of loaded material to Lab.

f. Pyranol A13B3B

1. Be sure tank 725 is empty and bottom valve is closed.
2. Transfer desired quantity of TTCB from tank 734. FQ74 is used to set quantity and will shutdown pump when transfer is complete.
3. Blow out line with nitrogen.
4. Transfer desired quantity of 1260 from tank 711. FQ73 is used to set quantity and will close valve in transfer line and shutdown pump when transfer is complete.
5. If line was full at start of transfer, do not blow out with nitrogen.
6. Add prescribed quantity of earth from tank 743. Add nitrogen to top of 743 to force earth into recycle line.
7. Agitate for 2 hours. Minimum batch is 3100 gals. to allow use of agitator.
8. Circulate through press for 30 minutes, then catch 1/2 gal. sample and shutdown circulation.
9. Label the sample A13B3B, check sp. gr., refractive index, moisture, chlorides, and send to Lab.
10. Continue agitating the mix until results of the analysis are received from Lab. (If out of spec., adjust to get in spec.)

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11. If the above sample is okay by the Lab., using pump 744 add prescribed weight of Expoxide 221. Blow out line to 725 to be sure desired weight is actually transferred. Drum of scavenger will be placed on scales to determine rate of transfer.
12. After Expoxide 221 is added, agitate and blow with nitrogen for 2 hours.
13. Begin recirculation of blend through Item 731. Circulate for 30 minutes.
14. Take three 1/2 gal. samples, label A13B3B for complete analysis and send to Lab.
15. If okay, proceed to transfer to shipping containers as directed by supervision.

Note: Specific gravity Range 1.563 - 1.571 @ 15.5°C.
Refractive Index 1.6075 - 1.6085 @ 25°C.

g. Inerteen PPO

1. Open drain valve on dishcharge of 725 to be sure it is clean, then close bottom valve.
2. Follow instructions a-2 through a-5.
3. Transfer desired quantity of 1260 from tank 711. FQ73 is used to set quantity and will close valve in transfer line and shutdown pump when transfer is complete.
4. If line was full at start of transfer, do not blow out with nitrogen.
5. Add prescribed quantity of earth from item 743.
6. Follow instructions f-7 through f-8.
7. Label the sample Inerteen PPO, check specific gravity, refractive index, moisture, and chlorides and send to Lab.
8. Continue agitating the mix until results of the analysis are recieved from Lab. (If the sample is out of specs, adjust to get in specification.)
9. If the above sample is okay by the Lab., then add PPO (ether) using pump 744. Blow out line to 725. Drum of ether will be placed on scales to determine rate and amount of transfer.
10. After the PPO is added, agitate and blow with nitrogen for two hours.
11. Circulate through Item 731 for 30 minutes. Take three one-half gallon samples, label Inerteen PPO for complete analysis and send to Lab.

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12. If okay, draw out in drums or load car as directed by production supervision.

Note 1: PPO is toxic, avoid contact with skin and eyes. If any is splashed in eyes, wash with water and report to dispensary. Wash off any spills on skin with alcohol and follow with soap and water. Wear goggles and gloves when handling.

Note 2: Specific gravity Range - 1.560 - 1.568 @ 15.5°C.

Refractive Index - 1.6137 - 1.6147 @ 25°C.

h. Inerteen 54201-KA

1. Follow instructions g-1.
2. Follow instructions g-2.
3. If power factor of TCB is above 5, earth treat to bring power factor @ 60 cycles below a maximum of 5.
4. Transfer desired quantity of 1254 from tank 707 and 708. FQ72 is used to set quantity and will close valve in transfer line and shut-down pump when transfer is complete.
5. If line was full at start of transfer, do not blow out line with nitrogen.
6. Add 10 pounds of earth to tank from item 743 and start agitating.
7. Agitate and circulate, by-passing filter for two hours. Blow tank contents with nitrogen to aid agitation and/or lower water content.
8. Circulate through filter Item 731 for 30 minutes, then catch one-half gallon sample.
9. Label the sample Inerteen 54201-KA. Send to Lab to check for adding ether.
10. Continue agitating and circulating the mix until results of the analysis are received from Lab. (If the sample is out of specs., make adjustment.) (If power factor @ 60 cycles is more than 1.0, earth treat with 10 lbs. by-passing filter. Take sample after two hours circulate and agitate, and 30 minutes filtering.)
11. If sample is okay by the Lab., then clean the filter.
12. Add desired quantity of PPO (Glycidyl Phenyl Ether) using pump 744 and movable scales. Blow out line with nitrogen.
13. After the PPO is added, agitate and circulate for one hour.

14. Circulate through filter Item 731 for 30 minutes. Take three one-half gallon samples, label Inerteen 54201-KA for complete analysis and send to Lab.
15. If okay, (Power factor at 60 cycles must be 3.0 or lower) draw out in drums or load car as directed by production supervision.

i. Inerteen 54201-CM

1. Open drain valve on discharge of 726 to be sure it is clean, or contains spec. material, then close bottom valve.
2. Set desired flow in FQ70.
3. Pump 1242 from either Item 704, 705 or 707.
4. Valve in pump discharge line will close and pump will cut off when desired flow has been transferred.
5. 1242 line should be full before transfer. If so, do not blow line with nitrogen.
6. No minimum size batch, batch size set by supervision.
7. Start circulating 1242 using pump 745.
8. Begin transferring PPO to suction side of pump 745. Add desired quantity of PPO using pump 744 and movable scales. Do not blow out line to 745 pump.
9. Continue to circulate for two hours.
10. Take one-half gallon sample to Laboratory for refractive index, water, chlorides, and PPO.
11. Await instructions from supervision regarding packaging details.

Note: Wear goggles and gloves when handling PPO.

j. Aroclor 1254-4465

1. Open drain valve on discharge of 727 at suction of pump 730. Be sure tank is empty.
2. Transfer desired quantity of 1254 from tank 707 and 708. FQ72 is used to set quantity and will close valve in transfer line and shutdown pump when transfer is complete.
3. Start agitator.
4. Be sure steam is on and TIC 61 is set at 150°C.

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5. Add desired quantity of 4465 from tank 810 using pump 837. Recycle at 810 open to allow slow addition to 727. Keep agitator running.
6. Agitate for 8 hours.
7. After 8 hours, take one one-half gallon sample. Have material analyzed for specific gravity, refractive index, viscosity, and color.

Specs:	Sp. gr.	@ 65°C.	-	1.512-1.526
	Refractive Index		-	1.6400-1.6420
	Viscosity @ 210°F.		-	49-55
	Color		-	2 Max.

8. If material is in specification take two one-half gallon samples. Await instructions for packaging.

k. Aroclor 1260-5% or 10% Toluene

1. Open drain valve on discharge of 727 at suction of pump 730, be sure tank is empty.
2. Transfer desired quantity of 1260 from tank 711 using pump 717. Set desired flow in FQ73.
3. Valve in pump discharge line will close and pump will cut off when desired flow is transferred. Do not blow out after transfer.
4. Pump Toluene from drums using pump 747. "Thief" each drum to be sure it is clear and free of water.
5. Agitate for 1 hour.
6. Take one one-half gallon sample to Laboratory.
7. If okay, await packaging instructions from supervision.

1. Aroclor 1254 - 10% Toluene

1. Open drain valve on discharge of 727 at suction of pump 730. Be sure tank is empty.
2. Transfer desired quantity of 1254 from tank 707 or 708 using pump 714. Set desired flow in FQ72.
3. See k-3 through k-7.

m. Aroclor 1262 - 10% Toluene

1. Open drain valve on discharge of 727 at suction of pump 730. Be sure tank is empty.
2. Transfer desired quantity of 1262 from tank 712 using pump 715. Set desired flow in FQ72.

3. Valve in pump discharge line will close and pump will cut off when desired flow is transferred. Blow out line upon completion of transfer. Use quick connect tie-in above pump 715.

4. See k-3 through k-7.

n. Aroclor 1262 - 10% Xylene

1. See m-1 through m-3.

2. Pump Xylene from drums using pump 747. "Thief" each drum to be sure it is clear and free of water.

3. See k-5 through k-7.

5. Tank Farm and Bulk Shipment Sampling

a) Raw Materials

1. TCB or TTCB

Protective Equipment: Gloves and goggle-shield

Purpose: To check quality of TCB or TTCB

Method: Each car will be sampled through the opened dome.

Container: Two-1/2 gallon bottles

Disposition: To Laboratory

Label: Car No.:

Date:

Time:

Analyze for:

Sampled by:

2. Expoxide 221, PPO, Toluene or Xylene

Protective Equipment: Gloves and goggle-shield

Purpose: To check moisture

Method: "Thief" each drum

Container: "Thief"

b) Storage and Blend Tanks

Protective Equipment: Gloves, goggle-shield and long sleeve shirts with sleeves buttoned

Purpose: Check physical and electrical properties

Method: Sample ports at drain line of tanks on suction side of pump.
Before taking sample, circulate for 5 minutes to insure a representative sample of the material in the tank to be sampled.
Caution, hot material (about 140°C.).

Container: 1/2 gallon bottle

Label: Aroclor Grade :

Tank No.:

Date:

Time:

Analyze for: *

Sampled by:

Disposition: To Laboratory

* Properties to be measured will vary with individual Aroclor grades.

Note: See Section III-C-4 for size sample and analysis for each blend.

c) Tank Car and Tank Truck Shipments

Protective Equipment: Gloves, goggle-shield and buttoned, long sleeve shirts

Purpose: To check physical and electrical properties

Method: After loading car dip sample through dome of car. Each car will be sampled. Caution, Hot Material.

Container: Two - 1/2 gallon bottles
One - 5 pint bottle

Label: Car No.:

Date:

Time:

Analyze for: *

Sampled by:

Disposition: To Laboratory

* Properties to be tested will vary with each Aroclor product.

12. Emergency Situationsa. Tank Farm

Occurrence	Symptom	Problem	Corrective Action
1. Instrument Air Failure	Tank-Levels Drop to 0	No level indication and metered transfers are stopped. Lose temp. control on 725 & 727	Stop transfers to storage tanks to prevent over-filling tanks. Stop pumps engaged in transfers to prevent pump seal damage.
2. Power Failure	None in Control Room	No high level to control room	Stop transfers to storage tanks to prevent over-filling tanks.
3. Low Pressure Nitrogen	None in Control Room	Pull air in tanks transferring from	Stop all transfers from storage tanks to prevent air replacement of liquid removed.
4. Steam	None in Control Room	Potential Line Pluggage	Stop transfers. Blow Aroclor filled lines with N ₂ to prevent pluggage.

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SECTION IV

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MASTER PLAN FOR TANK FARM TRAINING OF AROCLOR
OPERATORS AND CHIEFS

	JULY					AUGUST									
Topics	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12-16
<u>CLASSROOM</u>															
1) Indoctrination		1a&b								1c&d					
2) Organization		2a&b								2c&d					
3) Training Schedule		3a&b								3c&d					
4) Equipment		4a&b								4c&d					
5) Instrumentation			5a&b								5c&d				
6) Aroclor Transfers				6a		6b							6c&d		
7) Blending					7a		7b							7c&d	
8) Emergency Situations					8a		8b							8c&d	
<u>FIELD</u>															
1) Site Visit (Overall)		1a&b								1c&d					
2) Instrument Review			2a&b								2c&d				
3) Transfer Pumps				3a		3b							3c&d		
4) Blend Equipment					4a		4b							4c&d	
5) Tank Preparation								5	5	5	5	5			
6) Initial Operations															6

NOTE:

- Group A - 4 operators and 1 chief
- Group B - 4 operators and 1 chief
- Group C - 4 operators and 1 chief
- Group D - 6 operators, 1 chief, and 1 relief chief

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TRAINING PROGRAM
AROCLOR OPERATORS AND CHIEFS

FIRST DAY _____

GROUP _____

<u>TIME</u>	<u>TOPIC</u>	<u>INSTRUCTOR</u>
11:00 - 11:15 A.M.	Indoctrination	Williams
11:15 - 11:30	Organization	Haydel
11:30 - 11:45	Training Schedule	Faulkner
11:45 - 12:30	Equipment Layout	Faulkner
12:30 - 12:45	Break	
12:45 - 1:45	Tour of Site	
1:45 - 2:00	Tank Details	Faulkner
2:00 - 2:15	Pump Details	Faulkner
2:15 - 2:45	Filter Details	Faulkner

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SECOND DAY _____

GROUP _____

<u>TIME</u>	<u>TOPIC</u>	<u>INSTRUCTOR</u>
11:00 - 11:30 A.M.	Level Instruments	Veazey
11:30 - 12:30	Flow Instruments	Veazey
12:30 - 12:45	Break	
12:45 - 1:45	Field Review of Instruments	
1:45 - 2:00	Relief Valves	Smith
2:00 - 2:15	Pressure Control Systems	Smith
2:15 - 2:30	Temperature Control Systems	Smith
2:30 - 2:45	Interlocks	Smith

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THIRD DAY _____

GROUP _____

<u>TIME</u>	<u>TOPIC</u>	<u>INSTRUCTOR</u>
11:00 - 11:45 A.M.	Transfers to Storage	Faulkner or Lackey
11:45 - 12:30	Loading of Tank Cars	Faulkner or Lackey
12:30 - 12:45	Break	
12:45 - 1:15	Unloading	Faulkner or Lackey
1:15 - 1:30	Line Draining	Faulkner or Lackey
1:30 - 2:00	Blow-out of Lines	Faulkner or Lackey
2:00 - 2:45	Tour	

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FOURTH DAY _____

GROUP _____

TIME

TOPIC

INSTRUCTOR

11:00 - 12:30

Blends

Faulkner or Lackey

CM

1232

Tank 727

Tank 725

12:30 - 12:45

Break

12:45 - 1:30

Tour

1:30 - 2:00

Emergency Situations

Faulkner

2:00 - 2:45

Wrap-Up

Faulkner

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AROCLOR EXPANSION START-UP OPERATIONS MANUAL

SECTION V - OBJECTIVES - OPERATIONS PLAN AND PROCEDURES

GENERAL

Start-up of facilities provided by this project will be separated into two phases. Initial phase will include check-out of storage tanks, loading facilities, and blend tanks. This will begin in mid-August. The remainder of the equipment will be placed in operation beginning in mid-October. This includes flakers, baggers, conveyors, drummer and therminol system. In addition, a performance demonstration phase has been scheduled after the initial operation.

Check-out of electrical circuits, instruments, control loops and equipment installation will be completed by CED and will precede the preparation and simulation phases. Manufacturing will assist in the preliminary check-outs, following which the individual equipment items and auxiliaries will be formally accepted by manufacturing.

Preparation and simulation will entail the use of actual materials to flush lines and tanks. Start-up will be made on day shift only. CED will be requested to assist in the analysis and correction of operating problems.

The operations phase will begin when the objectives of preparation and simulation have been met. During initial operations, the equipment must perform at actual design conditions. During this period the process must be operated safely in accordance with the tentative operating instructions and must meet project premise quality and rate.

A schedule of start-up activities for both the earlier and later stages follows this section.

A. PROCESS SIMULATION

1. Utilities

a. Compressed Air

- 1) To clean supply and distribution piping of moisture, mill scale, and weld slag.
- 2) Deliver compressed air to tank farm and packaging facilities individually at required volumes maintaining supply header pressure at 90 psig.
- 3) Deliver 100 SCFM continuously and maintain supply header pressure.

b. City Water

- 1) To clean supply and distribution piping of dirt, weld slag, and mill scale.

- 2) Deliver water to users (loading docks, mill scrubber, personal services, safety showers) at 60 psig and up to 150 GPM.
- 3) Protect piping and users against freezing.

c. Cooling Tower Water

- 1) To clean supply and distribution piping of dirt, weld slag and mill scale.
- 2) Deliver cooling tower water to flakers at 50 psig in quantities up to 175 GPM, including up to 100 GPM to the Biphenyl flaker and up to 75 GPM to the Aroclor flaker.
- 3) Protect piping and users against freezing.
- 4) Accurately meter tower water usage.

d. Nitrogen

- 1) To clean supply and distribution piping of moisture, weld slag, and mill scale.
- 2) Maintain regulated header pressure of 40 psig and 50 SCFM flow to storage tanks.
- 3) Maintain inert blanket of 4 to 7 inches water column pressure on storage tanks.
- 4) Accurately meter nitrogen usage.

e. Steam

- 1) To clean supply and distribution piping, external panel coils, and tracing of weld slag and mill scale.
- 2) Discharge condensate at all traps.
- 3) Maintain regulated header pressure of 100 psig and 40 psig to tank coils.
- 4) Protect piping and users from freezing.

f. Electricity

- 1) To insure that electrical circuits have been tested, energized and formally released to manufacturing before the circuits are required for equipment simulation or initial operation.

- 2) Supply power for motors totaling 300 HP at 440 volts.
- 3) Supply 100 KVA for therminol heater.

2. Auxiliaries

a. Therminol Distribution

- 1) To clean therminol supply and return header.
- 2) To supply sufficient heat to jacketed solid Aroclor lines and flaker coil to prevent solidification and pluggage.
- 3) Perform leak test.
- 4) Pressure of 40 psig and temperature of 550°F.

b. Instrumentation and Controls

- 1) To insure that instruments have been properly installed and accurately calibrated.

3. Product Storage Tanks

- a. To clean product storage tanks by wiping with Aroclor soaked rags.
- b. Blanket the tanks with nitrogen making sure pressure regulators and relief valves function properly.
- c. Operate pumps to verify emergency stops are operative and agitator interlock functions properly.
- d. Record critical internal dimensions.
- e. Actuate high level alarm (90%) on each tank.
- f. Determine flaker feed tank high level automatically closes valve in tank feed line.

4. Blend Tanks

- a. To clean blend tanks by wiping with Aroclor soaked rags.
- b. Record critical internal dimensions.
- c. Blanket the tanks with nitrogen making sure pressure regulators and relief valves function properly.
- d. Operate pumps to verify stops are operative and agitator functions properly.
- e. Actuate high level alarm (90%) on blend tanks.

5. Raw Material Unloading and Storage

- a. To clean TCB and TTCB storage tanks and unloading lines of weld slag, etc.
- b. Record critical data.
- c. Hook up unloading lines to check operation of swivel joints.

6. Loading Lines and Docks

- a. To clean the loading lines of moisture, aluminum oxide, and weld slag by flushing with 1242 Aroclor.
- b. Operate all loading pumps.
- c. Check flow meters, automatic valve closure and pump shutdown.
- d. Mark all lines by material handled or "Destination" of Aroclor in each line.

7. Flakers

- a. To inspect flaker pan, drum and drive system.
- b. To verify vents are open.
- c. Water system does not leak.
- d. Temperature gauges are calibrated.
- e. Overflow pipes are clean and open.
- f. Air pressure regulator for drive of knife is calibrated.

8. Bagger

- a. Hopper and line are clean.
- b. Control loops are checked-out.
- c. Pour flake material into hopper to check bagger prior to start-up of flakers.

9. Conveyors

- a. To be sure conveyors are adequately guarded.
- b. Controls are checked out.
- c. Gravity units have sufficient slope.

Section V - Objectives
Operations Plan & Procedures

5.

10. Drummer

- a. To be sure lines to drumming station are clean.
- b. Scales are correct.
- c. Controls are checked out.

B. INITIAL OPERATIONS

1. Storage Tanks

- a. Transfer 1242 through each line and tank for flush.
- b. Load tank cars of "Flush Batch" to check loading lines and flow meter for transferring preset quantity.
- c. Actuate high level alarm on each tank.
- d. Measure loading and transfer times to determine performance of pumps.
- e. As tanks are filled and emptied, verify pressure of nitrogen blanket is maintained at 4" to 7" W.C.
- f. Determine optimum steam pressure for desired storage temperature.

2. Blend Tanks

- a. Transfer "Flush Batch" from raw material storage tanks to blend tank.
- b. Test clay addition system and attempt to upgrade "Flush Batch".
- c. Check automatic cut-off on horizontal agitator.
- d. Load tank car to test loading lines and automatic cut-off of pump when tank car is filled to desired level.
- e. Measure loading time to determine performance of pumps.
- f. As tanks are filled and emptied, verify pressure of nitrogen blanket is maintained at 4" to 7" W.C.
- g. Demonstrate control of temperature indicating control system.

Section V - Objectives
Operations Plan & Procedures

6.

3. Raw Material Unloading and Storage Tanks

- a. Unload "Flush Batch" from tank car to test unloading pump performance.
- b. Measure unloading time.
- c. Actuate high level alarm on each tank.
- d. As tanks are filled and emptied, verify pressure of nitrogen blanket is maintained at 4" to 7" W.C.
- e. Determine optimum steam pressure for desired storage temperature.

4. Flakers

(Insert later)

5. Bagger

(Insert Later)

6. Conveyors

(Insert later)

7. Drummer

(Insert later)

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Section V - Objectives
Operations Plan & Procedures

7.

C. PERFORMANCE DEMONSTRATION

1. To demonstrate quality stored materials from use of nitrogen blanket and aluminum pipes and tanks.
2. To demonstrate ability to avoid cross contamination.
3. To demonstrate flaking capacity of 5,000 pounds of biphenyl and 6,900 pounds of solid Aroclor per hour on day shift only, seven (7) days per week at 75% on-stream time.
4. To demonstrate bagging rate of 2.3 bags of 5460 and 1.7 bags of biphenyl per minute. (50# bags)
5. Operate all areas according to the Tentative Operating Instructions (as amended).

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TOWOLDMON0044156

CONTINUED

0284151

TOWOLDMON0044157

SECTION 11

0284152

TOWOLDMON0044158

1242 STORAGE TANKSITEMS 704, 705, & 707

<u>% Scale</u>	<u>Gallons</u>	<u>Ins.Aroclor (Innage)</u>	<u>% Scale</u>	<u>Gallons</u>	<u>Ins.Aroclor (Innage)</u>	<u>% Scale</u>	<u>Gallons</u>	<u>Ins.Aroclor (Innage)</u>
0	493	6	34	9724	118	68	18,955	230
1	765	9	35	9996	122	69	19,227	234
2	1036	13	36	10,267	125	70	19,498	237
3	1308	16	37	10,537	128	71	19,770	240
4	1579	19	38	10,810	131	72	20,041	244
5	1851	22	39	11,082	135	73	20,313	247
6	2122	26	40	11,353	138	74	20,584	250
7	2393	29	41	11,625	141	75	20,856	254
8	2665	32	42	11,896	145	76	21,127	257
9	2937	36	43	12,168	148	77	21,399	260
10	3208	39	44	12,439	151	78	21,670	263
11	3480	42	45	12,711	154	79	21,942	267
12	3751	46	46	12,982	158	80	22,213	270
13	4023	49	47	13,254	161	81	22,485	273
14	4294	52	48	13,525	164	82	22,756	277
15	4566	56	49	13,797	168	83	23,028	280
16	4837	59	50	14,068	171	84	23,299	283
17	5109	62	51	14,340	174	85	23,571	286
18	5380	65	52	14,611	178	86	23,842	290
19	5652	69	53	14,883	181	87	24,114	293
20	5923	72	54	15,154	184	88	24,385	296
21	6195	75	55	15,426	188	89	24,657	300
22	6466	79	56	15,697	191	90	24,928	303
23	6738	82	57	15,969	194	91	25,200	306
24	7009	85	58	16,240	197	92	25,471	310
25	7281	88	59	16,512	201	93	25,743	313
26	7552	92	60	16,783	204	94	26,014	316
27	7824	95	61	17,055	207	95	26,286	320
28	8095	98	62	17,326	211	96	26,557	323
29	8367	102	63	17,598	214	97	26,829	326
30	8638	105	64	17,869	217	98	27,100	329
31	8910	108	65	18,141	220	99	27,372	333
32	9181	112	66	18,412	224	100	27,643	336
33	9453	115	67	18,684	227			

Aroclor 1242

Temperature - 140°C.

Sp. Gr. - 1.272 @ 140°C.

Inst. Range - 0-425" H₂O

Inst. Scale - 0-100%

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TOWOLDMON0044159

AROCOR 1254ITEMS 707, 708

<u>% Scale</u>	<u>Gallons</u>	<u>Ins.Aroclor</u>	<u>% Scale</u>	<u>Gallons</u>	<u>Ins.Aroclor</u>	<u>% Scale</u>	<u>Gallons</u>	<u>Ins.Aroclor</u>
0	493	6	34	8619	106	68	16,745	206
1	732	9	35	8858	109	69	16,984	209
2	971	12	36	9097	112	70	17,223	212
3	1210	15	37	9336	115	71	17,462	215
4	1449	18	38	9575	118	72	17,701	218
5	1688	21	39	9814	121	73	17,940	221
6	1927	24	40	10,053	124	74	18,179	224
7	2166	27	41	10,292	127	75	18,418	226
8	2405	30	42	10,531	129	76	18,657	229
9	2644	32	43	10,770	132	77	18,896	232
10	2883	35	44	11,009	135	78	19,135	235
11	3122	38	45	11,248	138	79	19,374	238
12	3361	41	46	11,487	141	80	19,613	241
13	3600	44	47	11,726	144	81	19,852	244
14	3839	47	48	11,965	147	82	20,091	247
15	4078	50	49	12,204	150	83	20,330	250
16	4317	53	50	12,443	153	84	20,569	253
17	4556	56	51	12,682	156	85	20,808	256
18	4795	59	52	12,921	159	86	21,047	259
19	5034	62	53	13,160	162	87	21,286	262
20	5273	65	54	13,399	165	88	21,525	265
21	5512	68	55	13,638	168	89	21,764	268
22	5751	71	56	13,877	171	90	22,003	271
23	5990	74	57	14,116	174	91	22,242	274
24	6229	77	58	14,355	177	92	22,481	276
25	6468	80	59	14,594	180	93	22,720	279
26	6707	82	60	14,833	182	94	22,959	282
27	6946	85	61	15,072	185	95	23,198	285
28	7185	88	62	15,311	188	96	23,437	288
29	7424	91	63	15,550	191	97	23,676	291
30	7663	94	64	15,789	194	98	23,915	294
31	7902	97	65	16,028	197	99	24,154	297
32	8141	101	66	16,267	200	100	24,393	300
33	8380	103	67	16,506	203			

Aroclor 1254

Temperature - 140°C.

Sp. Gr. 1.425 @ 140°C.

Inst. Range - 0-428" H₂O

Inst. Scale - 0-100%

0284154

TOWOLDMON0044160

1248 STORAGE TANK

ITEM 709

<u>% Scale</u>	<u>Gallons</u>	<u>Ins.Aroclor (Innage)</u>	<u>% Scale</u>	<u>Gallons</u>	<u>Ins.Aroclor (Innage)</u>	<u>% Scale</u>	<u>Gallons</u>	<u>Ins.Aroclor (Innage)</u>
0	420	6	34	6574	94	68	12,728	181
1	601	9	35	6755	96	69	12,909	184
2	782	11	36	6936	99	70	13,090	187
3	963	14	37	7117	101	71	13,271	189
4	1144	16	38	7298	104	72	13,452	192
5	1325	19	39	7479	107	73	13,633	194
6	1506	21	40	7660	109	74	13,814	197
7	1687	24	41	7841	112	75	13,995	199
8	1868	27	42	8022	114	76	14,176	202
9	2049	29	43	8203	117	77	14,357	205
10	2230	32	44	8384	120	78	14,538	207
11	2411	34	45	8565	122	79	14,719	210
12	2592	37	46	8746	125	80	14,900	212
13	2773	40	47	8927	127	81	15,081	215
14	2954	42	48	9108	130	82	15,262	218
15	3135	45	49	9289	132	83	15,443	220
16	3316	47	50	9470	135	84	15,624	223
17	3497	50	51	9651	138	85	15,805	225
18	3678	52	52	9832	140	86	15,986	228
19	3859	55	53	10,013	143	87	16,167	230
20	4040	58	54	10,194	145	88	16,348	233
21	4221	60	55	10,375	148	89	16,529	236
22	4402	63	56	10,556	150	90	16,710	238
23	4583	65	57	10,737	153	91	16,891	241
24	4764	68	58	10,918	156	92	17,072	243
25	4945	70	59	11,099	158	93	17,253	246
26	5126	73	60	11,280	161	94	17,434	249
27	5307	76	61	11,461	163	95	17,615	251
28	5488	78	62	11,642	166	96	17,796	254
29	5669	81	63	11,823	169	97	17,977	256
30	5850	83	64	12,004	171	98	18,158	259
31	6031	86	65	12,185	174	99	18,339	261
32	6212	89	66	12,366	176	100	18,520	264
33	6393	91	67	12,547	179			

Aroclor 1248
 Temperature - 140°C.
 Sp. Gr. - 1.335 @ 140°C.
 Inst. Range - 0-352" H₂O
 Inst. Scale - 0-100%

0284155

TOWOLDMON0044161

AROCOR 1221 STORAGE TANK

ITEM 710

<u>% Scale</u>	<u>Gallons</u>	<u>Ins.Aroclor (Innage)</u>	<u>% Scale</u>	<u>Gallons</u>	<u>Ins.Aroclor (Innage)</u>	<u>% Scale</u>	<u>Gallons</u>	<u>Ins.Aroclor (Innage)</u>
0	420	6	34	6574	94	68	12,728	181
1	601	9	35	6755	96	69	12,909	184
2	782	11	36	6936	99	70	13,090	187
3	963	14	37	7117	101	71	13,271	189
4	1144	16	38	7298	104	72	13,452	192
5	1325	19	39	7479	107	73	13,633	194
6	1506	21	40	7660	109	74	13,814	197
7	1687	24	41	7841	112	75	13,995	199
8	1868	27	42	8022	114	76	14,176	202
9	2049	29	43	8203	117	77	14,357	205
10	2230	32	44	8384	120	78	14,538	207
11	2411	34	45	8565	122	79	14,719	210
12	2592	37	46	8746	125	80	14,900	212
13	2773	40	47	8927	127	81	15,081	215
14	2954	42	48	9108	130	82	15,262	218
15	3135	45	49	9289	132	83	15,443	220
16	3316	47	50	9470	135	84	15,624	223
17	3497	50	51	9651	138	85	15,805	225
18	3678	52	52	9832	140	86	15,986	228
19	3859	55	53	10,013	143	87	16,167	230
20	4040	58	54	10,194	145	88	16,348	233
21	4221	60	55	10,375	148	89	16,529	236
22	4402	63	56	10,556	150	90	16,710	238
23	4583	65	57	10,737	153	91	16,891	241
24	4764	68	58	10,918	156	92	17,072	243
25	4945	70	59	11,099	158	93	17,253	246
26	5126	73	60	11,280	161	94	17,434	249
27	5307	76	61	11,461	163	95	17,615	251
28	5488	78	62	11,642	166	96	17,796	254
29	5669	81	63	11,823	169	97	17,977	256
30	5850	83	64	12,004	171	98	18,158	259
31	6031	86	65	12,185	174	99	18,339	261
32	6212	89	66	12,366	176	100	18,520	264
33	6393	91	67	12,547	179			

Aroclor 1221

Temperature 140°C.

Sp. Gr. - 1.072 @ 140°C.

Inst. Range - 0-273" H₂O

Inst. Scale - 0-100%

0284156

TOWOLDMON0044162

AROCLOR 1232ITEM 710

<u>% Scale</u>	<u>Gallons</u>	<u>Ins.Aroclor</u>	<u>% Scale</u>	<u>Gallons</u>	<u>Ins.Aroclor</u>	<u>% Scale</u>	<u>Gallons</u>	<u>Ins.Aroclor</u>
0	420	6	34	5928	85	68	11,436	163
1	582	8	35	6090	87	69	11,598	165
2	744	11	36	6252	89	70	11,760	168
3	906	13	37	6414	91	71	11,922	170
4	1068	15	38	6576	94	72	12,084	172
5	1230	18	39	6738	96	73	12,246	175
6	1392	20	40	6900	98	74	12,408	177
7	1554	22	41	7062	101	75	12,570	179
8	1716	24	42	7224	103	76	12,732	182
9	1878	27	43	7386	105	77	12,894	184
10	2040	30	44	7548	108	78	13,056	186
11	2202	31	45	7710	110	79	13,218	188
12	2364	34	46	7872	112	80	13,380	191
13	2526	36	47	8034	115	81	13,542	193
14	2688	38	48	8196	117	82	13,704	194
15	2850	41	49	8358	119	83	13,866	198
16	3012	43	50	8520	121	84	14,028	200
17	3174	45	51	8682	124	85	14,190	202
18	3336	48	52	8844	126	86	14,352	205
19	3498	50	53	9006	128	87	14,514	207
20	3660	52	54	9168	131	88	14,676	209
21	3822	55	55	9330	133	89	14,838	212
22	3984	57	56	9492	135	90	15,000	214
23	4146	59	57	9654	138	91	15,162	216
24	4308	61	58	9816	140	92	15,324	219
25	4470	64	59	9978	142	93	15,486	221
26	4632	65	60	10,140	145	94	15,648	223
27	4794	68	61	10,302	147	95	15,810	225
28	4956	71	62	10,464	149	96	15,972	228
29	5118	73	63	10,626	152	97	16,134	230
30	5280	75	64	10,788	154	98	16,296	232
31	5442	78	65	10,950	156	99	16,458	235
32	5604	80	66	11,112	158	100	16,620	237
33	5766	82	67	11,274	161			

Aroclor 1232

Temperature 140°C.

Sp. Gr. - 1.160 @ 140°C.

Inst. Range - 0-278" H₂O

Inst. Scale - 0-100%

0284157

TOWOLDMON0044163

AROCOR 1260 STORAGE TANK

ITEM 711

<u>% Scale</u>	<u>Gallons</u>	<u>Ins.Aroclor (Innage)</u>	<u>% Scale</u>	<u>Gallons</u>	<u>Ins.Aroclor (Innage)</u>	<u>% Scale</u>	<u>Gallons</u>	<u>Ins.Aroclor (Innage)</u>
0	420	6	34	6574	94	68	12,728	181
1	601	9	35	6755	96	69	12,909	184
2	782	11	36	6936	99	70	13,090	187
3	963	14	37	7117	101	71	13,271	189
4	1144	16	38	7298	104	72	13,452	192
5	1325	19	39	7479	107	73	13,633	194
6	1506	21	40	7660	109	74	13,814	197
7	1687	24	41	7841	112	75	13,995	199
8	1868	27	42	8022	114	76	14,176	202
9	2049	29	43	8203	117	77	14,357	205
10	2230	32	44	8384	120	78	14,538	207
11	2411	34	45	8565	122	79	14,719	210
12	2592	37	46	8746	125	80	14,900	212
13	2773	40	47	8927	127	81	15,081	215
14	2954	42	48	9108	130	82	15,262	218
15	3135	45	49	9289	132	83	15,443	220
16	3316	47	50	9470	135	84	15,624	223
17	3497	50	51	9651	138	85	15,805	225
18	3678	52	52	9832	140	86	15,986	228
19	3859	55	53	10,013	143	87	16,167	230
20	4040	58	54	10,194	145	88	16,348	233
21	4221	60	55	10,375	148	89	16,529	236
22	4402	63	56	10,556	150	90	16,710	238
23	4583	65	57	10,737	153	91	16,891	241
24	4764	68	58	10,918	156	92	17,072	243
25	4945	70	59	11,099	158	93	17,253	246
26	5126	73	60	11,280	161	94	17,434	249
27	5307	76	61	11,461	163	95	17,615	251
28	5488	78	62	11,642	166	96	17,796	254
29	5669	81	63	11,823	169	97	17,977	256
30	5850	83	64	12,004	171	98	18,158	259
31	6031	86	65	12,185	174	99	18,339	261
32	6212	89	66	12,366	176	100	18,520	264
33	6393	91	67	12,547	179			

Aroclor 1260

Temperature - 140° C.

Sp. Gr. - 1.511 @ 140°C.

Inst. Range - 0-394" H₂O

Inst. Scale - 0-100%

0284158

TOWOLDMON0044164

AROCLOR 1262 STORAGE TANK

ITEM 712

<u>% Scale</u>	<u>Gallons</u>	<u>Ins.Aroclor (Innage)</u>	<u>% Scale</u>	<u>Gallons</u>	<u>Ins.Aroclor (Innage)</u>	<u>% Scale</u>	<u>Gallons</u>	<u>Ins.Aroclor (Innage)</u>
0	420	6	34	6574	94	68	12,728	181
1	601	9	35	6755	96	69	12,909	184
2	782	11	36	6936	99	70	13,090	187
3	963	14	37	7117	101	71	13,271	189
4	1144	16	38	7298	104	72	13,452	192
5	1325	19	39	7479	107	73	13,633	194
6	1506	21	40	7660	109	74	13,814	197
7	1687	24	41	7841	112	75	13,995	199
8	1868	27	42	8022	114	76	14,176	202
9	2049	29	43	8203	117	77	14,357	205
10	2230	32	44	8384	120	78	14,538	207
11	2411	34	45	8565	122	79	14,719	210
12	2592	37	46	8746	125	80	14,900	212
13	2773	40	47	8927	127	81	15,081	215
14	2954	42	48	9108	130	82	15,262	218
15	3135	45	49	9289	132	83	15,443	220
16	3316	47	50	9470	135	84	15,624	223
17	3497	50	51	9651	138	85	15,805	225
18	3678	52	52	9832	140	86	15,986	228
19	3859	55	53	10,013	143	87	16,167	230
20	4040	58	54	10,194	145	88	16,348	233
21	4221	60	55	10,375	148	89	16,529	236
22	4402	63	56	10,556	150	90	16,710	238
23	4583	65	57	10,737	153	91	16,891	241
24	4764	68	58	10,918	156	92	17,072	243
25	4945	70	59	11,099	158	93	17,253	246
26	5126	73	60	11,280	161	94	17,434	249
27	5307	76	61	11,461	163	95	17,615	251
28	5488	78	62	11,642	166	96	17,796	254
29	5669	81	63	11,823	169	97	17,977	256
30	5850	83	64	12,004	171	98	18,158	259
31	6031	86	65	12,185	174	99	18,339	261
32	6212	89	66	12,366	176	100	18,520	264
33	6393	91	67	12,547	179			

Aroclor 1262

Temperature - 140°C.

Sp. Gr. - 1.528 @ 140°C.

Inst. Range - 0-402 " H₂O

Inst. Scale - 0-100%

0284159

TOWOLDMON0044165

MIX TANKITEM 725 (15° SLOPE BOTTOM)

<u>% Scale</u>	<u>Gallons</u>	<u>Ins. Blends</u>	<u>% Scale</u>	<u>Gallons</u>	<u>Ins. Blends</u>	<u>% Scale</u>	<u>Gallons</u>	<u>Ins. Blends</u>
0	15	6	34	3530	77	68	7746	149
1	34	8	35	3654	80	69	7870	151
2	60	10	36	3778	82	70	7994	153
3	94	12	37	3902	84	71	8118	155
4	136	14	38	4026	86	72	8242	157
5	184	16	39	4150	88	73	8366	159
6	250	18	40	4274	90	74	8490	161
7	320	20	41	4398	92	75	8614	163
8	400	23	42	4522	94	76	8738	166
9	500	25	43	4646	96	77	8862	168
10	600	27	44	4770	98	78	8986	170
11	700	29	45	4894	100	79	9110	173
12	800	31	46	5018	103	80	9234	174
13	925	33	47	5142	105	81	9358	176
14	1050	35	48	5266	107	82	9482	178
15	1174	37	49	5390	110	83	9606	180
16	1298	40	50	5514	111	84	9730	182
17	1422	42	51	5638	113	85	9854	184
18	1546	44	52	5762	115	86	9978	187
19	1670	46	53	5886	117	87	10102	189
20	1794	48	54	6010	119	88	10226	191
21	1918	50	55	6134	121	89	10350	194
22	2042	52	56	6258	124	90	10474	195
23	2169	54	57	6382	126	91	10598	197
24	2290	56	58	6506	128	92	10722	199
25	2414	58	59	6630	131	93	10846	201
26	2538	61	60	6754	132	94	10970	203
27	2662	63	61	6878	134	95	11094	205
28	2786	65	62	7002	136	96	11218	208
29	2910	67	63	7126	138	97	11342	210
30	3034	69	64	7250	140	98	11466	212
31	3158	71	65	7374	142	99	11590	214
32	3286	73	66	7498	145	100	11714	216
33	3406	75	67	7622	147			

Mix Tank

Temperature - 140°C

Sp. Gr. - 1.375 @ 140°C

Inst. Range - 0-297" H₂O

Inst. Scale - 0-100%

0284160

TOWOLDMON0044166

CM BLEND STORAGE TANK

ITEM 726

<u>% Scale</u>	<u>Gallons</u>	<u>Ins. Aroclor (Innage)</u>	<u>% Scale</u>	<u>Gallons</u>	<u>Ins. Aroclor (Innage)</u>	<u>% Scale</u>	<u>Gallons</u>	<u>Ins. Aroclor (Innage)</u>
0	420	6	34	6574	94	68	12728	181
1	601	9	35	6755	96	69	12909	184
2	782	11	36	6936	99	70	13090	187
3	963	14	37	7117	101	71	13271	189
4	1144	16	38	7298	104	72	13452	192
5	1325	19	39	7479	107	73	13633	194
6	1506	21	40	7660	109	74	13814	197
7	1687	24	41	7841	112	75	13995	199
8	1868	27	42	8022	114	76	14176	202
9	2049	29	43	8203	117	77	14357	205
10	2230	32	44	8384	120	78	14538	207
11	2411	34	45	8565	122	79	14719	210
12	2592	37	46	8746	125	80	14900	212
13	2773	40	47	8927	127	81	15081	215
14	2954	42	48	9108	130	82	15262	218
15	3135	45	49	9289	132	83	15443	220
16	3316	47	50	9470	135	84	15624	223
17	3497	50	51	9651	138	85	15805	225
18	3678	52	52	9832	140	86	15986	228
19	3859	55	53	10013	143	87	16167	230
20	4040	58	54	10194	145	88	16348	233
21	4221	60	55	10375	148	89	16529	236
22	4402	63	56	10556	150	90	16710	238
23	4583	65	57	10737	153	91	16891	241
24	4764	68	58	10918	156	92	17072	243
25	4945	70	59	11099	158	93	17253	246
26	5126	73	60	11280	161	94	17434	249
27	5307	76	61	11461	163	95	17615	251
28	5488	78	62	11642	166	96	17796	254
29	5669	81	63	11823	169	97	17977	256
30	5850	83	64	12004	171	98	18158	259
31	6031	86	65	12185	174	99	18339	261
32	6212	89	66	12366	176	100	18520	264
33	6393	91	67	12547	179			

CM Blend

Temperature - 140°C

Sp. Gr. - 1.265 @ 140°C

Inst. Range - 0-334" H₂O

Inst. Scale - 0-100%

0284161

TOWOLDMON0044167

TCB STORAGE TANKITEM 733

<u>% Scale</u>	<u>Gallons</u>	<u>Inches TCB</u>	<u>% Scale</u>	<u>Gallons</u>	<u>Inches TCB</u>	<u>% Scale</u>	<u>Gallons</u>	<u>Inches TCB</u>
0	354	6	34	4570	77	68	8786	149
1	478	8	35	4694	80	69	8910	151
2	602	10	36	4818	82	70	9034	153
3	726	12	37	4942	84	71	9158	155
4	850	14	38	5066	86	72	9282	157
5	974	16	39	5190	88	73	9406	159
6	1098	19	40	5314	90	74	9530	161
7	1222	21	41	5430	92	75	9654	163
8	1346	23	42	5562	94	76	9778	166
9	1470	25	43	5686	96	77	9902	168
10	1594	27	44	5810	98	78	10026	170
11	1718	29	45	5934	100	79	10150	172
12	1842	31	46	6058	102	80	10274	174
13	1966	33	47	6182	105	81	10398	176
14	2090	35	48	6306	107	82	10522	178
15	2214	37	49	6430	109	83	10646	180
16	2338	40	50	6554	111	84	10770	182
17	2462	42	51	6678	113	85	10894	184
18	2586	44	52	6802	115	86	11018	187
19	2710	46	53	6926	117	87	11142	189
20	2834	48	54	7050	119	88	11266	191
21	2958	50	55	7174	121	89	11390	193
22	3082	52	56	7298	124	90	11514	195
23	3206	54	57	7422	126	91	11638	197
24	3330	56	58	7546	128	92	11762	199
25	3454	58	59	7670	130	93	11886	201
26	3578	61	60	7794	132	94	12070	203
27	3702	63	61	7918	134	95	12134	205
28	3826	65	62	8042	136	96	12258	208
29	3950	67	63	8166	138	97	12382	210
30	4074	70	64	8290	140	98	12506	212
31	4198	71	65	8414	142	99	12630	214
32	4322	73	66	8538	145	100	12754	216
33	4446	75	67	8662	147			

TCB

Temperature - 140°C

Sp. Gr. - 1.303 @ 140°C

Inst. Range - 0-281" H₂O

Inst. Scale - 0-100%

0284162

TOWOLDMON0044168

TTCB STORAGE TANKITEM 734

<u>% Scale</u>	<u>Gallons</u>	<u>Inches TTCB</u>	<u>% Scale</u>	<u>Gallons</u>	<u>Inches TTCB</u>	<u>% Scale</u>	<u>Gallons</u>	<u>Inches TTCB</u>
0	354	6	34	4570	77	68	8786	149
1	478	8	35	4694	80	69	8910	151
2	602	10	36	4818	82	70	9034	153
3	726	12	37	4942	84	71	9158	155
4	850	14	38	5066	86	72	9282	157
5	974	16	39	5190	88	73	9406	159
6	1098	19	40	5314	90	74	9530	161
7	1222	21	41	5430	92	75	9654	163
8	1346	23	42	5562	94	76	9778	166
9	1470	25	43	5686	96	77	9902	168
10	1594	27	44	5810	98	78	10026	170
11	1718	29	45	5934	100	79	10150	172
12	1842	31	46	6058	102	80	10274	174
13	1966	33	47	6182	105	81	10398	176
14	2090	35	48	6306	107	82	10522	178
15	2214	37	49	6430	109	83	10646	180
16	2338	40	50	6554	111	84	10770	182
17	2462	42	51	6678	113	85	10894	184
18	2586	44	52	6802	115	86	11018	187
19	2710	46	53	6926	117	87	11142	189
20	2834	48	54	7050	119	88	11266	191
21	2958	50	55	7174	121	89	11390	193
22	3082	52	56	7298	124	90	11514	195
23	3206	54	57	7422	126	91	11638	197
24	3330	56	58	7546	128	92	11762	199
25	3454	58	59	7670	130	93	11886	201
26	3578	61	60	7794	132	94	12070	203
27	3702	63	61	7918	134	95	12134	205
28	3826	65	62	8042	136	96	12258	208
29	3950	67	63	8166	138	97	12382	210
30	4074	70	64	8290	140	98	12506	212
31	4198	71	65	8414	142	99	12630	214
32	4322	73	66	8538	145	100	12754	216
33	4446	75	67	8662	147			

TTCB

Temperature - 140°C

Sp. Gr. - 1.357 @ 140°C

Inst. Range - 0-293" H₂O

Inst. Scale - 0-100%

0284163

TOWOLDMON0044169

EQUIPMENT PERFORMANCE CRITERIA

ITEM NO. _____

FUNCTION:

DESCRIPTION:

CAPACITY:

PERFORMANCE CRITERIA:

COMMENTS ON PERFORMANCE:

ITEMS TO BE CORRECTED:

CHECKED BY: _____
Signature

0284164

TOWOLDMON0044170