

SOLID AROCLOR EXPANSION

ANNISTON PLANT

CEA 2080

DIRECTOR'S REVIEW MEETING

GENERAL OFFICES

NOVEMBER 25, 1969

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A G E N D A

DIRECTOR'S REVIEW MEETING

SOLID AROGLOR EXPANSION - ANNISTON

CEA-2080

9:00 A.M. -- November 25, 1969 -- Room 303 -- "C" Building -- G.O.

- I. Introduction.....J. E. Smith/H. L. Williams
- II. ObjectivesW. E. Voss
- III. Summary of Process and Equipment.....R. A. Yates
- IV. Current Status
 - A. Construction.....R. S. Yates
 - B. Manning.....H. L. Williams/W. E. Voss
 - C. Training Program W. E. Voss
 - D. Overall Timing.....R. S. Yates/W. E. Voss
- V. Start-Up Plan..... W. E. Voss
- VI. Project Risk
 - Review of PPA R. S. Yates/W. E. Voss

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OBJECTIVES

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SOLID AROCLOR EXPANSION - ANNISTON

CEA-2080

START-UP OBJECTIVES

1. Demonstrate the safe operation of the expanded Solid Aroclor facility to produce 20.0 M lbs/year of "in specification" Aroclor 5460.
2. Effectively define any problems which occur in meeting objective Number 1, and resolve with the proper group (Mfg., CED, Maint., etc.).
3. Demonstrate the ability of the expanded facility to meet standard manufacturing cost.
4. Start-up cost do not exceed budget.
5. Determine the ability of the expanded facility to produce Aroclor 5460 that can be FDA approved (0.4% PCB).

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START-UP PLANS

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SOLID AROCLOR EXPANSION

ANNISTON - CEA 2080

PROJECT SCHEDULE

- | | |
|---|-------------------|
| 1. Completion of Utility and Therminol Circulating Systems. | 1/2/70 |
| 2. Start-Up of Therminol Circulating Systems. | 1/5/70 |
| 3. Complete Construction on Process Equipment. | 1/15/70 |
| 4. Check Out Process Equipment and Calibrate Instruments. | 1/15/70 - 1/30/70 |
| 5. Start-Up New Facility for Production of Aroclor 5460. | 2/2/70 |
| 6. Complete Demonstration of Design Yields and Bracket III Capacity (See attached 1970 Sales Requirements). | 2/28/70 |
| 7. Complete Demonstration of Design Capacity (20 M lbs./yr. rate). | 3/15/70 |

PROJECT DEMONSTRATION

Process simulation or check-out of this equipment is limited to actual production of Aroclor 5460.

Project demonstration will consist of introducing Santowax R into the weigh tank with a thorough check of equipment operation and instrument accuracy.

From the weigh tank, one chlorinator will be charged, chlorination accomplished and all features of the equipment checked out before the second chlorinator is put into service.

The S060 batch produced in the first chlorinator will be transferred to and held in the blow tank while the second chlorinator is being cycled through a batch. During this holding period, the blow tank equipment testing can be started.

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When both chlorinators have produced a batch of 5060 and the blow tank has been checked out with the double batch the material will be transferred to the still for refining to 5460.

Throughout this testing period all equipment and instrumentation will be observed utilizing round-the-clock technical supervision as will routine operator attention. All equipment must perform well in each step of the process before the next step is attempted.

It is estimated that four (4) chlorinator batches and two (2) still batches will be processed in the system before all corrections and modifications are made.

At such time as all supervision and CED personnel agree that the equipment is in operating condition, the facility will be operated at Bracket 3 capacity.

Special Note must be given to the fact that forecasted sales requirements and inventory capability do not permit operation at design capacity (20.0 M lbs/yr.) for a full month in early 1970. Therefore, achievement of design capacity will be a judgment factor utilizing all personnel involved in the start-up and short period production rates.

SOLID AROCLOR EXPANSION

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FORECASTED SALES REQUIREMENTS

<u>1970</u>	<u>5460</u>	<u>Bracket</u>		<u>2080 Design Capacity</u>
		<u>2</u>	<u>3</u>	
February	1,095,000	2,467,000	1,235,000	1,666,700
March	1,159,000	2,467,000	1,235,000	1,666,700
April	1,132,000	2,467,000	1,235,000	1,666,700
May	1,245,000	2,467,000	1,235,000	1,666,700
TOTAL 1970-	12,200,000		14,820,000	20,000,000

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RISK ANALYSIS

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POTENTIAL PROBLEM ANALYSIS
SOLID AROCLOR EXPANSION - ANNISTON

CEA-2080

<u>SPECIFIC POTENTIAL PROBLEMS</u>		<u>PROBLEM</u>	<u>SERIOUS</u>	<u>TOTAL</u>
I. <u>RAW MATERIALS</u>				
1. <u>Santowax R</u>				
a. High percent Quatraphenyls		70	10	700
b. High percent Biphenyl		50	10	500
c. High percent water		10	6	60
d. Availability		50	10	500
2. <u>Chlorine</u>				
a. Quality		10	2	20
b. Availability		10	10	100
3. <u>FeCl₃</u>				
a. Quality - percent water		50	3	150
b. Availability		10	10	100
4. <u>Lime</u>				
a. Quality - percent water		10	6	60
b. Availability		10	10	100
II. <u>CHLORINATION AREA</u>				
1. <u>Weigh Tank</u>				
a. Incorrect weight		10	5	50
b. Inadequate Catalyst		40	6	240
c. Poor or no agitation		10	4	40
d. Water leak into tank		10	6	60

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SPECIFIC POTENTIAL PROBLEMS	PROBLEM	SERIOUS	TOTAL
II. <u>CHLORINATION AREA</u> (Contd.)			
1. <u>Weigh Tank</u> (Contd.)			
e. Fire	10	10	100
f. Sampling hazard	10	10	100
g. Pump failure	10	10	100
h. Line pluggage	20	5	100
2. <u>Chlorinators</u>			
a. Liquid chlorine into chlorinator	10	7	70
b. Fire	10	10	100
c. Circulating pump failure	30	10	300
d. Demister pluggage or failure	50	6	300
e. Overcharge	60	4	240
f. Poor or no temperature control	40	6	240
g. Poor or no chlorine flow control	50	4	200
h. Out of spec chlorination level	40	8	320
i. Plugged lines	30	7	210
j. Chlorine flow failure	10	7	70
k. Soft point determination	10	7	70
l. Therminol leaks into batch	30	10	300
m. Overpressurize	10	8	80

SPECIFIC POTENTIAL PROBLEMS	PROBLEM	SERIOUS	TOTAL
II. <u>CHLORINATION AREA</u> (Contd.)			
3. <u>Blow Tank</u>			
a. Overcharge	20	7	140
b. Therminol leaks	10	8	80
c. Temperature control	10	5	50
d. Insufficient air	10	6	60
e. Ejector plugged	20	7	140
f. Pump failure	20	4	80
g. Insufficient HCl removal	20	5	150
h. Overpressurize	20	7	140
i. Water in product	70	2	140
j. Off-Spec. Material	10	3	30
k. 5060 production capability	100	5	500
l. Rework off-spec. material	50	6	300
4. <u>Off-Gas System</u>			
a. Contaminate blow tank	20	7	140
b. Temperature control-condenser	30	6	180
c. Water	10	6	60
d. Overpressurize	30	5	150
e. Plug Condenser	30	6	180
f. Plug return line	30	5	150
g. Pump failure	20	4	80
h. Off-gas line capacity	20	8	160
i. Off-gas line pluggage	40	8	320
j. Therminol leaks	20	8	160

SPECIFIC POTENTIAL PROBLEMS	PROBLEM	SERIOUS	TOTAL
III. <u>STILL AREA</u>			
1. <u>Still</u>			
a. Insufficient vacuum	50	9	450
b. Overcharge	60	4	240
c. Cyclone Operation poor	20	4	80
d. Lime addition equipment failure	40	3	120
e. Incorrect lime charge	30	6	180
f. Poor lime mixing	70	2	140
g. No yield improvement	80	8	640
h. Montar draw-off	60	6	360
i. Pump failure	40	9	360
j. Condenser design	20	8	160
k. Condenser pluggage	20	8	160
l. Therminol leak	20	8	160
m. Condenser temp. control	20	5	100
n. Pump replacement	40	4	160
2. <u>Still Heater</u>			
a. Coil rupture	20	8	160
b. Gas explosion	40	9	360
c. Coil pluggage	20	8	160
d. Temperature control	10	8	80
e. Coil flow instrument	90	3	270
f. Coil replacement	50	3	150
g. Heater capacity	30	6	180
h. Sucking coil	60	7	420

SPECIFIC POTENTIAL PROBLEMS		PROBLEM	SERIOUS	TOTAL
III. <u>STILL AREA</u> (Contd.)				
3. <u>Still Receiver</u>				
a. Level control		30	6	180
b. Vacuum problems		10	6	60
c. Pump failure		20	4	80
d. Plugged lines		20	4	80
e. Temperature control		20	4	80
f. Off-spec. Material		30	6	180
g. Water		10	7	70
4. <u>Still Jet</u>				
a. Pluggage		50	5	250
b. Capacity		30	8	240
c. Corrosion		30	8	240
d. Catch tank temp. control		20	5	100
e. Leak in Barometric leg		30	5	150
f. Drain knockout tank		20	5	100
g. Level indication (lack of)		20	5	100
h. Jet breakage		20	5	100
i. Steam quality		20	5	100
IV. <u>MAIN THERMINOL SYSTEM</u>				
a. Pump failures		40	9	360
b. Distribution		30	8	240
c. Temperature control		30	4	120
d. Heater capacity		20	8	160
e. Therminol leaks		20	8	160

SPECIFIC POTENTIAL PROBLEMS	PROBLEM	SERIOUS	TOTAL
V. <u>HOUSEKEEPING</u>			
a. Inability to achieve Plant Standards	30	8	240
VI. <u>MANPOWER</u>			
a. Labor hog	30	9	270
VII. <u>SAFETY</u>			
a. Thermal burns	30	9	270
b. Use of torches	20	9	180
c. Montar draw-out	30	9	270
VIII. <u>HCl AREA</u>			
a. Absorber capacity	80	5	400
b. Drowning jet capacity	10	8	80
c. Waste treatment capacity	50	8	400
IX. <u>UTILITIES</u>			
a. Steam	10	8	80
b. Water	10	8	80
c. Air	50	8	400
d. Electricity	10	8	80

POTENTIAL PROBLEMS	LIKELY CAUSES	PREVENTION Take Preventive Action or Accept Risk	PROTECTION Set Contingent Action or Accept Risk	PROVIDE FOR INFORMATION
I. <u>RAW MATERIALS</u>				
1. <u>Santowax R</u>	1) Process control at S/R column	1) TSD Study-Process Knowledge	1) Adjust 5060 softening point	1) Analyze prior to use at S/R
a. Quatraphenyl in SW R	2) Pump wrong S/R to Aroclor	2) Operator training	2) Biphenyl Dept. blend S/R	2) Plot trends
b. Biphenyl in S/R	1) Process control at Biphenyl still	1) Operator training-understanding of need	1) Sell as 5060	1) FDA Specs
		2) Analyze Biphenyl still feed and Santo. C - and control < 0.3% Biphenyl in S/C	2) S/R analysis to proceed Santowax R charge	2) Plot trends
d. Availability	1) Insufficient S/R capacity	1) Increase S/R capacity	1) Debottleneck S/R capability	1) Increased capacity required in 3rd Qtr. 1971
II. <u>CHLORINATION AREA</u>				
1. <u>Weigh Tank</u>				
b. Inadequate Catalyst	1) Operator error	1) Accept risk	1) Operator training	Study Catalyst Quality and effects on process
	2) Catalyst quality	2) Accept risk	2) Visual inspection	
	3) Poor mixing	3) Accept risk	3) Agitator shutdown alarm	
2. <u>Chlorinators</u>				
c. Pump Failure	1) Overloaded motor	1) Non-overloaded motor	1) Alarm-Shut chlorine valve	Observe pumps and seals for wear at regular intervals
	2) Grounded motor	2) Accept risk	2) Alarm-Shut chlorine valve	
	3) Seal failure	3) Accept risk	3) Jacketed pump face-Opr. and mechanic training	
	4) Erosion/Corrosion	4) 316 SS pump	4) Std. chlorinator pump	

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POTENTIAL PROBLEMS	LIKELY CAUSES	PREVENTION Take Preventive Action or Accept Risk	PROTECTION Set Contingent Action or Accept Risk	PROVIDE FOR INFORMATION
II. <u>CHLORI. AREA</u>				
2. <u>Chlorinators</u>				
d. Demister plug- age or failure	1) Overcharged chlorinator 2) Burpped chlori- nator 3) Lack of heat 4) Water in system 5) Plugged drain line 6) Drain line fell off 7) Corrosion	1) Weigh charge-blow tank level 2) Operator training-Proper chlorine addition, chlo- rine flow, control failure 3) Accept risk 4) Do not charge wet batch 5) Removed cup in new design 6) Accept risk 7) 316 SS wire	1) Accept risk 2) Accept risk 3) Tracing on demister 4) Accept risk 5) Accept risk 6) Visual inspection 7) Accept risk	Study need for chlorinator level indicator
e. Overcharge	1) Weigh tank oper.	1) Monthly check scales Interlock prevent pump- ing in S/R while pumping out S/R to chlorinator	1) Weigh tank overcharge alarms	
	2) Incomplete pump- out of chlor.	2) Accept risk	2) Blow tank level in- dication	Study need for chlorinator level indicator
f. Poor Chlorinator Temp. Control	1) Circ. pump con- dition or failure	1) Accept risk	1) Pump shutdown stops Cl ₂ flow and alarms	
	2) Product cooler or lines plugged	2) Jacketed w/Therminol	2) Hi temp. stops Cl ₂ flow and alarms	
	3) Therminol cool- ing system fails	3) Accept risk	3) Therminol low flow alarms	
	4) Temp. Control loop failure	4) Accept risk	4) Hi-Lo Therminol temp. alarms	
	5) Main Therminol distrib. system hot for circ. lines	5) Accept risk	5) Redundant temp. in- dication Therm. low flow alarm	

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POTENTIAL PROBLEMS	LIKELY CAUSES	PREVENTION Take Preventive Action or Accept Risk	PROTECTION Set Contingent Action or Accept Risk	PROVIDE FOR INFORMATION
II. <u>CHLORI. AREA</u>				
2. <u>Chlorinators</u>				
g. Poor Cl ₂ Flow Control	1) S/R or 5060 back in line	1) Accept risk	1) Steam trace and thermom from manual valve to chlorinator CO ₂ blow upstream from Orifice	
	2) Cl ₂ tar in line to vaporizer	2) Accept risk	2) Work with vendor	
	3) Flow control loop failure	3) Accept risk	3) Accept risk	
	4) Failed distributors	4) Monel distributors	4) Periodic inspection	
	5) Pressure Control loop failure	5) Accept risk	5) Accept risk	
h. Chlorination Level	1) Undercharge of chlorinator	1) Continuous Sp.Gr. Monitoring	1) Operator training and monitoring of operation	
	2) Circulation poor	2) Continuous Sp.Gr. Monitoring		
	3) Cl ₂ Flow high	3) Continuous Sp.Gr. Monitoring		
	4) Stepper-Timer	4) Operator checks		
i. Plugged Lines	1) Hot therminol system failure	1) See IV. a. and b.		
	2) Over chlorination	2) See II. 2. h.		
	3) Pump failure	3) See II. 2. c.		
	4) Downtime	4) Proper line drainage and heating provided	4) Accept risk	
1. Therminol leaks into Product	1) Jacketed piping	1) No jacket over welds	1) Accept risk	
	2) Matl. of construction	2) Stainless steel	2) Accept risk	
	3) Water in Santowax	3) Accept risk	3) Process control in S/R Dept. Preventive Maint.	

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POTENTIAL PROBLEMS	LIKELY CAUSES	PREVENTION Take Preventive Action or Accept Risk	PROTECTION Set Contingent Action or Accept Risk	PROVIDE FOR INFORMATION
II. <u>CHLORI. AREA</u>				
3. <u>Blow Tank</u>				
k. 5060 Production capability limited	1) Off Spec. 5060 in blow tank	1) Accept risk	1) Quality control in S/R Dept. Provide line to #2 blow tank	
1. Rework of off-Spec. material	1) Poor process control	1) Operator training-improved process control	1) Provide ability to return to blow tank for rework	
4. <u>Off-Gas System</u>				
1. Off-Gas Line Pluggage	1) Overcharged chlори. 2) Demister Plug 3) Line size	1) See II. 2. e. 2) See II. 2. d. 3) Accept risk	3) Install larger line	
III. <u>STILL AREA</u>				
1. <u>Still</u>				
a. Insufficient Vacuum	1) Pump packing leaks 2) 3-Way valve 3) Condenser Design 4) Jet design 5) Knock-Out Pot 6) Condenser Temp. Control 7) Receiver Overcharge	1) Proven packing material and method 2) Accept risk 3) Proven design 4) Accept risk 5) Tangential Entry Plate Coils Heating & Cooling 6) Accept risk 7) Level indication	1) Spare pump 2) Operator training 3) Accept risk 4) Accept risk 5) Accept risk 6) Accept risk 7) Operator inspect when in doubt	
b. Overcharge	8) Cyclone design 1) Level switch failure	8) Accept risk 1) Accept risk	8) Accept risk 1) Operator stick measure	

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POTENTIAL PROBLEMS	LIKELY CAUSES	PREVENTION Take Preventive Action or Accept Risk	PROTECTION Set Contingent Action or Accept Risk	PROVIDE FOR INFORMATION	
III. STILL AREA					
1. Still					
g. No Yield Improvement	1) Santowax quality 2) Receiver too small 3) Still pump NPSH 4) Heater hold up	1) Biphenyl & TSD efforts 2) Accept risk 3) Sump on still pot 4) Sump on still pot	1) Accept risk rework 2) Pump out receiver during batch 3) Accept risk 4) Accept risk	Justify Sandvik Belt	
h. Montar Draw-Off Problems	1) Still bottom nozzle 2) Long draw off line 3) Large No. of drums to handle	1) Adequate size design 2) Therminol jacketed lines sloped 3) Improved yield	1) Accept risk 2) Accept risk 3) Provide increased roller conveyor capacity		
i. Pump Failure	1) Long shaft 2) Lime pluggage	1) Accept risk 2) Accept risk	1) Spare pump 2) Lower yield and don't distill as far down		
2. Still Heater					
b. Gas Explosion	1) Failure of safe guard system 2) Operating error 3) Gas leak	1) Accept risk 2) Operator training 3) Accept risk	1) Accept risk with proper maintenance 2) Gas test before ignition 3) Gas test before ignition		
e. Coil Flow Instrument	1) Pluggage	1) Accept risk	1) Coil outlet temperature HI shutdown		
h. Sucking Coil	1) Plugged vent valve	1) Therminol heated vent nozzle and valve	1) Operator Rod Out		

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POTENTIAL PROBLEMS	LIKELY CAUSES	PREVENTION Take Preventive Action or Accept Risk	PROTECTION Set Contingent Action or Accept Risk	PROVIDE FOR INFORMATION
III. <u>STILL AREA</u>				
4. <u>Still Jet</u>				
a. Pluggage	1) Knockout Tank	1) See III. 1.a.		
	2) System Air Leaks	2) Accept Risk	2) Test for leaks and repair	
	3) Product Temperature too high	3) Accept Risk	3) Monitor condenser temp. control system	
b. Capacity	1) Jet Design	1) Accept Risk	1) Accept Risk	
c. Corrosion	1) HCl in system	1) Accept Risk	1) Prevent water in system	
	2) Overheated bottoms liberate HCl	2) Accept Risk	2) Instrument maintenance operator training	
IV. <u>MAIN THERMINOL SYSTEM</u>				
a. Pump Failure	1) Low level in system	1) Horizontal pump eliminate leaks level indication	1) Accept risk	
	2) Seal failures	2) Seal guard system	2) Accept risk	
b. Distribution	1) Piping Sizing	1) Improved design better temperature indication	1) Piping modifications	
V. <u>HOUSEKEEPING</u>				
a. Inability to Maintain Plant Standards	1) Therminol leaks	1) Improved design using 316 SS	1) Proper emphasis on housekeeping	
	2) Product leaks	2) Equipment arrangement		
	3) Operating errors	3) Operator training		
	4) System pluggage	4) Improved therminol distrib. jacketed lines, better system drainage		
		5) Utility stations properly located		
		6) Sample funnels returned to weigh tank.		

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POTENTIAL PROBLEMS	LIKELY CAUSES	PREVENTION Take Preventive Action or Accept Risk	PROTECTION Set Contingent Action or Accept Risk	PROVIDE FOR INFORMATION
VI. <u>MANPOWER HOG</u>	1) Manual Operating functions 2) Housekeeping problems 3) Plugged lines	1) Instrumentation on levels, flows, temperatures, gravities, control room layout improvements. 2) Improved equipment design and layout. Provide proper housekeeping equipment 3) Jacketed piping, improved thermol distribution, insulation and tracing	1) Proper instrument maintenance 2) Increased emphasis on housekeeping 3) Accept risk	Continuing Manpower study to reduce operating load by modifications or new design
VII. <u>SAFETY</u>				
a. Thermal Burns	1) Uninsulated piping and vessels 2) Sucking coil 3) Leaks 4) Lighting gas heater	1) Adequate insulation on hazardous areas 2) Heating on vent valve 3) Accept risk 4) Operator training	1) Safety awareness by all concerned 2) Personal Protective equipment 3) Proper maintenance 4) Follow procedures	Safety Audit after three months operation
c. Montar Draw-Out	1) Fumes 2) Sticking rollers 3) Overfilling drums 4) Insufficient roller conveyor	1) Fume Collection System 2) Proper maintenance and housekeeping 3) Accept risk 4) Provide for maximum number of drums	1) Personnel protection equipment 3) Operator training	

POTENTIAL PROBLEMS	LIKELY CAUSES	PREVENTION Take Preventive Action or Accept Risk	PROTECTION Set Contingent Action or Accept Risk	PROVIDE FOR INFORMATION
VIII. HCl AREA				
a. Absorber Capacity	1) Increased HCl load	1) Larger drowning jet Automatic drowning operation	1) Further CED effort in Muriatic Acid area	TSD Study and Definition in HCl Area
c. Waste Treatment	1) Increased load	1) Accept risk	1) Provide additional neutralization facilities	
IX. UTILITIES				
c. Air	1) Insufficient air for new instruments 2) Dryer capacity	1) All available instrument air compressors and dryers in good operating condition	1) Purchase additional air capacity	Study improved central air system

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START-UP BUDGET

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SOLID AROCLOR EXPANSION

ANNISTON - CEA 2080

The start-up expenses for the Solid Aroclor Expansion are estimated at \$93,310. The detailed budgets for the Preparation and Operation Phases are included in this section.

This budget has only recently been prepared and is not approved.

SUMMARY

Preparation-----	\$41,780
Operation-----	<u>\$51,530</u>
Total Budget-----	\$93,310
Per cent of Approved Capital-----	8.5
Actual and Estimated Expenditure in 1969 - Preparation-----	\$20,230
Estimated Expenditure in 1970 Preparation and Operation -----	\$73,080

SOLID AROCLOR EXPANSION
ANNISTON - CEA 2080

JOB NO. 916.56

	PREPARATION PHASE			START-UP BUDGET				TOTAL
	1st Qtr. 1969	2nd Qtr. 1969	3rd Qtr. 1969	Oct. 1969	Nov. 1969	Dec. 1969	Jan. 1970	
Manufacturing Wages	--	--	--	--	--	--	4,000	4,000
Manufacturing O.H.	--	--	--	--	--	--	700	700
Salaries	867	895	1,690	20	2,000	7,500	7,500	20,472
Salary O.H.	155	158	308	4	360	1,350	1,350	3,685
Supplies	--	--	70	--	100	2,000	2,000	4,170
Clothing & Laundry	--	--	--	--	--	--	150	150
Travel	164	150	189	--	750	500	200	1,953
Stationery-Printing	--	--	--	--	200	500	200	900
Mechanical Expense							5,000	5,000
Meetings & Conferences						300	450	750
TOTALS	1,186	1,203	2,257	24	3,410	12,150	21,550	41,780

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PREPARATION PHASE - START-UP BUDGET

EXPENSE DETAILS

MANUFACTURING WAGES

\$4,000

Training for 12 men - 40 overtime hours

Operating personnel for the expanded plant will be those now operating in the Aroclor Department. These operators are familiar with the process and the general type of equipment being installed on CEA 2080. Due to their continuing operating duties up to the time of start-up of CEA 2080, all training must be performed on overtime.

SALARIES

\$20,472

Through October 1969, only the required portion of the manufacturing representative's salary has been charged to the Preparation Phase. Late in November one technical man will be picked up to begin detailed preparation of the start-up manual. In December and January the budget provides for full time utilization and training of four (4) shift supervisors, the start-up supervisor, and the manufacturing representative.

SUPPLIES

\$4,170

Housekeeping Equipment
Safety Equipment
Safety Signs
Utility Lockers and Cabinets
Training Supplies
Other Miscellaneous purchases

TRAVEL

\$1,953

Trips for the Manufacturing Representative to visit CED. Attendance of concerned personnel at the Director's Review Meeting requires the large budgeted amount in November.

MECHANICAL EXPENSE

\$5,000

Instrument Check-Out and Calibration
IPO's

SOLID AROCLOR EXPANSION
ANNISTON - CEA 2080

OPERATION PHASE - START-UP BUDGET

COST ABOVE 1970 SOLID AROCLOR COST STANDARD

	<u>February</u> <u>1970</u>	<u>March</u> <u>1970</u>	<u>Total</u>
Raw Materials	5,100	--	5,100
Steam	1,000	--	1,000
Salaries	6,000	2,500	8,500
Salary O.H.	1,080	450	1,530
Factory Supplies	1,000	500	1,500
Laboratory	1,200	600	1,800
Production Research	1,000	--	1,000
Mechanical Expense	15,000	10,000	25,000
Performance Volume	<u>6,100</u>	<u>--</u>	<u>6,100</u>
TOTALS	37,480	14,050	51,530

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TOWOLDMON0048400

OPERATION PHASE - START-UP BUDGET

EXPENSE DETAILS

BASIS: Begin producing Aroclor 5460	2/2/70
Schedule Production-Bracket 3	1,235,000
New facility will produce - Feb. 90% Bkt. 3	1,115,000
Mar. 100% Bkt. 3	1,235,000
Yield on Raw Materials - Feb. 73%	
Mar. 80%	

YIELD VARIANCE

Feb. 1970: 1,115,000 (<u>\$6.09 - \$5.64</u>)	\$5,018
100	

PERFORMANCE VOLUME

Feb. 1970: (1,235,000 - 1,115,000) <u>\$5.09</u>	\$6,108
100	

MECHANICAL EXPENSE

Feb. 1970: Appropriation Request Approval for Start-Up Modifications	\$15,000
Mar. 1970: Additional Correction Expense	\$10,000