Central Engineering Department

Project Scope Report

Solid Aroclor Expansion

CEA 2080

New 20 M lbs./year Plant

Anniston, Alabama Plant

By: R. S. Yates
Central Engineering Department
January 14, 1969

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TOWOLDMON0048131

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CEA 2080
Date: 1/16/69
By: R. S. Yates

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A. Equipment Information Summary

B. Process Flow Diagram

C. Equipment Arrangement Study

D. Building and Site Requirements

E. Description of Work by Code of Accounts

F. Preliminary Schedule

G. Project Loss Prevention Report

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1.1 Project Scope Summary

1.11 Title

Aroclors - Increase Solid Aroclor Capacity - Organic Division at Anniston, Alabama Plant
CEA 2080

1.12 Synopsis and Project "Tone"

The objectives of this project are to

a. Provide new facilities to increase solid Aroclor plant capacity from 9.6 M lbs./year to 29.6 M lbs./year.

b. Provide an overall production capacity for solid Aroclors of up to 30% more than indicated in the latest sales forecast.

c. Provide for an orderly expansion of the solid Aroclor facilities.

d. Complete these facilities by December, 1969.

New facilities to be added are:

1. Two batch chlorinator systems consisting of a single terphenyl feed tank, two chlorination tanks with heat removal systems and one intermediate storage and blow tank.

2. An off-gas recovery system consisting of heat exchanger and surge tank to recover entrainment lossss from both chlorinator systems.

3. One batch distillation system consisting of still pot, external circulating system through a gas-fired heater, condensing and receiving equipment, and a high vacuum ejector.

4. Sufficient piping tie-ins to insure good operating flexibility with the existing batch system.

5. Expand the existing control room to provide sufficient space for instrumentation for the new facility.

6. Expand the existing Therminol heating system to provide proper distribution of hot fluid to the new facility.

7. Add drowning facilities at the HCl plant to drown the extra HCl gas produced from the chlorinators.

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8. A new elevator in Building 27.

9. A flaker for Aroclor 1268.

Sales forecasts indicate that we will be out of solid Aroclor capacity in 1969. The plant is carrying out a debottlenecking program which will allow us to meet most of our 1969 requirements. The new facilities should be operational by December 1969 or earlier if possible. A preliminary schedule shows that if we can start definitive engineering in January, these new facilities will be available for start-up in December 1969.

Full design capacity will not be necessary until after 1973. It is divisional policy in certain product groups to provide excess capacity over and above sales forecasts and we are providing a 31% excess capacity in these new facilities for 1973 based on the sales forecast of December 6, 1968.

Low capital cost is important to this project, however, schedules must be met for a December 1969 or earlier start-up even at some increased capital cost. There are no items that could be deferred from this project to a later date.

It is estimated that the cost of these new facilities will be:

Capital	$ 950,000
Expense	50,000
Total	$1,000,000

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1.2 Process Technology

1.21 Process Description

1.211 Details of Process

Aroclors are the reaction products formed by the chlorination of biphenyl and/or terphenyls using an iron catalyst. The by-product HCl gas produced is absorbed in water to produce muriatic acid. Solid Aroclors are produced in chlorinator reaction vessels, air blown and distilled. They are drummed, flaked, or flaked and milled and packaged for shipment.

Distillation residues are discarded as waste or sold as Montars.

Aroclors, when used as plasticizers and that crystallize at ambient temperatures are considered solid Aroclors. Below is a list of the Aroclor grades that are considered solid Aroclors:

Aroclor Designation	Starting Raw Material	Chlorination Level	Distilled
1268	Biphenyl	68%	Yes
2565	25% Santowax C 75% Biphenyl	65%	No
4065	40% Santowax R 60% Biphenyl	65%	No
4465	40% Santowax R 60% Biphenyl	65%	Yes
5060	100% Santowax R	60%	No
5460	100% Santowax R	60%	Yes
5042	100% Santowax R	42%	No
5442	100% Santowax R	42%	Yes

Blend

We intend to make only Santowax R based Aroclors in this new equipment.

1.212 Yields and Raw Material Usage

Yields are calculated for both chlorine and Santowax and/or Biphenyl. Based on cost standards of January 1, 1969 these are (% theory to standard):

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Aroclor Designation	On Chlorine	On Biphenyl	On Santowax C	On Santowax R
1268	73	73		
2565	96	96.2	96.2	
4465	73	73		73
5060	96			96
5460	82			85
5442	80.2			73

The yield on 5460 has not been demonstrated. Last year the standard yield on chlorine and Santowax R was 73.5%

Lime and Ferric chloride are added to all products as follows:

	Lbs./100 Lbs. Aroclor
Lime	1.000
Ferric Chloride	0.020

1.213 Process Documents

"Standard Manufacturing Process for Aroclors Anniston Plant" September, 1966, M. J. Williams

"Standard Operating Instructions for Aroclors Anniston Plant" November, 1968, M. J. Williams

1.22 Raw Materails

1.221 Specifications

Raw material specifications, as listed below, are appended.

Material Code	Date	Material
33500	2/26/57	Ferric Chloride Anhydride
83601	11/18/65	Biphenyl
82910	3/9/66	Santowax "C"
82602	3/2/66	Santowax "R"
82638	8/31/66	Chlorine Gas
38800	7/20/66	Lime Hydrate

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1.222 Sources

Biphenyl

Biphenyl is stored in horizontal tanks in the Biphenyl Area and pumped on demand into the Terphenyl Mix Tank.

Ferric Chloride

Received from the warehouse in 100 lb. kegs.

Chlorine

Received from tank cars and the chlorine plant. In 1969 the chlorine plant will be shut down and the entire supply will be from 44, 55 or 90 ton tank cars shipped into the plant. Liquid chlorine will be vaporized and transferred as a gas to the department area.

Lime Hydrate

Received from the warehouse in 50 lb. bags loaded on palettes.

Santowax "C"

Received from the continuous biphenyl stills on demand through a transfer line.

Santowax "R"

Received from a 50,000 gallon storage tank, heated west of the HB40 department, on demand, through a transfer line. Santowax "R" is obtained from the continuous Santowax still in the Biphenyl refining area.

1.23 Products and By-Products

1.231 Quality Considerations

Aroclor 5460 has a color and softening point specification which because of the nature of the process gets out of control on occasion. Color is more of a problem than softening point.

1.232 Specifications

Finished goods specifications, as listed below, are appended.

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Product Code	Date	Product
82616	3/11/66	Aroclor 1268
82618	3/11/66	Aroclor 2565
82619	3/11/66	Aroclor 4465
82620	3/11/66	Aroclor 5060
82622	3/11/66	Aroclor 5460
82621	3/15/66	Aroclor 5442

1.233 By-Products

HCl gas is a by-product of the chlorination reaction and can be absorbed in water to produce muriatic acid or sewered and neutralized with limestone.

Residues from the distillation are drawn off to drums and sold as Montars or discarded. Listed below are data on the Montars.

Montar No.	Aroclor	Softening Point Range	Calcium Oxide
5	5460	155-195°C	1.6%
6	4465	135-190°C	2.0%
7	1268	200°C	
8	5442		

The plant is considering the flakering of Montars in order to change the product form.

Latest sales forecast, November 27, 1968, indicates sales requirements for the solid Montars as follows for the year 1969:

Montar 5	180,000 lbs.
Montar 5 crushed, dom.	400,000 lbs.
Montar 5 crushed, inter.	80,000 lbs.
Montar 6	50,000 lbs.

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1.234 Packaging and Shipping

Container Weights

Material	Weight - lbs.	Container	Form
1268	200	41 gal. fibre drum	Flakes
2505	50 and 500	5 and 40 gal. drums	Solid
4465	50 and 500	5, 40 and 55 gal. drums	Solid
5060	50 and 100	paper bags	Flakes
5460	50 and 100	paper bags	Flakes
5442	50 and 450	5 and 40 gal. drums	Solid

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1.24 Waste Streams

Approximately 2200 gallons of Montar 5 will be produced daily with an approximate composition as follows:

Chlorine	57-59%
Iron	0.12%
Calcium Oxide	1.6%

Some of this material is sold, the remainder is put in drums and taken to the toxic dump. The plant has a project to pump these waste materials to Cleghorn's lake, a sump used for residue disposal.

An additional 70,000 lbs. of HCl gas will be produced daily from this new plant and will have to be absorbed and sewered at the acid plant. If additional absorption capacity is required, a separate project will be submitted.

1.25 Personnel, Property and Public Hazards

Chlorine Gas

Causes eye, skin and mucous membrane irritation. Maximum allowable concentration is 2 ppm. Concentrations in the order of 15 ppm will cause throat irritation. Cannister gas masks, Scott Air Paks or other similar equipment is required in strong concentrations.

Biphenyl

A toxic organic chemical. Breathing fumes or vapors should be avoided. During processing the material is usually hot (100°C or above) and can cause serious thermal burns in contact with the skin. Protective garments should be worn to aboid contact. Flash point of biphenyl is 235°F.

Ferric Chloride

Not toxic but presents an eye hazard. Normal precautions of wearing safety glasses should be followed.

HCl Gas

Fumes are toxic and hazardous to teeth, skin, eyes and mucuous membranes. In strong concentrations, rubber protective equipment should be worn. Maximum allowable concentration of HCl gas in air is 10 ppm.

TOWOLDMON0048141

Santowax R

Relatively non-toxic, however, the vapors are irritating to the bronchial tract. Prolonged breathing of vapors should be avoided. Material is generally hot (150°C or above) and can cause serious thermal burns in contact with the skin.

Crude Aroclors

Crude Aroclors are hot since all are handled in Therminol heated jacketed lines. They can cause serious thermal burns in contact with the skin.

Still Bottoms or Residue

Fumes from still bottoms are toxic. They are extremely irritating to the mucous membranes, eyes and respiratory tract and should be avoided. They are hot (above 150°C) and can cause serious thermal burns.

Hydrated Lime

Dust is irritating to the eyes and skin and any material on the skin should be washed off with water.

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1.3 Manufacturing Facilities

1.31 Description

1.311 General

The following information is included in the Appendix of this report:

Equipment Information Summary

Process Flow Diagram

Equipment Arrangement Study

Building and Site Requirement

Description of Work by Code of Accounts

Preliminary Schedule

Project Loss Prevention Report

1.312 Manufacturing Facilities

A 2000 gallon mix tank for terphenyls with charge lines and supported on a 40,000 lb. hopper scale.

Two 3100 gallon chlorination tanks with circulation pumps and heat removal systems consisting of two shell and tube heat exchangers and a Therminol surge tank and pump.

An off-gas system consisting of heat exchanger and 2000 gallon storage tank to recover entrainment losses from the chlorinator off gases with tailings pump.

A 6500 gallon batch intermediate storage and blow tank with scrubber and transfer pump.

A 7300 gallon still pot, 3500 gallon receiver with entrainment separator, still condenser and external gas fired heater with submerged centrifugal pump.

A condenser control system consisting of two shell and tube heat exchangers and a Therminol surge tank and pump.
A three-stage ejector with intercondenser, and aftercondenser and catch tank and sump tank.

Additions to the present control room to provide space for additional instrumentation.

A two-stage HCl gas drowning system.

A new freight elevator for Building 27.

Additions to the present Therminol system.

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1.32 Design Capacity

Chlorination:

Basis	Producing Aroclor 5060
OST	6350 hrs./year
Rate	27.6 M lbs./year

Distillation:

Basis	Producing Aroclor 5460
OST	6350 hrs./year
Rate	20.0 M lbs./year

After these additions are complete, plant capacity will be as follows:

Present Capacity	9.6 M lbs./year
New Capacity	20.0 M lbs./year
Total Capacity	29.6 M lbs./year

Basis: OST 6350 hrs./year
OAY 73%

Based on the December 6, 1968 Sales Forecast, (HD to RY), excess capacity will be as follows:

	1970	1973
New Capacity	29.6 M lbs./yr.	29.6 M lbs./yr.
Required	17.1 M lbs./yr.	22.6 M lbs./yr.
Excess Capacity	12.5 M lbs./yr.	7.0 M lbs./yr.
Excess Capacity	73 %	31 %

1.33 Flexibility Requirements

Two complete and separate solid Aroclor systems will allow flexibility in our production runs. We will produce the larger volume requirement, Aroclor 5460 (82%), in the new units with the remaining solid Aroclors being produced in the smaller unit. Consideration will be given to incorporating the chlorinators into a continuous chlorination system at some future date. Both units will have the flexibility of being able to produce any of the solid Aroclor products. If fractionation is required to meet FDA standards, a separate distillation unit can be added to the existing system.

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1.34 Future Expansion

The present expansion will occupy an 18 foot wide area directly to the north of Building 27. There is sufficient area to the north of this expansion to provide for two additional chlorination-distillation systems. In the meantime, work should proceed toward developing a continuous chlorination system which long range should provide greater flexibility in labor and equipment.

1.35 Physical Appearance

We propose to make the top roof deck concrete, a continuation of the surface we installed to the west of Building 27 on project OEA 4-488. Additional weather protection will be provided in the form of a panel enclosure on the north wall of the structure.

1.36 Storage and Shipping Requirements

No additional storage facilities are contemplated. Recently completed project CEA 1430 provided a 5500 gallon day tank for finished solid Aroclors. In addition, a new 6900 lb./hr. flaker with a 5500 gallon flaker feed tank has also been installed in a separate flaking and packaging building.

Raw material storage for Santowax R and Biphenyl are adequate.

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1.4 Utilities and Services

1.41 Utilities Summary

The approximate utility requirements are as follows:

For ejector, lbs./hr.	450
For tracer and tank heating, lbs./hr.	250
Power, Installed HP	245
Cooling Tower Water, GPM	600
Potable Water, GPM	50
Natural Gas, Cu.Ft./hr.	2000

1.42 Utilities Facilities

No additional utility facilities are required for this project.

TOWOLDMON0048146

MONSANTO CHEMICAL COMPANY
ORGANIC CHEMICALS DIVISION
W. G. KRUMMRICH PLANT
RAW MATERIAL SPECIFICATION

PRODUCT CODE: 33500
METHOD IDENTITY: [illegible]
SUPPLIER:

ISSUED Feb. 26, 1957
STANDARDS DEPARTMENT
Wm. G. Krummrich Plant
By [illegible]

MATERIAL: FERRIC CHLORIDE ANHYDRIDE

CHEMICAL FORMULA: $FeCl_3$

MOL. WT.: 162.21

SUPERSEDES SPECS. OF: New

SAMPLE FOR ANALYSIS: 1x8 oz. W. M. Bottle

UNCLASSIFIED INFORMATION

General Tests (made only on request)

Property	Specification	J.F.Q. Method No.
Appearance	Black powder or granules	16-A
Assay	97.0%, Min.	22-570
Sulfates	0.05%, Max.	120-570
Ferrous Salts	Trace, Max.	S-570-1
Solubility:		112-B
10:10 of water	Complete to slightly turbid, Max.	
10:10 of Formula 30 alcohol	Complete to slightly turbid, Max.	

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IN 84 MONSANTO CHEMICAL COMPANY
ORGANIC CHEMICALS DIVISION

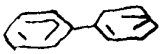
FINISHED PRODUCT SPECIFICATION

PRODUCT CODE	826.01
METHOD IDENTITY	
SALES CODE	135-000-03-09

Issued 5/5/61
Anniston Plant
By W. W. Kiemmar
Revised to add typ values 11-18-65

PRODUCT (Trade name)	Biphenyl
TYPE	Technical
PRODUCT (Chemical name)	Biphenyl
TYPE	Technical

CHEMICAL FORMULA



$C_{12}H_{10}$

MOL WT. 154.20

USE Sales

SUPERSEDES SPECS OF	SPECIAL JOB NO.	SAMPLE FOR ANALYSIS
7/8/65		1 x 16 oz. can

Characteristics	Limits	Typical Values
Routine tests		
Appearance	White to pale yellow crystals	White crystals
Crystallizing Point, °C	68.7 Min.	68.8
Color, Gardner	6 Max.	1.5
General Test (determined only on request)		
Biphenyl, %		99.9
Napthalene, %		0.001
3 - Methylbiphenyl, %		0.05
4 - Methylbiphenyl, %		0.02
Unknown, %		<0.03
Distillation Range, °C 1st drop - Dry Point	Must include 255°C	

0020563

This specification for internal use only

TOWOLDMON0048148

Monsanto
ORGANIC CHEMICALS DIVISION

FINISHED PRODUCT SPECIFICATION

PRODUCT		DEPT.
Santowax C		32
PLANT	PRODUCT CODE	USE
Anniston	829.10	Internal
DATE EFFECTIVE	SALES CODE	
3-9-66	7795-050-99-009	

APPROVALS

PRODUCTION	RESEARCH
F. G. Moody /s/ 2-1-66	L. R. Stark /s/ 2-3-66 - M. McEwen /s/ 2-22-66
SALES	QUALITY CONTROL (Chief Chemist)
J. E. Ault /s/ 2-22-66	O. E. Dolin /s/ 2-1-66

GENERAL DESCRIPTION: Mixture

CHEMICAL FORMULA:

MOL WT.

SUPERSEDES SPECS. OF	SAMPLE FOR ANALYSIS	ISSUED BY
1-57	2 - 1 Pint Cans	J. A. Liddle 1-12-66

CHARACTERISTIC	LIMITS	METHOD
RESTRICTED INFORMATION		
Appearance	Brown, waxy solid	G-1
Boiling Point, °C	350 Min.	
Ortho Terphenyl, %	**10	064
Meta Terphenyl, %	**50	064
Para Terphenyl, %	**26	064
Quaterphenyl, %	**14	072
Biphenyl, %	**0.1	064
Flash Point, °C	**375	114
Chlorine, ppm	2.0 (Typical)	
Sulfur, ppm	2.0 "	

The distribution of isomers and quaterphenyls vary with operating condition.

Very limited data is available; therefore, the limits given are typical values of these characteristics.

This product is mainly used as a raw material for other finished products produced at Anniston.

This specification is for internal use only.

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(R) Routine Analysis. All others Analysed by request Only

SH-502

TOWOLDMON0048149

Monsanto
ORGANIC CHEMICALS DIVISION

FINISHED PRODUCT SPECIFICATION

PRODUCT		DEPT.
Santowax R		32
PLANT	PRODUCT CODE	USE
Anniston	826.02	Sales
DATE EFFECTIVE	SALES CODE	
3-2-66	7795-000-11-009	

APPROVALS

PRODUCTION	RESEARCH
R. G. Moody /s/ 1-31-66	L. R. Stark /s/ 2-3-66 - M. McEwen /s/ 2-22-66
SALES	QUALITY CONTROL (Chief Chemist)
W. E. Ault /s/ 2-22-66	O. E. Dolin /s/ 1-25-66

GENERAL DESCRIPTION — CHEMICAL FORMULA

Mixed Terphenyls

MOL WT.

SUPERSEDES SPECS. OF	SAMPLE FOR ANALYSIS	ISSUED BY
2-12-62	2 x 1 pint cans	J. A. Liddle 1-11-66

CHARACTERISTIC	LIMITS	METHOD
UNRESTRICTED INFORMATION		
(R) Appearance	Yellow white noncrystalline flaked solid	G-1
(R) Color (liquid), NPA	4.0 Max.	128
(R) Upper Hold Point, °C	136 - 145	129
(R) Lower Hold, °C	48 - 63	129
RESTRICTED INFORMATION		
Distillation Range, °C, 80% (Uncorrected)	350 - 400	
Ortho terphenyl, %	10.0 - Typical Value	
Meta terphenyl, %	54.0 - " "	
Para terphenyl, %	27.0 - " "	
Quaterphenyls, %	9.0 - " "	

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(R Routine Analysis. All others Analyzed by request Only

TOWOLDMON0048150

Monsanto
ORGANIC CHEMICALS DIVISION

RAW MATERIAL SPECIFICATION

MATERIAL CODE	MATERIAL
826.38	Chlorine Gas
PLANT	**USING DEPTS.**
Anniston	04, 05, 27
DATE EFFECTIVE	**SUPPLIER**
8-31-66	See below

APPROVALS

PRODUCTION	RESEARCH
R. G. Moody /s/R. G. Moody - 8/11/66	L. R. Stark /s/L. R. Stark - 8/29/66
PROCUREMENT	**QUALITY CONTROL** (Chief Chemist)
H. L. Phillips /s/H. L. Phillips - 8/15/66	O. E. Dolin /s/O. E. Dolin - 8/10/66

GENERAL DESCRIPTION

Greenish yellow gas

CHEMICAL FORMULA

Cl_2
Mol. wt. 70.91

SUPERSEDES SPECS OF	SAMPLE FOR ANALYSIS	ISSUED BY
Sept. 11, 1957	GLC sampling container	J. A. Liddle - 5/16/66

CHARACTERISTIC	LIMITS	Typical Values	METHOD
UNRESTRICTED INFORMATION			
Material Supplied by Diamond Alkali Company			
Assay, (Vol. %)	99.4 Min.		113
Residual Gases (Vol. %)	0.5 Max.		113
Moisture, ppm	40 Max.		
Non-volatile Matter, ppm	40 Max.		
Material Supplied by Depts. 56, 57 (Anniston)			
Assay (Vol. %)		85.5 - 93.5	113
H_2 (Vol. %)		1.5 - 2.5 (3 Max.)	113
CO_2 (Vol. %)		0.5 - 1.0	113
CO (Vol. %)		Nil	113
N_2 (Vol. %)		3.0 - 8.0	113
O_2 (Vol. %)		1.2 - 3.0	113

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(R) Routine Analysis. All others Analysed by request only.

WGK-314

TOWOLDMON0048151

Monsanto
ORGANIC CHEMICALS DIVISION

RAW MATERIAL SPECIFICATION

MATERIAL CODE	MATERIAL
38800	Lime Hydrate
PLANT	USING DEPTS.
Anniston	27, 28
DATE EFFECTIVE	SUPPLIER
7-20-66	Alabaster Lime Co.

APPROVALS

PRODUCTION	RESEARCH
R. G. Moody /s/R. G. Moody 6/9/66	W. F. Mueller /s/W. F. Mueller 7/13/66
PROCUREMENT	QUALITY CONTROL (Chief Chemist)
H. L. Phillips /s/H. L. Phillips 6/10/66	O. E. Dolin /s/O. E. Dolin 6/8/66

GENERAL DESCRIPTION

White fine powder

CHEMICAL FORMULA

$Ca(OH)_2$

Mol. wt. = 74.10

SUPERSEDES SPECS OF	SAMPLE FOR ANALYSIS	ISSUED BY
Sept. 11, 1957	2 - 1 lb. cans	J. A. Liddle - 5/18/66

CHARACTERISTIC	[redacted]	METHOD
	Typical Analysis	
UNRESTRICTED INFORMATION		
CaO (%)	73.00	
MgO (%)	1.20	
SiO_2 (%)	0.36	
Al_2O_3 (%)	0.60	
Fe_2O_3 (%)	0.30	
Ignition Loss (%)	24.04	
$Ca(OH)_2$ (% Calculated)	97.50(1)	
Screen Analysis		
Through 200 mesh (%)	99.8	120
Through 325 mesh (%)	94.5	

Basis of Specifications: Suppliers typical analysis of product (5/23/66)

(1) $Ca(OH)_2$ % = 100% - [MgO(%) + SiO_2 (%) + Al_2O_3 (%) + Fe_2O_3 (%)]

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(R) Routine Analysis, All others Analysed by request only.

TOWOLDMON0048152

Monsanto
ORGANIC CHEMICALS DIVISION

FINISHED PRODUCT SPECIFICATION

PRODUCT		DEPT.
Aroclor 1268		27-S
PLANT	PRODUCT CODE	USE
Anniston	826.16	Sales
DATE EFFECTIVE	SALES CODE	
3-11-66	1040-340-04-11-16-009	

APPROVALS

PRODUCTION	RESEARCH
R. G. Moody /s/ 12-30-65	L. R. Stark /s/ 3-8-66
SALES	QUALITY CONTROL (Chief Chemist)
W. E. Ault /s/ 3-2-66	O. E. Dolin /s/ 12-29-65

GENERAL DESCRIPTION

Mixture

CHEMICAL FORMULA

MOL WT.

SUPERSEDES SPECS. OF	SAMPLE FOR ANALYSIS	ISSUED BY
4-25-61	1 x 16 oz. Can or W.M. Bottle	J. A. Liddle 11-30-65

CHARACTERISTIC	LIMITS	METHOD
UNRESTRICTED INFORMATION		
(R) Appearance and color	White to off-white powder	G-1
Color, Gardner	6 Max.	
(R) Hold Point, °C	150 - 170	119
(R) Acid No., mg KOH	0.05 Max.	116
RESTRICTED INFORMATION		
Screen Test, % retained on		
No. 16 mesh	0.1 Max.	120
No. 20 mesh	10 Max.	
Specific Gravity @ 25/25°C., Pycnometer	1.804 - 1.811	
Loss @ 163°C., %	0.15 - 0.24	

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(R) Routine Analysis. All others Analyzed by request Only

TOWOLDMON0048153

Monsanto
ORGANIC CHEMICALS DIVISION

FINISHED PRODUCT SPECIFICATION

PRODUCT			DEPT.
Aroclor 2565			27-S
PLANT	PRODUCT CODE	USE	
Anniston	826.18	Sales	
DATE EFFECTIVE	SALES CODE		
3-11-66	1040-390-04-009		

APPROVALS

PRODUCTION	RESEARCH
R. G. Moody /s/ 12-29-65	L. R. Stark /s/ 3-8-66
SALES	QUALITY CONTROL (Chief Chemist)
W. E. Ault /s/ 3-2-66	O. E. Dolin /s/ 12-29-65

GENERAL DESCRIPTION

Mixture

CHEMICAL FORMULA

MOL WT.

SUPERSEDES SPECS. OF	SAMPLE FOR ANALYSIS	ISSUED BY
4-25-61	1 x 16 oz. Can or W.M. Bottle	J. A. Liddle 11-30-65

CHARACTERISTIC	LIMITS	METHOD
UNRESTRICTED INFORMATION		
(R) Appearance and Color	Black, brittle resin	G-1
(R) Softening Point, °C	66 - 72	115
(R) Acid No., mg KOH/g	1.4 Max.	116

0020569

(R) Routine Analysis. All others Analyzed by request Only

TOWOLDMON0048154

Monsanto
ORGANIC CHEMICALS DIVISION

FINISHED PRODUCT SPECIFICATION

PRODUCT		DEPT.
Aroclor 4465		27-S
PLANT	**PRODUCT CODE**	**USE**
Anniston	826.19	Sales
DATE EFFECTIVE	**SALES CODE**	
3-11-66	1040-430-04-11-16-009	

APPROVALS

PRODUCTION	RESEARCH
R. G. Moody /s/ 2-29-66	L. R. Stark /s/ 3-8-66
SALES	**QUALITY CONTROL** *(Chief Chemist)*
W. E. Ault /s/ 3-2-66	O. E. Dolin /s/ 12-29-65

GENERAL DESCRIPTION

Mixture

CHEMICAL FORMULA

MOL WT.

SUPERSEDES SPECS. OF	SAMPLE FOR ANALYSIS	ISSUED BY
4-25-61	1 x 16 oz. Can or W.M. Bottle	J. A. Liddle 11-30-65

CHARACTERISTIC	LIMITS	METHOD
UNRESTRICTED INFORMATION		
(R) Appearance and Color	Clear, light yellow resin	G-1
(R) Color, NPA, Molten	2 Max.	G-4
(R) Softening Point, °C	60 - 66	115
Acid No., mg KOH/g	0.05 Max.	116

0020570

(R) Routine Analysis, All others Analyzed by request Only

TOWOLDMON0048155

Monsanto
ORGANIC CHEMICALS DIVISION

FINISHED PRODUCT SPECIFICATION

PRODUCT		DEPT.
Aroclor 5060		27-S
PLANT	PRODUCT CODE	USE
Anniston	826.20	Sales
DATE EFFECTIVE	SALES CODE	
3-11-66	1040-450-04-009	

APPROVALS

PRODUCTION	RESEARCH
R. G. Moody /s/ 12-30-65	L. R. Stark /s/ 3-8-66
SALES	QUALITY CONTROL (Chief Chemist)
W. E. Ault /s/ 3-2-66	O. E. Dolin /s/ 12-29-65

GENERAL DESCRIPTION: Mixture

CHEMICAL FORMULA:

MOL WT.:

SUPERSEDES SPECS. OF	SAMPLE FOR ANALYSIS	ISSUED BY
4-25-61	1 x 16 oz. Can or W.M. Bottle	J. A. Liddle 11-30-65

CHARACTERISTIC	LIMITS	METHOD
UNRESTRICTED INFORMATION		
(R) Appearance and Color	Black, brittle resin	G-1
(R) Softening Point, °C	105 - 115	115
(R) Acid No. mg KOH/g	0.5 Max.	116

0020571

(R) Routine Analysis. All others Analyzed by request Only

TOWOLDMON0048156

Monsanto
ORGANIC CHEMICALS DIVISION

FINISHED PRODUCT SPECIFICATION

PRODUCT		DEPT.
Aroclor 5460 (High Soluble Grade)		27-S
PLANT	PRODUCT CODE	USE
Anniston	826.22	Sales
DATE EFFECTIVE	SALES CODE	
3-11-66	1040-480-04-009	

APPROVALS

PRODUCTION	RESEARCH
R. G. Moody /s/ 12-30-65	L. R. Stark /s/ 3-8-66
SALES	QUALITY CONTROL (Chief Chemist)
W. E. Ault /s/ 3-2-66	O. E. Dolin /s/ 12-29-65

GENERAL DESCRIPTION: Mixture

CHEMICAL FORMULA:

MOL WT.:

SUPERSEDES SPECS. OF	SAMPLE FOR ANALYSIS	ISSUED BY
4-21-61	1 x 16 oz. Can or W.M. Bottle	J. A. Liddle 11-30-65

CHARACTERISTIC	LIMITS	METHOD
UNRESTRICTED INFORMATION		
(R) Appearance and Color	Clear, yellow to amber brittle resin or flakes	G-1
(R) Color, NPA, Molten	2 Max.	G-4
(R) Softening Point, °C	98 - 105	115
(R) Solubility (25 g in 25 g. Acetone @ 25°C.)	3 hour, Min.	117
Acid No., Mg KOH/gm.	0.05 Max.	116
Chlorine, %	58.5 - 60.6	093
RESTRICTED INFORMATION		
Hydrolysis Stability, ppm Cl	300 Max.	092

0020572

(R) Routine Analysis. All others Analyzed by request Only

TOWOLDMON0048157

Monsanto
ORGANIC CHEMICALS DIVISION

FINISHED PRODUCT SPECIFICATION

PRODUCT			DEPT.
Aroclor 5442			27-S
PLANT	PRODUCT CODE	USE	
Anniston	826.21	Sales	
DATE EFFECTIVE	SALES CODE		
3-15-66	1040-470-04-009		

APPROVALS

PRODUCTION	RESEARCH
R. S. Moody /s/ 12-29-65	L. R. Stark /s/ 3-11-66
SALES	QUALITY CONTROL (Chief Chemist)
W. E. Ault /s/ 3-2-66	O. E. Dolin /s/ 12-29-65

GENERAL DESCRIPTION: Mixture

CHEMICAL FORMULA:

MOL WT.

SUPERSEDES SPECS. OF	SAMPLE FOR ANALYSIS	ISSUED BY
4-25-61	1 x 16 oz. Can or W.M. Bottle	J. A. Liddle 11-30-65

CHARACTERISTIC	LIMITS	METHOD
UNRESTRICTED INFORMATION		
(R) Appearance and Color	Clear, yellow sticky resin	G-1
(R) Color, NPA, Molten	2 Max.	G-4
(R) Softening Point, °C	46 - 52	115
Acid No., mg. KOH/g	0.05 Max.	116

0020573

TOWOLDMON0048158

CENTRAL ENGINEERING DEPARTMENT — EQUIPMENT INFORMATION SUMMARY

PREPARED BY	CEA NO	AREA	SHEET
RS YATES	2080	1	15 OF 15
APPROVED BY	**INITIAL ISSUE**	**REV NO**	**REV ISSUED**
	1-22-69	1	1-27-69

PROJECT NAME: EXPAND SOUD ARROLOS

CED EQUIPMENT IDENTIFICATION NUMBER	DESCRIPTION OF EQUIPMENT ITEM	QTY.	SIZE, RATING, MODEL, ETC	MATERIAL OF CONSTRUCTION	**OPERATING WEIGHT (POUNDS)	REMARKS	SOURCE*	ESTIMATED PRICE ($)
1-152	FLAKER FEED TANK	1	3000 GAL 90"DIA x 105" HIGH	CARBON STEEL	38600	WITH 50 PSIG JACKET FOR THERMINOL EMPTY WEIGHT 5100 LBS	N	
1-153	PULVERIZER	1	#20H MIKRO PULVERIZER 2000 #/HR	CARBON STEEL		EMPTY WEIGHT 1200 LBS	N	
1-153.001	MOTOR, PULVERIZER	1	10HP/1800RPM			TEFC	N	
1-153.002	AIR CONVEYING HOPPER	1	27" x 12¼" x 16½" HIGH	CARBON STEEL		FOR A NO 20H UNIT	N	
1-153.003	AIR CONVEYING DUCT	1	6" DIA	CARBON STEEL		FOR A NO 20H UNIT	N	
1-154	DUST COLLECTOR	1	#255-6-30 MIKRO PULSAIRE COLLECTOR	WITH WOOL FELT (IHCE) FILTER MEDIA		EMPTY WEIGHT 700 LBS	N	
1-154.001	CONTROLS, DUST COLLECTOR	1				TOTALLY ENCL	N	
1-155	AIRLOCK	1	8" MIKRO	CAST IRON		SPEED 45/16 RPM	N	
1-155.001	MOTOR, AIRLOCK	1	¼ HP/1800 RPM			TEFC	N	
1-156	BLOWER	1	#5E BUFFALO	CAST IRON		W/BLAST GATE	N	
1-156.001	MOTOR, BLOWER	1	5HP/3450 RPM			TEFC	N	
1-157	CONVEYOR	1	24" WIDE x 50FT LONG			FOR FIBRE 1268 CONTAINERS	N	
0020574								

CE-224

* SOURCE: - N = NEW E = EXISTING R = TO BE RELOCATED

** ESTIMATED WEIGHT FILLED WITH NORMAL CONTENTS OR TEST MATERIAL, WHICHEVER IS HEAVIER

APPENDIX A

TOWOLDMON0048159

CENTRAL ENGINEERING DEPARTMENT EQUIPMENT INFORMATION SUMMARY

PREPARED BY	CEA NO	AREA	PAGE
R.S. YATES	8590	1	2 OF 15

PROJECT NAME	APPROVED BY	INITIAL ISSUE	REV NO	REV ISSUED
EXPAN. SOLID [illegible]		9-27-69	1	1-6-69

CED EQUIPMENT IDENTIFICATION NUMBER	DESCRIPTION OF EQUIPMENT ITEM	QTY	SIZE, RATING, MODEL, ETC	MATERIAL OF CONSTRUCTION	** OPERATING WEIGHT (POUNDS)	REMARKS	* SOURCE	ESTIMATED PRICE ($)
1-103	TERPH FEED PUMP HORIZ. CENTRIFUGAL	1	125 GPM/75'TDH ANS 3x2-10	DUCTILE IRON		INCL MECH SEAL & DRIP PAN & JCTD COVER PLATE	N	
1-103-001	MOTOR, TERPH FEED PUMP	1	5HP/1800 RPM			TEFC	N	
1-104	CHLORINATOR No 10	1	3064 GAL 54"OD x 25' HIGH	CARBON STEEL	46000	W/SUPPORT LUGS W/20"x36" MH AND MONEL SPARGER PIPE (30FT) W/30" DIA x 84"/HIGH TANK ON TOP OF UNIT FOR BRINKS ELEMENT EMPTY WEIGHT 5000 LBS	N	
1-105	CHLORINATOR [illegible] HORIZ. CENTRIFUGAL	1	250 GPM/75'TDH API	316 STAINLESS STEEL		INCL MECH SEAL [illegible] JCTD COVER PLATE	N	
[illegible]-001	MOTOR, CHLORINATOR PUMP	1	15HP/1800 RPM			TEFC	N	

0020575

CE-224

* SOURCE: N = NEW E = EXISTING R = TO BE RELOCATED

** ESTIMATED WEIGHT FILLED WITH NORMAL CONTENTS OR TEST MATERIAL, WHICHEVER IS HEAVIER

APPENDIX A

TOWOLDMON0048160

CENTRAL ENGINEERING DEPARTMENT EQUIPMENT INFORMATION SUMMARY

PREPARED BY	CEA NO	AREA	PAGE
[illegible]	20[illegible]	1	3 of 15

PROJECT NAME	APPROVED BY	INITIAL ISSUE	REV NO	REV ISSUED
EXPAND SOLID ARCOLAN		[illegible]-69	1	1-6-69

CED EQUIPMENT IDENTIFICATION NUMBER	DESCRIPTION OF EQUIPMENT ITEM	QTY	SIZE, RATING, MODEL, ETC	MATERIAL OF CONSTRUCTION	** OPERATING WEIGHT (POUNDS)	REMARKS	* SOURCE	ESTIMATED PRICE ($)
1-1[illegible]	CHLORINATOR COOLER	1	1,400,000 BTU/HR SHELL & TUBE 280 SQ.FT 16" DIA x 11 FT	CARBON STEEL SHELL & BONNETS 316SS HEADS AND TUBES	3620	184 TUBES x 3/4" OD x 14 BWG x 8FT LONG W/2 PASSES W/ F&F EXP JOINT EMPTY WEIGHT 2415 LBS	N	
1-107	MIST ELIMINATOR	1	465 ACFM AT 250°C	316 STAINLESS STEEL SUPPORT WIRE	IN CHLOR WEIGHT	UNITS FIT INTO 2½' x 7' HIGH TANK ON TOP OF CHLORINATOR	N	
1-108	OFF GAS CONDENSER	1	100,000 BTU/HR SHELL & TUBE 250 SQ.FT 24" DIA x 11 FT	CARBON STEEL	5650	80 TUBES x 1½" OD x 14 BWG x 8FT LONG W/4 PASSES W/ F&F EXP JOINT EMPTY WEIGHT 2485 LBS	N	

0020576

CE-224

* SOURCE: N = NEW E = EXISTING R = TO BE RELOCATED

** ESTIMATED WEIGHT FILLED WITH NORMAL CONTENTS OR TEST MATERIAL WHICHEVER IS HEAVIER

APPENDIX A

TOWOLDMON0048161

CENTRAL ENGINEERING DEPARTMENT EQUIPMENT INFORMATION SUMMARY

PREPARED BY	CEA NO	AREA	PAGE
R S YATES	2080	1	4 of 15

PROJECT NAME	APPROVED BY	INITIAL ISSUE	REV NO	REV ISSUED
BRAND SOLID AROCLORS		9-27-69	1	1-6-69

CED EQUIPMENT IDENTIFICATION NUMBER	DESCRIPTION OF EQUIPMENT ITEM	QTY	SIZE, RATING, MODEL, ETC	MATERIAL OF CONSTRUCTION	** OPERATING WEIGHT (POUNDS)	REMARKS	* SOURCE	ESTIMATED PRICE ($)
1-101	OFF GAS SURGE TANK	1	2000 GAL 78" OD x 93" HIGH	CARBON STEEL	31700	W/SUPPORT LUGS W/2-36" HIGH x 120" LONG PLATE COILS EMPTY WEIGHT 4100 LBS INCL INSUL RINGS	N	
1-110	TAILINGS PUMP HORIZ. CENTRIFUGAL	1	100 GPM/50' HD AVS 3x1½-10	DUCTILE IRON		INCL. MECH. SEAL & DRIP PAN & JCTD COVER PLATE	N	
1-110-001	MOTOR, TAILINGS PUMP	1	5HP/1800 RPM			TEFC	N	
1-111	THERMINOL SURGE TANK	1	300 GAL 42" OD x 51" HIGH	CARBON STEEL	5275	W/1 TURN OF 1½" COIL (14 FT) INCL INSUL RINGS EMPTY WEIGHT 725 LBS IN SUPPORT LEGS	N	

0020577

CE-224

* SOURCE: N = NEW E = EXISTING R = TO BE RELOCATED

** ESTIMATED WEIGHT FILLED WITH NORMAL CONTENTS OR TEST MATERIAL, WHICHEVER IS HEAVIER

APPENDIX A

TOWOLDMON0048162

CENTRAL ENGINEERING DEPARTMENT EQUIPMENT INFORMATION SUMMARY

PREPARED BY	CEA NO	AREA	PAGE
R S Yates	20[illegible]	1	5 OF 15

PROJECT NAME	APPROVED BY	INITIAL ISSUE	REV NO	REV ISSUED
Exam. Solid Aroclors		9-27-68	1	1-6-69

CED EQUIPMENT IDENTIFICATION NUMBER	DESCRIPTION OF EQUIPMENT ITEM	QTY.	SIZE, RATING, MODEL, ETC	MATERIAL OF CONSTRUCTION	** OPERATING WEIGHT (POUNDS)	REMARKS	* SOURCE	ESTIMATED PRICE ($)
1-112	Therminol Pump Horiz. Centrifugal	1	150 GPM/75' HD AVS 3x2-10	Ductile Iron		Incl Mech Seal & Drip Pan	N	
1-112-001	Motor, Therminol Pump	1	10 HP/1800 RPM			TEFC	N	
1-113	Therminol Cooler	1	125000 BTU/HR Air Cooled 100 SQ FT	Carbon Steel	2000	W/Multiblade Louvres & Annin Operator Empty Weight 1500 LBS	N	
1-113-001	Motor, Therminol Cooler Fan	1	2 HP/1160 RPM			TEFC W/2 Speeds	N	
1-114	Therminol Surge Tank	1	300 GAL 42"OD x 51" HIGH	Carbon Steel	4725	W/One Turn of 1½" Dia Coil (14 FT) Incl Insul Rings Empty Weight 925 LBS W/Support Legs	N	
1-115	Therminol Pump Horiz. Centrifugal	1	300 GPM/100 HD AVS 3x2-13	Ductile Iron		Incl Mech Seal & Drip Pan	N	
1-115-001	Motor, Therminol Pump	1	20 HP/1800 RPM			TEFC	N	

0020578

CE-224

* SOURCE: N = NEW E = EXISTING R = TO BE RELOCATED

** ESTIMATED WEIGHT FILLED WITH NORMAL CONTENTS OR TEST MATERIAL WHICHEVER IS HEAVIER

Appendix A

TOWOLDMON0048163

CENTRAL ENGINEERING DEPARTMENT EQUIPMENT INFORMATION SUMMARY

PREPARED BY	CEA NO	AREA	PAGE
[illegible]	[illegible]	1	6 OF 15

PROJECT NAME	APPROVED BY	INITIAL ISSUE	REV NO	REV ISSUED
[illegible]		9-27-69	1	1-6-69

CED EQUIPMENT IDENTIFICATION NUMBER	DESCRIPTION OF EQUIPMENT ITEM	QTY	SIZE, RATING, MODEL, ETC	MATERIAL OF CONSTRUCTION	** OPERATING WEIGHT (POUNDS)	REMARKS	* SOURCE	ESTIMATED PRICE ($)
1-116	THERMINOL COOLER	1	1,400,000 BTU/HR SHELL & TUBE 937 SQ FT 20" DIA x 20 FT	CARBON STEEL	9525	304 TUBES x 3/4" OD x 14 BWG x 8 FT LONG W/2 PASSES EMPTY WEIGHT 5895 LBS	N	
1-117	CHLORINATOR No 11	1	3064 GAL 54" OD x 25' HIGH	CARBON STEEL	46000	SAME AS ITEM 1-104 EMPTY WEIGHT 5000 LBS	N	
1-118	CHLORINATOR PUMP HORIZ. CENTRIFUGAL	1	250 GPM/75' TDH API	316 STAINLESS STEEL		INCL MECH SEAL & DRIP PAN JCTD COVER PLATE	N	
1-118-001	MOTOR, CHLORINATOR PUMP	1	15 HP/1800 RPM			TEFC	N	
1-119	CHLORINATOR COOLER	1	1,400,000 BTU/HR SHELL & TUBE 280 SQ FT 12" DIA x 11 FT	CARBON STEEL SHELL & BONNETS 316 SS HEADS AND TUBES	3600	184 TUBES x 3/4" OD x 14 BWG x 8 FT LONG W/2 PASSES W/FX EXCHANGE EMPTY WEIGHT 2410 LBS	N	

0020579

CE-224

* SOURCE: N = NEW E = EXISTING R = TO BE RELOCATED

** ESTIMATED WEIGHT FILLED WITH NORMAL CONTENTS OR TEST MATERIAL, WHICHEVER IS HEAVIER

[illegible]

TOWOLDMON0048164

CENTRAL ENGINEERING DEPARTMENT EQUIPMENT INFORMATION SUMMARY

PREPARED BY	CEA NO	AREA	PAGE
[illegible]	[illegible]	1	7 OF 15

PROJECT NAME	APPROVED BY	INITIAL ISSUE	REV NO	REV ISSUED
EXPAND SOLID [illegible]		1-27-69	1	1-6-69

CED EQUIPMENT IDENTIFICATION NUMBER	DESCRIPTION OF EQUIPMENT ITEM	QTY	SIZE, RATING, MODEL, ETC	MATERIAL OF CONSTRUCTION	OPERATING WEIGHT (POUNDS) **	REMARKS	SOURCE *	ESTIMATED PRICE ($)
1-12[illegible]	MIST ELIMINATOR	1	465 ACFM AT 250 °C	316 STAINLESS STEEL SUPPORT WIRE	IN CHEM. WEIGHT	UNITS FIT INTO 22" DIA x 7' HIGH TANK ON TOP OF CHEM. FEED	N	
1-121	THERMINOL SURGE TANK	1	300 GAL 42" OD x 51" HIGH	CARBON STEEL	4725	ONE TURN 1½" DIA COIL IN TANK INCL. INSUL RING EMPTY WEIGHT 925 LBS W/SUPPORT LEGS	N	
1-122	THERMINOL PUMP HORIZ. CENTRIFUGAL	1	300 GPM @ [illegible] FT HD ANC 3x2-13	DUCTILE IRON		INCL MECH SEAL & DRIP PAN	N	
1-122-01	MOTOR: THERMINOL PUMP	1	20 HP / [illegible] RPM			TEFC	N	
1-123	THERMINOL COOLER	1	1,400,000 BTU/HR SHELL SIDE 937 SQ FT 20" DIA x 20 FT	CARBON STEEL	9525	304 TUBES x ¾" OD x 14 BWG x 8 FT LONG IN 12 PASSES EMPTY WEIGHT 5895 LBS	N	

0020580

CE-224

* SOURCE: N = NEW E = EXISTING R = TO BE RELOCATED

** ESTIMATED WEIGHT FILLED WITH NORMAL CONTENTS OR TEST MATERIAL, WHICHEVER IS HEAVIER

APPENDIX A

TOWOLDMON0048165

CENTRAL ENGINEERING DEPARTMENT EQUIPMENT INFORMATION SUMMARY

PREPARED BY	CEA NO	AREA	PAGE
R.C. YATES	2080	1	3 OF 15

PROJECT NAME	APPROVED BY	INITIAL ISSUE	REV NO	REV. ISSUE
EXPAND SOLID ANODIZE S		7-27-66	1	1-10-67

CEO EQUIPMENT IDENTIFICATION NUMBER	DESCRIPTION OF EQUIPMENT ITEM	QTY	SIZE, RATING, MODEL, ETC	MATERIAL OF CONSTRUCTION	OPERATING WEIGHT (POUNDS) **	REMARKS	SOURCE *	ESTIMATED PRICE ($)
1-124	AIR BLOWER	1	200 ACFM DISCH P= 10 PSIG SUCT P= ATM SUTORILIT MODEL TH	CARBON STEEL		W/BELT DRIVE	N	
1-124-001	MOTOR, AIR BLOWER	1	15HP/1800RPM			TEFC	N	
1-125	BLOWING TANK	1	6500 GAL 120"OD x 120" HIGH	CARBON STEEL	82500	W/SUPPORT LUGS - INCL INSUL RINGS W 2-48" HIGH x 180" LONG PLATE RINGS MIN WEIGHT 6000 LBS W/SPARGER 2-2"OD x 10 FT LONG PIPES WITH ¼" DIA HOLES	N	
1-126	BLOW TANK PUMP HORIZ. CENTRIFUGAL	1	125 GPM/33' HD AT 3x2-10	DUCTILE IRON		INCL MECH SEAL, DRIP PAN, & JOID COVER PLATE	N	
1-126-001	MOTOR, BLOW TANK PUMP	1	5HP/1800 RPM			TEFC	N	

0020581

CE-224

* SOURCE: N=NEW E=EXISTING R=TO BE RELOCATED

** ESTIMATED WEIGHT FILLED WITH NORMAL CONTENTS OR TEST MATERIAL WHICHEVER IS HEAVIER

ATTACHMENT A

TOWOLDMON0048166

CENTRAL ENGINEERING DEPARTMENT EQUIPMENT INFORMATION SUMMARY

PREPARED BY	CEA NO	AREA	PAGE
R. S. YATES	208[illegible]	1	9 OF 15

PROJECT NAME	APPROVED BY	INITIAL ISSUE	REV NO	REV ISSUED
EXPAND SOLID ANOCLORS		9-27-68	1	1-10-69

CED EQUIPMENT IDENTIFICATION NUMBER	DESCRIPTION OF EQUIPMENT ITEM	QTY	SIZE, RATING, MODEL, ETC	MATERIAL OF CONSTRUCTION	** OPERATING WEIGHT (POUNDS)	REMARKS	* SOURCE	ESTIMATED PRICE ($)
1-127	OFF GAS SCRUBBER	1	230 ACFM AT 0" WATER DRAFT S+K # 4014 SCRUBBER - SEA SIZE - 6'	HAVEG 61 POLYESTER			N	
1-128	STILL No 5 HEATER	1	1,300,000 BTU/HR OUTLET TEMP 370°C 8' DIA x 35' HIGH	CARBON STEEL	16000	EFF = 50% AREA = 550 FT² FIRED WITH NATURAL GAS	N	
1-128-001	STILL No 5 HEATER CONTROL	1				APPROVED S+PP SYSTEM	N	
1-129	STILL POT No. 5	1	7800 GAL 132" OD x 96" HIGH	CARBON STEEL	104000	W/SUPPORT LUGS INCL INSUL RINGS INCL SUMP IN BOTTOM DISH FOR PUMP EMPTY WEIGHT 12000 LBS	N	

0020582

CE-224

* SOURCE: N = NEW E = EXISTING R = TO BE RELOCATED

** ESTIMATED WEIGHT FILLED WITH NORMAL CONTENTS OR TEST MATERIAL WHICHEVER IS HEAVIER

APPENDIX A

TOWOLDMON0048167

CENTRAL ENGINEERING DEPARTMENT EQUIPMENT INFORMATION SUMMARY

PREPARED BY	CE & NO	AREA	PAGE
R.S. YATES	2040	1	10 OF 15

PROJECT NAME	APPROVED BY	INITIAL ISSUE	REV NO	REV ISSUED
EXPAND SOLID ABSORBERS		7-27-68	1	1-10-69

CED EQUIPMENT IDENTIFICATION NUMBER	DESCRIPTION OF EQUIPMENT ITEM	QTY	SIZE, RATING, MODEL, ETC	MATERIAL OF CONSTRUCTION	OPERATING WEIGHT (POUNDS)**	REMARKS	# SOURCE	ESTIMATED PRICE ($)
1-130	CYCLONE SEPARATOR	1	DIA - 30 INCH CONE - 4'6" CYLINDER - 4'6"	CARBON STEEL	4000	W/SUPPORT LUGS INCL INSUL RINGS EMPTY WEIGHT 900 LBS	N	
1-131	STILL NO 5 CONDENSER	1	600000 BTU SHELL & TUBE 460 SQ FT 20" DIA x 10 FT	CARBON STEEL SHELL & BONNETS & TUBES	4200	304 TUBES x 3/4 OD x 14 BWG x 8 FT LONG, SINGLE PASS ON TUBE SIDE W/SUPPORT LUGS EMPTY WEIGHT 3100 LBS	N	
1-132	STILL NO 5 RECEIVER	1	3500 GAL 90" OD x 120" HIGH	CARBON STEEL	54000	W/SUPPORT LUGS INCL INSUL RINGS EMPTY WEIGHT 6500 LBS W/3 TURNS 2" IPS COIL (TEFT)	N	
1-133	RCVR TRANSFER PUMP HORIZ. CENTRIFUGAL	1	1265 GPM / 50' HD AVS 3.2-10	DUCTILE IRON		INCL MECH SEAL DRIVE FAN AND JACKETED CASING	N	
1-133-001	MOTOR, RCVR TRANSFER PUMP	1	5 HP / 1800 RPM			TEFC	N	

0020583

CE-224

SOURCE: N=NEW E=EXISTING R=TO BE RELOCATED

** ESTIMATED WEIGHT FILLED WITH NORMAL CONTENTS OR TEST MATERIAL, WHICHEVER IS HEAVIER

APPENDIX A

TOWOLDMON0048168

CENTRAL ENGINEERING DEPARTMENT — EQUIPMENT INFORMATION SUMMARY

PREPARED BY	CEA NO	AREA	PAGE
R S [illegible]	23[illegible]	1	11 of 15

PROJECT NAME	APPROVED BY	INITIAL ISSUE	REV NO	REV ISSUED
EXPAND SOUD ADSORBERS		9-27-68	1	1-10-69

CED EQUIPMENT IDENTIFICATION NUMBER	DESCRIPTION OF EQUIPMENT ITEM	QTY	SIZE, RATING, MODEL, ETC	MATERIAL OF CONSTRUCTION	** OPERATING WEIGHT (POUNDS)	REMARKS	* SOURCE	ESTIMATED PRICE ($)
1-134	STILL NO 5 CIRCULATING PUMP VERTICAL CENTRIFIGAL	1	200 GPM 100' HD TABER HEAVY DUTY	CARBON STEEL			N	
1-134-001	MOTOR, STILL NO 5 CIRCULATING PUMP	1	25HP/1800 RPM			TEFC	N	
1-135	CATCH TANK	1	300 GAL 42"OD x 51" HIGH	CARBON STEEL	5275	W/2-20" HIGH x 65" LONG PLATECOILS EMPTY WEIGHT 925 LBS W/SUPPORT LEGS	N	
1-136	STILL NO 5 EJECTOR	1	3STAGE WITH INTER CONDENSER AFTER FIRST STAGE	GRAPHITE NOZZLES, PORCELAIN INTER CONDENSER		WORTHINGTON # 2½ JPD 1ST STGE SPEC 2ND STGE NO 5 3RD STGE NO 6 W/10" INTER-CONDENSER	N	
1-136-001	AFTER CONDENSER	1	10" DIAMETER	CARBON STEEL		TO CONDENSE 350 LB/HR OF STEAM	N	

0020584

CE-224

* SOURCE: N=NEW E=EXISTING R=TO BE RELOCATED

** ESTIMATED WEIGHT FILLED WITH NORMAL CONTENTS OR TEST MATERIAL WHICHEVER IS HEAVIER

Appendix A

TOWOLDMON0048169

CENTRAL ENGINEERING DEPARTMENT EQUIPMENT INFORMATION SUMMARY

PREPARED BY	CEA NO	AREA	PAGE
RS YATES	2080	1	12 of 15

PROJECT NAME	APPROVED BY	INITIAL ISSUE	REV NO	REV ISSUED
EXPAND SOLID ARCLORS		9-27-69	1	1-10-69

CED EQUIPMENT IDENTIFICATION NUMBER	DESCRIPTION OF EQUIPMENT ITEM	QTY	SIZE, RATING, MODEL, ETC	MATERIAL OF CONSTRUCTION	** OPERATING WEIGHT (POUNDS)	REMARKS	* SOURCE	ESTIMATED PRICE ($)
1-137 (EXIST ITEM 810)	FINISHED PRODUCT SURGE TANK	1	5000 GAL 102"OD x 135" HIGH	CARBON STEEL		WITH LEG SUPPORTS	E	
1-138 (EXIST ITEM 837)	TRANSFER PUMP HORIZ. CENTRIFUGAL	1	120 GPM/100' HD AVS 3x2-13	DUCTILE IRON				
1-139	THERMINOL SURGE TANK	1	300 GAL 42"OD x 51" HIGH	CARBON STEEL	5275	W FINNED COIL FOR HEATING INCL INSUL RINGS W/ SUPPORT LEGS EMPTY WEIGHT 925 LBS	N	
1-140	THERMINOL PUMP HORIZ. CENTRIFUGAL	1	100 GPM/75' HD AVS 3x2-10	DUCTILE IRON		INCL MECH SEAL & DRIP PAN	N	
1-140-001	MOTOR, THERMINOL PUMP	1	7½ HP/1800 RPM			TEFC	N	
1-141	THERMINOL COOLER	1	600 000 BTU/HR SHELL & TUBE 280 SQ FT 16" DIA x 11 FT	CARBON STEEL	3800	184 TUBES x 3/4" OD x 14 BWG x 8 FT LONG W/2 PASSES EMPTY WEIGHT 2500 LBS	N	

0020585

CE-224

* SOURCE: N = NEW E = EXISTING R = TO BE RELOCATED

** ESTIMATED WEIGHT FILLED WITH NORMAL CONTENTS OR TEST MATERIAL WHICHEVER IS HEAVIER

APPENDIX A

TOWOLDMON0048170

CENTRAL ENGINEERING DEPARTMENT EQUIPMENT INFORMATION SUMMARY

PREPARED BY	CEA NO	AREA	PAGE
R. S[illegible]	209[illegible]	1	13 OF 15

PROJECT NAME	APPROVED BY	INITIAL ISSUE	REV NO	REV ISSUED
EXPAND SOLID AROCLORS		9-27-69	1	1-10-61

CED EQUIPMENT IDENTIFICATION NUMBER	DESCRIPTION OF EQUIPMENT ITEM	QTY.	SIZE, RATING, MODEL, ETC	MATERIAL OF CONSTRUCTION	** OPERATING WEIGHT (POUNDS)	REMARKS	* SOURCE	ESTIMATED PRICE ($)
1-142	EJECTOR SUMP TANK	1	200 GAL 36" OD x 45" HIGH	CARBON STEEL	1880	W/LEGS MTY WEIGHT 600 LBS	N	
1-143	ELEVATOR	1	CAPACITY - 5000 LBS PLATFORM - 9'0" x 6'0" OVERALL HEIGHT 35'0" HYDRAULIC TYPE				N	
1-143-001	MOTOR, ELEVATOR	1	30HP/1800RPM			TEFC	N	
1-144	PRIMARY SCRUBBER	1	8000 #/hr HCl	POLYESTER & FIBERGLASS			N	
1-145	PRIMARY SCRUBBER SEPARATOR BOX	1	60" x 48" x 24"	POLYESTER & FIBERGLASS			N	
1-146	SECONDARY SCRUBBER	1	400 #/hr HCl	POLYESTER & FIBERGLASS			N	
1-147	SECONDARY SCRUBBER SEPARATOR BOX	1	30" x 24" x 24"	POLYESTER & FIBERGLASS			N	

0020586

CE-224

* SOURCE: N = NEW E = EXISTING R = TO BE RELOCATED

** ESTIMATED WEIGHT FILLED WITH NORMAL CONTENTS OR TEST MATERIAL, WHICHEVER IS HEAVIER

APPENDIX A

CENTRAL ENGINEERING DEPARTMENT EQUIPMENT INFORMATION SUMMARY

PREPARED BY	CEA NO	AREA	PAGE
R. Yates	2080	1	14 OF 15

PROJECT NAME	APPROVED BY	INITIAL ISSUE	REV NO	REV ISSUED
Expand Solid Aroclors		1-10-67		

CED EQUIPMENT IDENTIFICATION NUMBER	DESCRIPTION OF EQUIPMENT ITEM	QTY	SIZE, RATING, MODEL, ETC	MATERIAL OF CONSTRUCTION	** OPERATING WEIGHT (POUNDS)	REMARKS	* SOURCE	ESTIMATED PRICE ($)
1-148	Motor Control Center	1					N	
1-149	Therminol Surge Tank	1	1900 GAL 60" OD x 144" LONG	Carbon Steel	26000	W/Support Channels W/Insul. Support W/Pump Mount Flange	N	
1-150	Therminol Pump Vertical Centrifugal	1	400 GPM 100' TDH Taber Heavy Duty	Carbon Steel			N	
1-150-001	Motor, Therminol Pump	1	50 HP/1800 RPM			TEFC	N	
1-151	1268 Flaker	1	24" OD x 48" Long Ni Resist - Surf.	304 Stainless Hood			N	
1-151-001	Motor, Flaker	1	5HP/1800 RPM			TEFC	N	

0020587

CE 224

* SOURCE: N = NEW E = EXISTING R = TO BE RELOCATED

** ESTIMATED WEIGHT FILLED WITH NORMAL CONTENTS OR TEST MATERIAL, WHICHEVER IS HEAVIER

Appendix A

TOWOLDMON0048172

CENTRAL ENGINEERING DEPARTMENT EQUIPMENT INFORMATION SUMMARY

PREPARED BY	CEA NO	AREA	PAGE
R.S. YATES	2080	1	15 OF 15
APPROVED BY	INITIAL ISSUE	REV NO	REV ISSUED
	1-22-67		

PROJECT NAME: EXPAND SOUR [illegible]

CED EQUIPMENT IDENTIFICATION NUMBER	DESCRIPTION OF EQUIPMENT ITEM	QTY	SIZE, RATING, MODEL, ETC	MATERIAL OF CONSTRUCTION	** OPERATING WEIGHT (POUNDS)	REMARKS	* SOURCE	ESTIMATED PRICE ($)
1-152	FLAKER FEED TANK	1	3000 GAL 90"Ø x 105" HIGH	CARBON STEEL	38600	WITH 50 PSIG JACKET FOR THERMINOL EMPTY WEIGHT 5100 LBS		

0020588

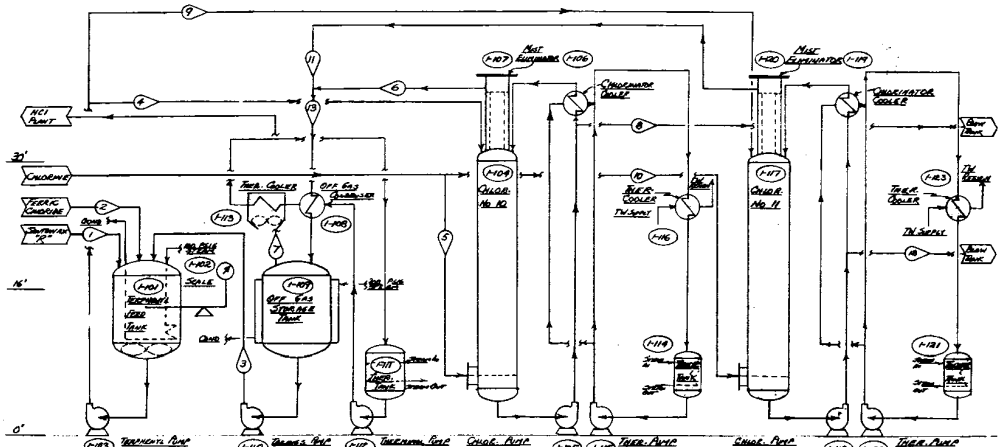
CE-224

* SOURCE: N = NEW E = EXISTING R = TO BE RELOCATED

** ESTIMATED WEIGHT FILLED WITH NORMAL CONTENTS OR TEST MATERIAL, WHICHEVER IS HEAVIER

[illegible] A

TOWOLDMON0048173



STREAM DESCRIPTION	FORMULA	MOL WT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Benzotrichl.	$C_6H_5CCl_3$	230.9	11800			11200					11800															
Ferric Chlor.	$FeCl_3$	162.2		15		15				15	15			15				30					30			
Chlorine	Cl_2	70.9					32400	25	50			32400	25		50											
Air		29.0					3500	3500	7000			3500	3500		7000	500	300									
Hydrogen	H_2	2.0					100	100	200			100	100		200											
Chlor 5060										25700				25700				5780								
Hydrogen Chlor.	HCl	36.5						17425	34850	250			17425	250	34850		500									
Lime	$Ca(OH)_2$	74.1																	400				400			
5460	$C_6H_5CCl_3$	574.8																		57150	50	57700		100	57800	57800
Mortar 5																							13700			
Tailings					945	945		945			945		945		1890											
Total $\frac{lbs}{hr}$ / $\frac{lbs}{hr}$			11800	15	945	12160	36600	21995	42000	2145	12660	36600	21995	2665	43990	300	800	51830	400	57950	50	57700	14330	100	57800	57800
Gal / Hr			1330		95	1450				260	1450			260				6480			6.2	3020	1100		3020	3020
Cu Ft / Hr							100800	33600	99420			100800	33600		167400	2910	11550			1550 cu ft				14650	
GPM - Avg					100	125				250	125			250										125		
GPM - Max					100	125				250	125			250										125		
Density $\frac{lbs}{cu\ ft}$			8.9		10	8.9	0.328 lbs/cu ft	0.067 lbs/cu ft	0.067 lbs/cu ft	12.1	8.9	0.328 lbs/cu ft	0.067 lbs/cu ft	12.1	0.284 lbs/cu ft	0.103 lbs/cu ft	0.028 lbs/cu ft	12.8		0.077 lbs/cu ft	11.0	12.5	13	0.077 lbs/cu ft	13.5	13.5
Viscosity - cP			1.0		100	2.6				12	2.6			12								1.20	40		120	120
Temp °C			140		180	140	15	250		250	140	15	250	250	250	15	100	200		370	370	160	370	150	160	160
Pressure - Atm			1		1	1	1.35	1.35	1.35	1	1	1.35	1.35	1	1.35	1.35	1	1		0.33	0.33	0.197	1	0.197	1	1

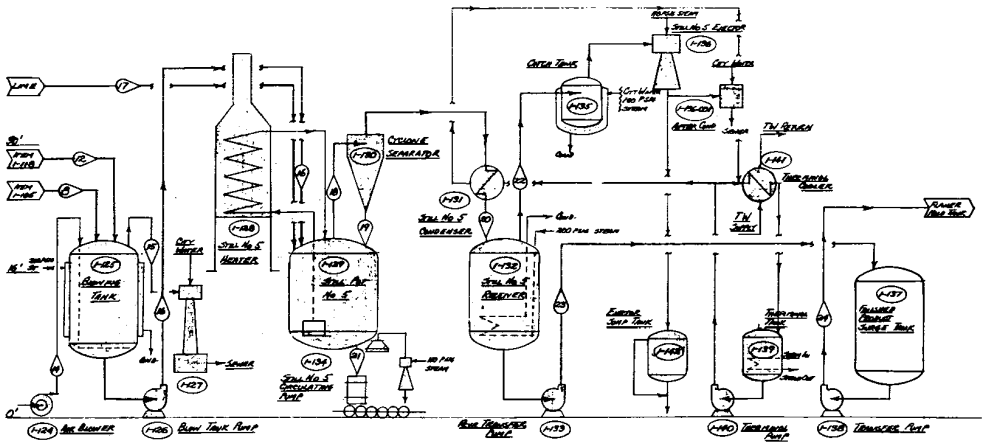
REV	BY	DATE	APPD	DESCRIPTION
A		1-5-61		ISSUED

ORIGINAL ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI
CHEMICAL DIVISION
GENERAL CHEMICAL CORPORATION
BENZOTRICHLORIDE PLANT
MATERIAL FLOW DIAGRAM
APPROVED: [illegible]
DATE: 1-10-61
DWG. NO. 2080
DR. NO. 2080-1-8

00205889

App "B"

TOWOLDMON0048174



Material Capacity = LBS/BATCH × BATCH/HR × OPERATING HRS.

10,000,000 = 37,800 LBS/BATCH × CHG BATCH /12 HOURS × 6,350 HRS

BATCH CHLORINATOR CYCLE	TIME-HRS
CHARGE SHORTNESS (17)	0.50
CHARGE U³⁵ 1,500 Pmh (20)	1.00
3000 "	1.00
3000 "	9.00
EMPTY (16)	0.50
TOTAL	12.00 HRS

BATCH STILL CYCLE	TIME-HRS
CHARGE STILL (18)	0.50
HEAT UP	2.00
DISTILL (19)	8.50
EMPTY (23)	1.00
TOTAL	12.00 HRS

8	1/26/69	FINAL	AST
CH	DATE		BY

MONSANTO COMPANY
CHEMICAL ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

CERAMIC DIVISION	ANNISTON PLANT

PROCESS FLOW DIAGRAM U TETRAFLUORIDE
SOLID REACTOR EVAPORATION INSTALLATION

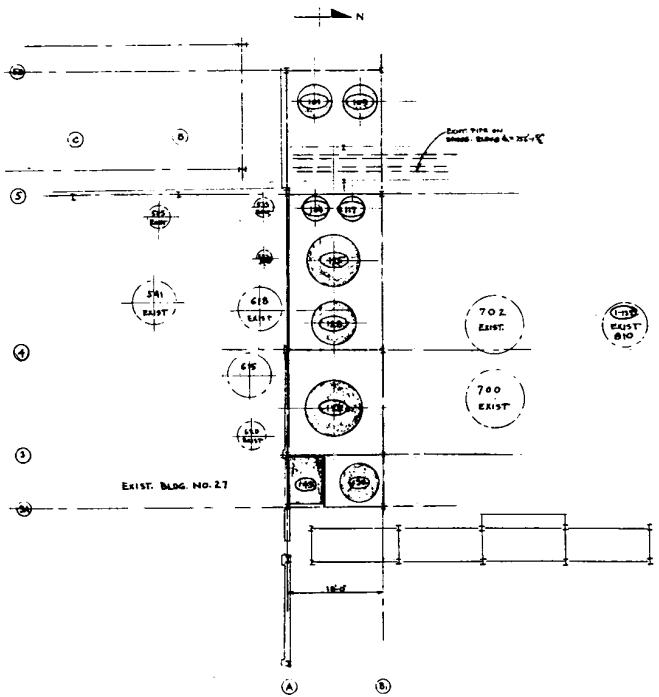
	BY	DATE
DRAWN	R.S. HAMES	1-16-69

DES. NO.	FINISH	CODE	SHEET	FOR REVISIONS		CODE
2080		C		D	2	8

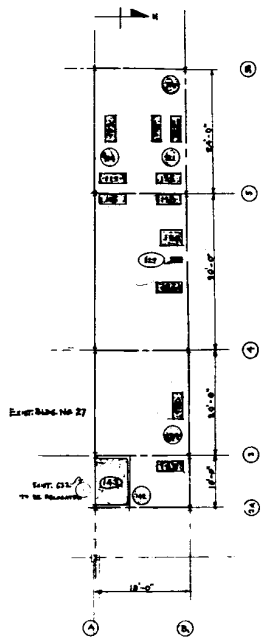
APP "B"

0020590

TOWOLDMON0048175



SECOND LEVEL
SCALE 1" = 10'-0"



GROUND LEVEL (ELEV. = 749.19')
SCALE 1" = 10'-0"

EQUIPMENT ARRANGEMENT STUD
SOLID ABSOLUTE EXPANSION

CEA-2080 SCALE 1" = 10'-0"

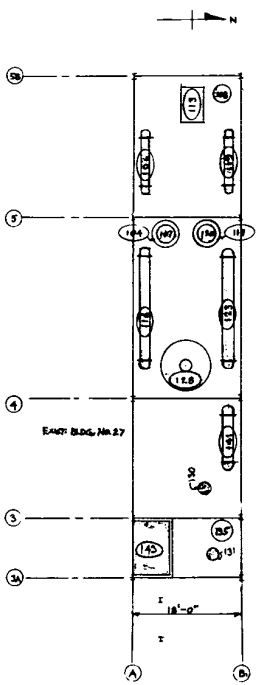
By H.D. Gabelman
1/4/69

sheet 1 of 2

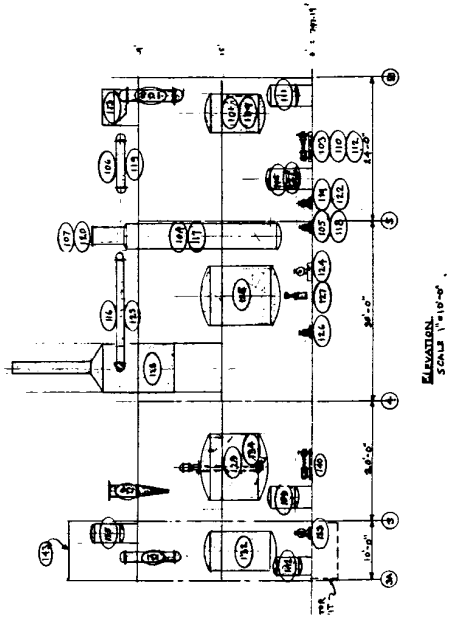
App "C"

0020591

TOWOLDMON0048176



THIRD LEVEL
SCALE 1" = 10'-0"



EQUIPMENT ARRANGEMENT STUDY
SOLID ARGOLUX EXPANSION
CEA -2080 SCALE 1" = 10'-0"
by H.D. Gabelman
1/4/69
sheet 2 of 2

App "C"

0020592

TOWOLDMON0048177

Appendix D

Building and Site Requirement

A. Building Size

Number of Floors	- Three (includes ground and roof level)
Area per floor	- 1500 sq/ft.
Bay Size	- 20' X 18' - 2 required
	- 30' X 18' - 1 required
	- 12' X 18' - 1 required

B. Type of Construction

1.	Structure -	Open steel structure. Roof to be reinforced concrete. North wall to be enclosed with Monsanto Lustra span panels or equal. Second level floor to be grating. Finish on steel to be coating standard No. 502 or equal. One stair at the east end of the structure.
2.	Rooms	Control room ceiling will be acoustical tile. Control room floor will be terrazzo to conform to existing floor. Walls will be painted concrete block.
3.	Personnel Service Facilities	None required.
4.	Elevators	A freight elevator for moving bags of lime and rework to the operating floor is required. Capacity - 5000 lbs. Only one floor is served.
5.	Heating and Ventilating	None required.

C. Electrical

There are no flammable materials handled in the immediate operating area. Classification is water resistant.

Normal grounding requirements.

Lighting requirements - Allow sufficient lighting for operations at the ground, operating and roof level.

TOWOLDMON0048178

Provide two welding receptacles at each operating level, six required.

Provide two small tool outlet receptacles at each operating level, six required.

D. Maintenance Provisions

The coil in the furnace, Item 1-128, has to be accessible for repair.

The submerged pump, Item 1-134, in the still pot, Item 1-129, must be installed so that it is readily removable.

E. Drainage

No spacial materials are required for drainage. Drainage ditches will be constructed in the ground level concrete pad and a curb installed around three sides of the entire pad.

F. Communications

None required.

G. Safety

No safety showers or eye wash fountains are required.

No explosion barricades are required.

No blow out panels are required.

H. Fire Protection

No sprinkler systems are required.

No fire wall, fire hose stations, fire alarms, or foam systems are required.

No building steel fireproofing is required.

I. Walks and Roads

None required.

J. Railroads

None required.

K. Parking Lots

None required.

L. Fences

None required.

M. Dock Facilities

None required.

TOWOLDMON0048179

N. Facilities to be Relocated

The control room will be expanded and the existing chlorinator panel will be relocated into this new control room addition.

O. Grading and Excavation

The area to the north of Building 27 is a filled area and good soil is available at 12 to 15 feet from the surface.

P. Site Covering

Rock covering in the areas around the site location.

TOWOLDMON0048180

Appendix E

Solid Aroclor Expansion

Scope of Work

01 - Equipment

See Equipment Information Summary

02 - Instrument Items

See Instrument List and Summary

03 - Setting and Testing Equipment

Area accessible for truck and train unloading. High lift can be used to set larger units. The new elevator will be installed in Building 27.

04 - Setting and Testing Instruments

An addition to the present control room will be required to make space available for setting instruments. The new addition will be 20 ft. X 30 ft.

05 - Piling

None required.

06 - Excavation

For operating floor 2200 cu.ft.

100 ft. X 22 ft. X 1 ft.

For elevator pit 360 cu.ft.

6 ft. X 10 ft. X 6 ft.

For structural piers 7700 cu.ft.

Mfg. Area 7 piers X 8 ft. X 8 ft. X 12 ft. = 5400
= 5400

Control Room 3 piers X 8 ft. X 8 ft. X 12 ft.
= 2300

Backfill required 5000 cu.ft.

Remove spoil - Sheet piling may be required for shoring.

TOWOLDMON0048181

07 - Foundations

For Structural Steel 10 pads X 6 ft. square X 1.2 deep with 12 ft. column 1.5 ft. square	700 cu.ft.
Floor Slab - Reinforced Concrete 24 ft. X 90 ft. X 6" thick	1100 cu.ft.
Equipment Pads 10 items X 6" Thick X 6 ft. X 4 ft.	120 cu.ft.
Concrete Basin Within Floor Slab for drainage 2 ft. wide X 1-1/2 ft. deep X 6" thick X 90 ft. long, 2 required	450 cu.ft.

08 - Supports, Platforms and Structures

Equipment Supports	55 tons
Grating Requirement	2000 sq.ft.
Handrails	400 ft.
Toeplate	400 ft.
Misc. Structural Supports	8 tons
Stair Requirement	One complete stairway for two levels
Control Room Building Frame	10 tons
Control Room Floor 30 ft. X 20 ft. X 6" thick	300 cu.ft.

09 - Other Building Items

Floor Covering for Control Room 30 ft. X 20 ft. terrazzo to conform to existing floor	600 sq.ft.
Acoustical Ceiling for Control Room	600 sq.ft.
Windows for Control Room - Four Units 5 ft. X 4 ft.	
Doors for Control Room - Two Hollow Steel Units 3 ft. X 7 ft.	

0020597

TOWOLDMON0048182

10 - Sprinklers

None required.

11 - Piping

Item	Service	Material	Size	Rmks.	Length	Insul.	Valves
1-101	Sant R	C.S.	2"X3"	Jacketed	75 ft.	1"	2 - Jctd.
	Biphenyl	C.S.	2"	Traced	75 ft.	1"	2 - CD3
	Vent	C.S.	3"X4"	Jacketed	35 ft.	1"	1 - Jctd. Vent
	To It.103	C.S.	3"X4"	Jacketed	30 ft.	1"	1 - Jctd.
	Misc.	C.S.	3"X4"	Jacketed Hose	2 ft.	-	-
	Misc.	C.S.	2"X3"	Jacketed Hose	2 ft.	-	-
	Misc.	C.S.	2"X3"	Jacketed Hose	2 ft.	-	-
	Therm.Ret.	C.S.	1"	-	50 ft.	1"	3 - FA37
	Steam	C.S.	1½"	-	40 ft.	1"	-
	Cond.	C.S.	1"	-	40 ft.	1"	-
1-103	Chlor. Charge	C.S.	3"X4"	Jacketed	100 ft.	1½"	1 - Jctd.
1-104	Relief	C.S.	2"	Traced	50 ft.	-	1 - CA46
	Relief	C.S.	3"	-	50 ft.	-	-
	Chlorine	C.S.	3"	-	60 ft.	-	4 - DE41M
	To It. 105	C.S. Jkt. S.S.Inner	3"X4"	Jacketed	30 ft.	2"	1 - Jctd.
1-105	To It. 106	C.S.Jkt. S.S.Inner	3"X4"	Jacketed	50 ft.	2"	2 - Jctd.
	To It. 125	C.S.	3"X4"	Jacketed	25 ft.	2"	1 - Jctd.
	Sample	C.S.	2"X3"	Jacketed	30 ft.	2"	1 - Jctd.
1-106	To It. 104	C.S.Jkt. S.S.Inner	3"X4"	Jacketed	25 ft.	2"	-
	To It. 116	C.S.	4"	-	25 ft.	No	2 - FA42

TOWOLDMON0048183

Item	Service	Material	Size	Rmks.	Length	Insul.	Valves
1-107	To It. 108	C.S.	4"	2 tracers	50 ft.	1½"	1 - CA46
	To HCl Line	C.S.	4"	2 tracers	50 ft.	1½"	2 - CA46
	To It. 109	C.S.	4"	2 tracers	30 ft.	1½"	1 - CA46
1-108	To It. 113	C.S.	3"	-	20 ft.	1"	-
	To It. 109	C.S.	4"	2 tracers	15 ft.	1½"	-
	Drain	C.S.	1"	-	20 ft.	-	1 - FA42
1-109	Vent	C.S.	2"X3"	Jacketed	25 ft.	1½"	1 - Jctd.
	Relief	C.S.	2"	-	25 ft.	-	-
	200 psig steam In.	C.S.	1"	-	50 ft.	1½"	2 - FA37
	Cond. Out	C.S.	1"	-	50 ft.	1½"	2 - FA37
	To It. 110	C.S.	2"X3"	Jacketed	30 ft.	2"	1 - Jctd.
1-110	To It. 101	C.S.	2"X3"	Jacketed	70 ft.	2"	2 - Jctd.
1-111	Vent	C.S.	2"	-	20 ft.	-	-
	Therm.In	C.S.	1½"	-	40 ft.	1½"	2 - FA37
	Therm.Out	C.S.	1½"	-	40 ft.	1½"	2 - FA37
	To It. 112	C.S.	3"	-	25 ft.	1"	1 - FA42
1-112	To It. 108	C.S.	3"	-	50 ft.	1"	1 - FA42
1-113	To It. 111	C.S.	3"	-	50 ft.	1"	-
1-117	Relief	C.S.	2"	Traced	50 ft.	-	1 - CA46
	Relief	C.S.	3"	-	50 ft.	-	-
	Chlorine	C.S.	3"	-	100 ft.	-	4 - DE41M
	To It.118	C.S. Jkt. S.S.Inner	3"X4"	-	30 ft.	2"	1 - Jctd.

TOWOLDMON0048184

Item	Service	Material	Size	Rmks.	Length	Insul.	Valves.
1-118	To It. 119	C.S.Jkt. S.S.Inner	3"X4"	Jacketed	50 ft.	2"	2 - Jctd.
	To It. 123	C.S.	3"X4"	Jacketed	25 ft.	2"	1 - Jctd.
	Sample	C.S.	2"X3"	Jacketed	30 ft.	2"	1 - Jctd.
1-119	To It. 117	C.S. Jdt. S.S.Inner	3"X4"	Jacketed	25 ft.	2"	-
	To It. 123	C.S.	4"	-	25 ft.	No	2 - FA42
1-120	To It. 108	C.S.	4"	2 Tracers	50 ft.	1½"	1 - CA46
	To HCl Line	C.S.	4"	2 Tracers	50 ft.	1½"	2 - CA46
1-121	Vent	C.S.	4"	-	30 ft.	-	-
	To It. 122	C.S.	4"	Traced	30 ft.	No	2 - FA42
	Steam In	C.S.	1½"	-	50 ft.	1"	-
	Steam Out	C.S.	1½"	-	50 ft.	1"	-
1-122	To It. 119	C.S.	4"	Traced	70 ft.	No	3 - FA42
	To It. 123	C.S.	4"	Traced	30 ft.	No	1 - FA42
1-123	To It. 121	C.S.	4"	Traced	40 ft.	No	1 - FA42
	TW In	C.S.	6",3"	-	50 ft.	-	1 - EA46
	TW Out	C.S.	6",3"	-	50 ft.	-	1 - EA46
1-114	Vent	C.S.	4"	-	30 ft.	-	-
	to It. 115	C.S.	4"	Traced	30 ft.	No	2 - FA42
	Steam In	C.S.	1½"	-	50 ft.	1"	-
	Steam In	C.S.	1½"	-	50 ft.	1"	-
1-115	To It. 106	C.S.	4"	Traced	70 ft.	No	3 - FA42
	To It. 116	C.S.	4"	Traced	30 ft.	No	1 - FA42

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Item	Service	Material	Size	Rmks.	Length	Insul.	Valves
1-116	To It. 114	C.S.	4"	Traced	40 ft.	No	1 - FA42
	TW In	C.S.	6",3"	-	50 ft.	-	1 - EA46
	TW Out	C.S.	6"3"	-	50 ft.	-	1 - EA46
1-124	To It. 125	C.S.	2"	-	60 ft.	-	-
1-125	Steam In	C.S.	1½"	-	60 ft.	2	2 - FA37
	Steam Out	C.S.	1½"	-	60 ft.	2	2 - FA37
	Vent	Saran Lined Steel	6"	Traced	50 ft.	No	-
	To It. 126	C.S.	3"X4"	Jacketed	30 ft.	2	2 - Jctd.
1-126	To It. 129	C.S.	3"X4"	Jacketed	75 ft.	2	2 - Jctd.
1-127	Vent	P.E.	6"	-	50 ft.	-	-
	Drain	Saran Lined Steel	3"		50 ft.		
1-128	To It. 129	C.S.	3"X4"	Jacketed	30 ft.	2"	2 - Jctd.
	Gas In	C.S.	1½"	-	50 ft.	-	2 - CD3
1-129	To It. 130	C.S.	18"	-	-	2"	-
	To It. 134	C.S.	3"X4"	Jacketed	40 ft.	2"	2 - Jctd.
1-130	To It. 131	C.S.	16"	-	30 ft.	2"	-
	To It. 129	C.S.	2"X3"	Jacketed	10 ft.	2"	Site Glass
	To It. 141	C.S.	2"	-	30 ft.		
1-131	To It. 132	C.S.	3"X4"	Jacketed	20 ft.	2"	2 - Jctd. Site Glass
	To It. 141	C.S.	2"	-	40 ft.	-	2 - FA37

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Item	Service	Material	Size	Rmks.	Length	Insul.	Valves
1-132	Vent	C.S.	3"X4"	Jacketed	30 ft.	2"	1 - Jctd.
	Relief	C.S.	4"	-	30 ft.	-	-
	To It. 135	C.S.	3"X4"	Jacketed	40 ft.	2"	2 - Jctd.
	To It. 133	C.S.	3"X4"	Jacketed	30 ft.	2"	2 - Jctd.
	Steam In	C.S.	1½"	-	60 ft.	2"	2 - FA37
	Steam Out	C.S.	1½"	-	60 ft.	2"	2 - FA37
1-133	To It. 137	-	3"X4"	Jacketed	110 ft.	2"	2 - Jctd.
1-134	To It. 128	-	3"X4"	Jacketed	40 ft.	2"	2 - Jctd.
1-135	To It. 136	-	3"X4"	Jacketed	30 ft.	2"	2 - Jctd.
	Steam In	-	1"	-	30 ft.	1"	-
	Steam Out	-	1"	-	50 ft.	1"	-
	Water In	-	1"	-	50 ft.	1"	-
	Water Out	-	1"	-	50 ft.	1"	-
1-136	Steam In	C.S.	2"	-	30 ft.	1½"	-
	Water In	C.S.	2"	-	30 ft.	-	-
	Water Out Aftercond.	C.S.	2"	-	40 ft.	-	-
	Water Out Intercond.	C.S.	2"	-	40 ft.	-	-
	Vent	C.S.	3"	-	20 ft.	-	-
1-139	Steam In	C.S.	1½"	-	50 ft.	-	-
	Steam Out	C.S.	1½"	-	50 ft.	-	-
	Vent	C.S.	3"	-	20 ft.	-	-
	To It. 140	C.S.	2"	-	30 ft.	1"	2 - FA42
1-140	To It. 131	C.S.	2"	-	70 ft.	-	2 - FA42
1-141	To It. 139	C.S.	2"	-	50 ft.	1"	-

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Item	Service	Material	Size	Rmks.	Length	Insul.	Valves
Misc.	Therm 14 Conn. In	C.S.	1¼"	-	500 ft.	1½"	30 - FA37
	Therm 14 Conn. Out	C.S.	1½"	-	500 ft.	1½"	30 - FA37
	Therm	C.S.	6"	-	500 ft.	-	4 - FA37

12 - Ductwork

A 6 ft. X 6 ft. cabinet will be required for housing drums for draw-off of residue product for still pot.

13 - Electrical

Motors to be installed and wired:

Number	Horsepower
1	2
5	5
1	7½
2	10
3	15
2	20
1	25
1	30
1	50

Allow for remote pushbuttons and alarms for 10 motors.

Lighting required in operating area:

Ground Area,	18 ft. X 82 ft.	1476 ft^2
Operating Area,	18 ft. X 82 ft.	1476 ft^2
Roof Area,	18 ft. X 82 ft.	1476 ft^2

14 - Site Preparation

None required.

15 - Sewers

1. 50 ft. of 4" permanite sewer pipe with one tie-in to existing 8" sewer which runs west of Building 27.
2. 150 ft. of 304 S.S. guttering around the top of the new structure with 3-4" downspouts, each 30 ft. long

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16 - Underground Mains

None required.

17 - Yards, Roads and Fencing

None required.

18 - Railroads

None required.

19 - Insulation

Piping - Refer to Code 11

Equipment - As below - material Standard #100
Weatherproof, Std. #65

Item	Area	Thickness
1-101	250 ft^2	2"
1-104	200 ft^2	2"
1-107	50 ft^2	1"
1-109	250 ft^2	2"
1-111	80 ft^2	1½"
1-117	200 ft^2	2"
1-120	50 ft^2	1"
1-125	550 ft^2	2"
1-129	550 ft^2	4"
1-130	150 ft^2	3"
1-132	350 ft^2	2"
1-139	80 ft^2	1½"
10 Pumps		2"

20 - Painting

Coating Standard #502, Epoxy System.

All uninsulated piping, air, water, gas.

Supports for Items 106, 113, 116, 119, 123, 128, 141, 142, 132, 135.

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21 - Walls, Masonry, Roofs and Roofing

Concrete roof deck for mfg. area - reinforced concrete, 20 ft. X 90 ft. X 5" thick	750 cu.ft.
Concrete roof for control room - reinforced concrete, 20 ft. X 35 ft. X 5" thick	290 cu.ft.
Concrete wall for control room - concrete block, 3 walls, total feet - 70 ft. X 15 ft. high	1050 sq.ft.
Concrete enclosure for elevator - concrete block, 4 walls, total feet - 30 ft. X 25 ft. high	750 sq.ft.
Built up 4-ply roof for control room, 20 ft. X 35 ft.	700 sq.ft.
North wall of mfg. structure will have Monsanto Lustra Span panels for a distance of 80 ft. and height of 12 ft. in each level.	1920 sq.ft.

90 - Dismantling

1. North wall of Building 27, approximately 1500 sq. ft. of brick wall.
2. South wall of present control room, 450 sq.ft. of concrete block wall.
3. Shed to south of present control room, approximately 600 sq.ft. of transite roof and steel platforms inside shed.
4. Biphenyl heater on Still No. 1. This is a unit heater in the shed.

92 - Repairs Expense

Replace existing head on Item 535. This is a 2000 gallon vessel and requires a new 78" O.D. carbon steel head.

93 - Relocation and Modification Expense

1. Remove and relocate Item 205, a 14' dia. X 10' high storage tank with coil and agitator.
2. Remove and relocate stairway to the north of Building 27.
3. Remove and relocate 10 ton stand-up tube air-conditioner which is now in the south section of the control room.
4. Remove and relocate a 20 ft. chlorinator panel from its existing position in the present control room to the new control room.
5. Remove the present 1268 flaker (24" X 48" unit) and replace with a new unit. This unit will be relocated to an area just east of the present flaker.

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APPENDIX E - Amendment No. 1

Scope of Work - CEA 2080

07 - Foundations

For Elevator Pit (Reinforced Concrete) 150 cu.ft.

08 - Supports, Platforms and Structures

Equipment Support For Item 152	6 tons
Grating Requirement For Item 152	225 sq.ft.
Handrails	60 ft.
Toeplate	60 ft.
Stair Requirement	One Stairway For One Level

11 - Piping

Item	Service	Material	Size	Rmks.	Length	Insul.	Valves
1-152	Charge	C.S.	3"X4"	Jacketed	125 Ft.	2"	1 - Jctd.
	Charge	C.S.	2"X3"	Jacketed	125 Ft.	2"	1 - Jctd.
	Therminol	C.S.	1½"	-	200 Ft.	1½"	2 - FA5
	Vent	C.S.	3"X4"	Jacketed	30 Ft.	-	-
	Overflow	C.S.	3"X4"	Jacketed	30 Ft.	1½"	-
	Outlet	C.S.	2"X3"	Jacketed	50 Ft.	1½"	1 - Jctd.

12 - Ductwork

A 6 ft. X 8 ft. X 10 ft. hopper will be required under the new flaker.

13 - Electrical

Use PVC coated conduit.

19 - Insulation

Item	Area	Thickness
1-152	320 ft^2	2"

90 - Dismantling

A section of floor in Building 27 - Area 400 ft^2 for 1268 flaker.

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92 - Repairs Expense

5. Repair or replace section of floor at new 1268 flaker.

93 - Relocation and Modification Expense

Remove Item (5) from original scope and replace with the following:

5. Relocate 18" I beam to south of control room. This beam is 40 ft. long and will be moved south approximately one foot.

6. Relocate 2 - 6" IPS tower water lines to south of control room - Total feet = 100.

7. Relocate miscellaneous 2" IPS pipe to south of control room - Total feet = 100.

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APPENDIX E - Amendment No. 2

Scope of Work - CEA 2080

This amendment describes the work required to install a power pulverizer to grind flakes of Aroclor 1268. It includes a mill, conveying duct to dust collector, air lock to discharge material into fiber containers and a dust collector with blower. Instruments will be required at the dust collector.

03 - Setting and Testing Equipment

Pulverizer will be located under the flaker unit. The dust collector and pulverizer will be located on support steel.

08 - Supports, Platforms and Structures

Miscellaneous equipment supports, light steel 1 Ton

12 - Ductwork

Install 75 feet of 6 and 8" duct for blower and pulverizer.

11 - Piping

Install 100 feet of 1½" IPS piping to filter for air.

13 - Electrical

Motors to be installed and wired:

Number	Horsepower
1	10
1	5
1	¼

Conduit run to dust collector controls.

20 - Painting

Support steel with Std. #502 Epoxy System.

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APPENDIX E - Amendment No. 3

Scope of Work - CEA 2080

22 - Spares

A pump, indentical to Item 1-134, is to be purchased and held as a spare in the storeroom. Item 1-134 is a special submerged pump, critical to the operation of the Aroclor plant, and is required to prevent losses due to pump failures.

Size	200 GPM
TDH	100 Feet
Make	Taber Heavy Duty

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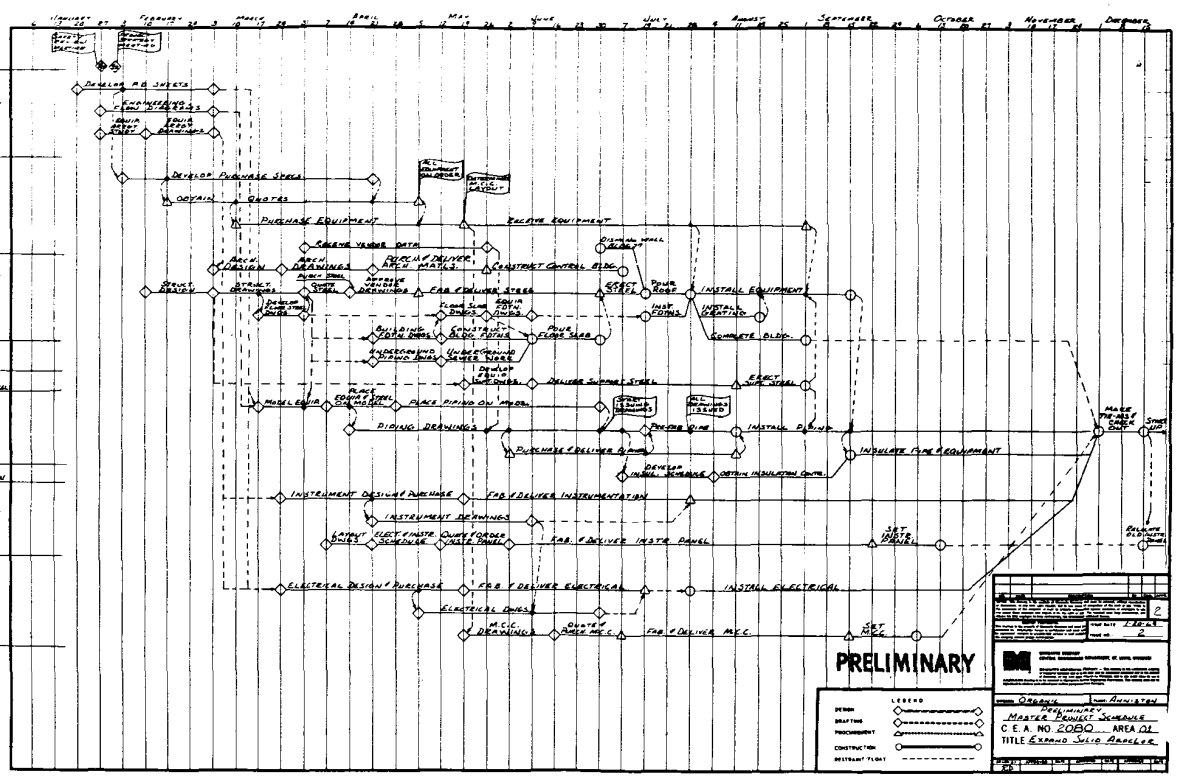

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