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PROJECT SCOPE REPORT

AROCLORS EXPANSION

CEA 1430

Add Storage Tanks, Drumming Facilities, Flakers, Packaging Equipment and New Manufacturing Building

Anniston, Alabama, Plant

CEA 1800

New Continuous 40M lbs/year Plant with Additional Storage Tanks for Raw Materials and Finished Goods

W. G. Krummrich Plant

By: R. S. Yates

CENTRAL ENGINEERING DEPARTMENT

August 29, 1967

0725811

TOWOLDMON0044897

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TOWOLDMON0044899

1.1 TITLE

Aroclors - Increase Aroclor Capacity - Organic Division

At Anniston Plant - CEA 1430
At WGK Plant - CEA 1800

1.2 SUMMARY

The objectives of this project are to,

a) Provide adequate finished goods storage facilities at Anniston and WGK to assure a minimum inventory of the various Aroclors and Aroclor blends so that bulk shipments can be made on demand.

b) Provide at Anniston for blending and drumming of the several Aroclors with other components without interferring with primary production facilities.

c) Minimize potential for cross contamination of products.

d) Provide loading facilities for tank trucks and tank cars and unloading facilities for raw materials in tank cars.

e) Provide additional raw material storage at WGK for biphenyl and at Anniston for TCB and TTCB.

f) Provide at Anniston new expanded facilities for flaking and bagging biphenyl and solid Aroclors.

g) Provide new facilities at WGK to increase plant capacity from 29.5M lbs./year to 69.5M lbs./year.

h) Provide an overall production capacity for liquid Aroclors of up to 30% more than indicated in the latest Sales forecasts.

i) Provide for an orderly expansion of the WGK and Anniston Aroclor facilities.

Addition of these facilities will result in capacity increases over the present standard[1] capacity as follows:

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At WGK,	Liquid	40.0$\overline{M}$	lbs./year
At Anniston,	Liquid	5.7$\overline{M}$	lbs./year
	Solid	1.0$\overline{M}$	lbs./year

(1) Note - Standard capacities at present are:

At WGK,	Liquid	29.5$\overline{M}$	lbs./year
At Anniston,	Liquid	48.0$\overline{M}$	lbs./year
	Solid	10.02$\overline{M}$	lbs./year

The installation at Anniston will include finished storage and blending tanks, two flakers for solid Aroclors and biphenyl, a drumming station, tank car spur and loading facilities and bagging station for solid Aroclors and biphenyl.

The installation at WGK will include a new continuous chlorination line, blow tank, intermediate storage, distillation equipment, continuous clay treatment facilities, finished storage tanks, and a biphenyl storage tank with additional rail spur and unloading docks.

Desired completion dates:

Tank farm at WGK	July 1, 1968
Tank farm at Anniston	August 1, 1968
Flaking facilities at Anniston	September 1, 1968
New production facilities at WGK	December 1, 1968

1.3 PROCESS TECHNOLOGY

1.31 Process Description

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.

Crude Aroclors are produced in chlorinator reaction vessels, air blown and distilled. Liquid Aroclors are earth treated, filtered and loaded for shipment. Solid Aroclors are drummed, flaked or flaked and milled and packaged for shipment.

Distillation residues are discarded as waste or sold as Montars.

A numerical system of nomenclature is used for identifying the various Aroclors.

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Product yields are calculated on both chlorine and biphenyl and are different for each plant and for each Aroclor produced. They are recorded in the respective plant cost standards.

Process documents:

"Standard Operating Instructions for Aroclors - Anniston Plant" - April 1966 - M. J. Williams

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

"Process Description for the Manufacture of Aroclors - Department 246 - WGK Plant" - October 1966 - D. E. Harris

"Process Description for the Manufacture of Pyranols and Inerteens - Department A246 - WGK Plant" - October 1966 - D. E. Harris

"Standard Manufacturing Process for Pydraul A-200 - Department B-246 - WGK Plant" - October 1966 - D. E. Harris

"Operating Instructions - Aroclor and Pyranols - Departments 246 and A246 - WGK Plant" - August 1966 - V. Brawley

"Final Report on the Continuous Chlorination of Biphenyl" - June 4, 1957 - R. A. Simone

"Tentative Process for Continuous Chlorination of Biphenyl" - March 23, 1956 - R. A. Simone

"Final Report on the Continuous Chlorination of Aroclors - Plant Demonstration" - May 7, 1958 - R. A. Simone

1.32 Raw Materials

1.321 *Specifications*

Reference is made to the respective standard process manuals for raw material specifications. Raw materials at Anniston, for this project, are the Aroclors and additives used in blends and mixes and at the flakers. Raw materials at WGK are the materials used for the manufacture of Aroclors. A list of materials follows:

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Plant	Material Code	Date	Material
WGK (246)	82601	12/8/64	Diphenyl
	33500	1/7/66	Ferric Chloride, Anhydride
	38800	7/21/66	Lime, Hydrated
	19409	1/21/66	Attapulgus Earth 200/UP
	43099	2/18/65	Nitrogen Gas
	81059	6/29/66	Chlorine, Liquid
Anniston (27)	82612	6/17/66	Aroclor 1242 Electrical Grade
	81102	1/10/64	Aroclor 1248 Electrical Grade
	82641	7/5/64	Aroclor 1248 Non-Electrical Grade
	82613	6/28/64	Aroclor 1254 Electrical Grade
	82613	7/15/64	Aroclor 1254 Non-Electrical Grade
	82614	2/7/62	Aroclor 1260 Electrical Grade
	82614	7/15/64	Aroclor 1260 Non-Electrical Grade
	82615	3/2/66	Aroclor 1262
	36100	5/26/66	Glycidyl Phenyl Ether (1)
	60200	6/3/65	Trichlorobenzene (1)
	58500	8/29/63	Tetrachlorobenzene (1)
	61320	12/23/63	Epoxide 201
	-	-	Toluene
	64010	12/18/64	Xylene

(1) WGK Specification

1.322 Sources

WGK

Biphenyl

Received from the Anniston Plant in 20,000 gallon unlined steel, steam heated tank cars. Transferred to an existing 25,000 gallon storage tank.

Chlorine

Received direct from WGK's Department 232 in a 4" transfer line. This line is being replaced by a 6" transfer line in the third quarter of 1967.

Ferric Chloride

Received from the warehouse in 2 lb. glass containers.

Lime, Hydrated

Received from the warehouse in 100 lb. bags.

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Attapulgus Earth

Received from the warehouse in 50 lb. bags.

Nitrogen Gas

Supplied by a bulk station located in the tank farm area.

Anniston

Aroclors are transferred by pipeline direct from department to storage and from storage tanks to mix tanks, to drumming station and to flakers.

Glycidyl Phenyl Ether

Received from the warehouse in 55 gallon drums.

Trichlorobenzene

Received from Hooker Chemical Company in 8,000 gallon steel tank cars.

Tetrachlorobenzene

Received from Hooker Chemical in 8,000 gallon tank cars.

Epoxide 221

Received from warehouse in 55 gallon drums.

Toluene

Received from warehouse in 55 gallon drums.

Xylene

Received from warehouse in 55 gallon drums.

1.33 Products and By-Products

1.331 Quality Considerations

Marketing stresses that quality protection is the most effective means of protecting our present sales position of electrical grade Aroclors. Plant studies have shown that the use of aluminum tanks and aluminum transfer piping systems coupled with inert blanking of in-process and finished goods storage tanks will give us maximum protection.

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1.332 Specifications

Reference is made to the respective standard process manuals for finished goods specifications. Finished products at Anniston, for this project, are the completed blends from mix tanks and solids from the flakers. At WGK, finished products, are the liquid Aroclors and Montars. A list of products follows:

Product Code Anniston	Date	Product Code WGK	Date	Product
82611	10/28/63	8115	4/7/64	Aroclor 1232
82612	6/17/66	81101	6/17/66	Aroclor 1242 Electrical Grade
82612	7/15/64	81101	7/15/64	Aroclor 1242 Non-Electrical Grade
81102	1/10/64	81102	1/10/64	Aroclor 1248 Electrical Grade
82641	7/15/64	81102	7/15/64	Aroclor 1248 Non-Electrical Grade
82613	6/28/65	81103	6/28/65	Aroclor 1254 Electrical Grade
82613	7/15/64	81103	7/15/64	Aroclor 1254 Non-Electrical Grade
82614	5/25/66	81105	5/25/66	Aroclor 1260 Electrical Grade
82614	6/15/64	81105	6/15/64	Aroclor 1260 Non-Electrical Grade
82615	3/2/66	81107	3/2/66	Aroclor 1262 Non-Electrical Grade
---	7/15/64	82868	7/15/64	Montars 1, 2
---	7/15/64	82868	7/15/64	Montars 314
82622	3/11/66			Aroclor 5460
82621	3/15/66			Aroclor 5442
82620	3/11/66			Aroclor 5060
82619	3/11/66			Aroclor 4465
82618	3/11/66			Aroclor 2565
82616	3/11/66			Aroclor 1268
82601	7/8/65			Biphenyl
82649	4/18/66			Inerteen PPO
82658	4/18/66			A13B3B
82681	5/3/67			Inerteen 54201 KA
82659	3/11/66			Aroclor 1260 - 10% Toluene
82661	3/15/66			Aroclor 1262 - 10% Toluene
82685	3/9/66			Therminol FRO
82664	4/17/58			Aroclor 1254 - 10% Toluene

1.333 Packaging and Shipping

Liquid Aroclors

At both Anniston and WGK, liquid Aroclors are shipped in the following manner:

Tank Trucks

Size - 4,000 gallon

Materials of Construction - All electrical grade Aroclors are loaded into SS trailers. Non-electrical grade Aroclors may be shipped in steel trailer tanks.

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Tank Cars

Size - 4,000 or 8,000 gallon

Materials of Construction - All electrical grade Aroclors are loaded into solid aluminum cars or in tin, zinc or aluminum spray-lined cars. Non-electrical grade Aroclors may be shipped in steel cars.

Drums and Cars

Size - 5, 30 or 55 gallon

Materials of Construction - Lacquer-lined containers.

Solid Aroclors

At Anniston, solid Aroclors are packaged in 5 and 40 gallon galvanized steel drums as a solid and in 41 gallon fibre drums as flakes. Biphenyl and Aroclor 5460 are packaged in bags as follows (major part of the production):

Bags

Aroclor 5460

Net weight - 100 lbs., St. Regis No. PCBG-32A.

Size - 18" X 6" X 34" with a 5" valve.

Type - Sewn Valve (SV).

Biphenyl

Net weight - 50 lbs., St. Regis No. PCBG-145A.

Size - 16-3/4" X 5" X 33" with 5-1/2" valve.

Type - Sewn Valve (SV).

HB-40

At Anniston, HB-40 is packaged in 5 and 55 gallon steel drums.

1.34 Waste Streams

WGK

1,250 lbs./day of HCl gas absorbed in a 50 GPM water stream (0.21%) will be discharged from the continuous blow tank into the plant sewer. Other process losses are of a minor nature.

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Anniston

No change is expected in waste discharges as a result of this project. A dust collector will be installed to control Aroclor dusts from the milling operation of Aroclor 1268.

1.35 Personnel, Property and Public Hazards

Chlorine Gas

Causes eye, skin and mucous membrane irritation. In strong concentrations canister gas masks, Scott Air Paks, or oxygen breathing apparatus are required.

Biphenyl

Solid at normal temperatures. Fumes are toxic over a prolonged period of exposure. The flash point is 235°F.

HCl Gas

Fumes are very toxic and hazardous to teeth, skin, eyes and mucous membranes. In strong concentrations, rubber protective equipment and approved pack or cannister gas masks are required.

Ferric Chloride

Solid at normal temperatures. Material is not toxic but presents an eye hazard.

Xylene

Fumes are very toxic. Limiting explosion concentration is 1.27 to 7.0% by volume in air. The flash point is 40°F.

Trichlorobenzene

Solid at normal temperatures. Fumes are medium toxic. Fire point is above 210°F.

Crude Aroclors

During processing, Aroclors are generally hot, 100°C or above, and can cause serious thermal burns. Continuous or repeated skin contact must be avoided. Vapors at room temperatures should not be breathed in a confined space. At elevated temperatures, fumes are quite toxic. Continuous or repeated skin contact with Aroclor must be avoided by the use of gloves and protective garments.

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1.4 MANUFACTURING FACILITIES

1.41 Description

1.411 General

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

Equipment Flow Sheets
Suggested Equipment Layout
Equipment Lists
Scopes of Work
Preliminary Schedule
Project Loss Prevention Report

1.412 For Anniston

New storage and blending tanks to be added:

Aroclor 1242	54,000 gallon	(2 - 27,000 gallon)
" 1248	18,000 "	
" 1254	54,000 "	(2 - 27,000 gallon)
" 1260	18,000 "	
" 1262	18,000 "	
" 1221/1232	18,000 "	
Inerteen PPO and A13B	30,000 "	(1 - 12,000 gallon)
TCB	12,000 "	(1 - 18,000 gallon)
TTCB	12,000 "	

An existing 2,000 gallon mixing tank will be relocated.

One covered loading dock for tank cars.

One covered loading dock for tank cars and trailers.

A new railroad spur.

Four existing 12,000 gallon storage tanks with submerged pumps will be dismantled and scrapped.

New drumming facilities to be added include a high speed drumming scale and a conveyor system to bring empty drums to the scale and take filled drums away from the scale.

New flaking and bagging facilities to be added:

Storage for Aroclor 5460, 1268 and biphenyl

Flaker for solid Aroclors

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Flaker for biphenyl

Mill for Aroclor 1268

High speed bagging machines for Aroclor 5460 flakes and biphenyl flakes

Conveyor system to take filled bags away from bagging machines

Fume control system for Aroclor 1268

The existing Aroclor and biphenyl flakers will be dismantled together with the present Aroclor feed tank.

A suitable building (120' X 60') to house the drumming and flaking operations.

Pipelines from Department 27 to tank farm as follows:

One line for Aroclor 1242 from existing 12,000 gallon day tank

One line for Aroclor 1248 and 1221

One line for Aroclor 1254 from existing 12,000 gallon day tank

One line for Aroclor 1260

One line for Aroclor 1262

Pipelines from tank farm to mix tanks:

One line for Aroclor 1242

One line for Aroclor 1254

One line for Aroclor 1260

One line for Aroclor 1248 and 1262

Pipelines from tank farm to loading spots and drum filling:

One line for A13B

One line for KA and PPO

One line for Xylene and Toluene blends (drum filling only)

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One line for HB-40 (drum filling only)

One line for Aroclor 1242

One line for Aroclor 1254

One line for Aroclor 1221, 1232, 1248, 1262

One line for Aroclor 1260

Pumps will be provided as follows:

One for Aroclor 1242 transfer at tank farm

One for Aroclor 1254 transfer at tank farm

One for Aroclor 1248/1221, 1232/1262 transfer at tank farm

One for Aroclor 1260 transfer at tank farm

One for Mix tank and PPO tank transfer

One for Xylene Mix tank transfer

One for TCB, TTCB tank car unloading

One for TCB, TTCB transfer to Mix tank

Three to transfer Aroclors from Building 27 to storage

1.413 For W. G. Krummrich

New storage tanks to be added:

Aroclor 1242	44,000 gallon (2 - 22,000 gallon)
Aroclor 1248	22,000 gallon
Aroclor 1254	22,000 gallon
Aroclor 1260	22,000 gallon
Biphenyl	100,000 gallon

A new railroad spur

Two unloading docks for biphenyl cars

Three existing 15,000 gallon storage tanks with submerged pumps will be dismantled.

Pipelines from day tanks to tank farm as follows:

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One line for Aroclor 1242

One line for Aroclor 1248

One line for Aroclor 1254

One line for Aroclor 1260

Pipelines from tank farm to loading spots and drum filling:

One line for Aroclor 1242

One line for Aroclor 1248

One line for Aroclor 1254

One line for Aroclor 1260

Pumps will be added as follows:

One for Aroclor 1248 transfer

One for Aroclor 1254 transfer

One for Aroclor 1260 transfer

One for Aroclor 1242 transfer

Facilities to produce 40$\overline{M}$ lbs./year of Aroclor 1242:

A continuous chlorinator chain consisting of biphenyl mix and continuous feed tank, four chlorination tanks, four mass circulating pumps and four external air coolers.

A continuous blow tank and intermediate storage tank.

Two semi-continuous distillation systems consisting of still pot, external circulating system with therminol heating, entrainment separator, vapor condenser, receiver and vacuum steam ejector.

Two continuous porocel treatment systems consisting of feed tank, absorber, cleanup filter and product receivers. One train will have two absorbers to provide flexibility.

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A complete therminol heating, storage and circulating system.

Additions to the existing control room to provide space for a foreman and motor control center.

1.42 Design Capacity

1.421 Anniston

Finished Product Storage

Product	Recommended[1] (gal.)	Provided (gal.)	Future Need (gal.) (1970)
1221	13,050	18,000	
1232	14,000		
1242	97,500	66,000[2]	27,000
1248	20,800	18,000	
1254	51,500	66,000[2]	
1260	20,900	18,000	
1262	5,550	18,000	
TOTAL	223,300	204,000	27,000

Increased flexibility in the storage area will allow a capacity increase of 5.7M lbs./year (from 48M to 53.7M).

Estimated tank car shipments for 1971: 372 (3)
Estimated tank trailer shipments for 1971: 66 (3)
Estimated drum shipments for 1971: 25,610 (3)
Estimated can shipments for 1971: 2,030 (3)

(1) Letter from HJD to RSY 5/18/67.
(2) Includes 12,000 gallon of day storage.
(3) Anniston Job No. 370-720 (1) by R. H. Taylor

Mixing and Drumming Area

A new 12,000 gallon mix tank, a relocated 2,000 gallon mix tank and an 18,000 gallon mix tank to provide for:

Estimated tank car shipments for 1971: 55 (3)
Estimated tank truck shipments for 1971: 1 (3)
Estimated drum shipments for 1971: 5,764 (3)
Estimated can shipments for 1971: 1,312 (3)

A new drumming station with associated conveyors to handle 150 drums/day. (Basis: 8 hrs./day, 260 days/year, 75% OST)

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Flaking and Bagging

Aroclor flaking capacity (Aroclor 5460) 41,500 lbs./day (Basis: 8 hrs./day, 365 days/year, 75% OST)

Aroclor bagging capacity 2 bags/min.

Biphenyl flaking capacity 18,300 lbs./day (Basis: 8 hrs./day, 365 days/year, 75% OST)

Biphenyl bagging capacity 2 bags/min.

Flaking and bagging design will allow these operations to be carried out on a one-shift basis, seven days a week. Exception is Aroclor 1268 which will be flaked and packaged on a three-shift basis, seven days a week (3% of production).

Raw Material Storage

Raw Material	Provided (gal.)
TTCB	12,000
TCB	12,000

1.422 WGK

Finished Product Storage

Product	Recommended[1] (gal.)	Provided (gal.)	Future Need (gal.) (1970)
1242	132,000	84,000[2]	66,000
1248	25,200	42,000[3]	
1254	34,400	42,000[4]	
1260	20,200	22,000	
TOTAL	211,800	190,000	66,000

Estimated tank car shipments for 1971: 112
Estimated tank trailer shipments for 1971: 306
Estimated drum shipments for 1971: 12,200
Estimated can shipments for 1971: 765

(1) Letter from HJD to RSY 5/18/67.
(2) Includes 40M gallons on hand storage.
(3) Includes 20M gallons on hand storage. Extra storage required for operating flexibility.
(4) Include 20M gallons on hand storage.

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Raw Material Storage

Raw Material	Provided (gal.)
Biphenyl	125,000(5)

(5) Includes 25M gallons on hand storage.

Provides capacity for 4 - 20,000 gallon cars and six days' supply at increased rate.

New unloading track and docks provide four days turnaround time at increased rate.

New Manufacturing Facilities

Continuous chlorination:

Basis: Producing Aroclor 1142
OST: 7,950 hrs./year
Rate: 43M lbs./year

Semicontinuous distillation and earth treatment:

Basis: Producing Aroclor 1242
OST: 7,950 hrs./year
Rate: 40M lbs./year

For the overall product group, after these additions are completed, Anniston and WGK plant capacity will be as follows, M lbs./ year:

	Present Capacity	New Capacity	Increase in Capacity
Anniston	48.0	53.7	5.7
WGK	29.5	69.5	40.0
TOTAL CAPACITY	77.5	123.2	45.7

Based on 1971 requirements for both plants (July 1967 Sales Forecast), excess capacity at that time will be:

New Capacity	123.2M lbs./year
Required in 1971	99.2M lbs./year
Excess Capacity	24.0M lbs./year
Excess Capacity	24.2%

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1.43 Flexibility Requirements

1.431 Anniston

Increased storage capacity and blending facilities will allow for better utilization of present still capacity. This will be accomplished by longer runs on the same product and result in increased production capacity.

1.432 WGK

Based on the sales forecast of July 1967 for the Aroclor product group, batch units will produce Aroclors 1248, 1254 and 1260. The maximum capacity of these units is as follows for each Aroclor:

Aroclor 1248

$\frac{8,750 \text{ hrs.}}{8.5 \text{ hrs./ba.}}$ X 7,200 lb./ba. X 5 chlor X 92% OST = 34.4 $\overline{M}$ lbs.

Aroclor 1254

$\frac{8,750 \text{ hrs.}}{10.5 \text{ hrs./ba.}}$ X 8,040 lb./ba. X 5 chlor X 92% OST = 30.8 $\overline{M}$ lbs.

Aroclor 1260

$\frac{8,750 \text{ hrs.}}{12.5 \text{ hrs./ba.}}$ X 9,100 lb./ba. X 5 chlor X 92% OST = 29.2 $\overline{M}$ lbs.

For the year 1971, the maximum batch capacity will be:

For Aroclor 1248: 34.4 $\overline{M}$ lbs. X 21%(1) = 7.25 $\overline{M}$ lbs.

For Aroclor 1254: 30.8 $\overline{M}$ lbs. X 35%(1) = 10.80 $\overline{M}$ lbs.

For Aroclor 1260: 29.2 $\overline{M}$ lbs. X 43%(1) = 12.60 $\overline{M}$ lbs.

Total Batch Capacity on this basis = 30.65 $\overline{M}$ lbs.

(1) From the July 1967 Sales Forecast for 1971.

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Requirements for 1971 are 20.3$\overline{M}$ lbs., leaving an excess capacity of 51% at WGK.

For 1971, the continuous system capacity utilization will be 25.6$\overline{M}$ lbs., leaving an excess capacity of 56% at WGK.

Flexibility will be designed into the WGK distillation systems to allow for the following operations:

Still No. 1 (existing)	Aroclor 1260, 1262
Still No. 2 (existing)	Boil down still to separate Montars (residues) from all products, Aroclors 1242, 1248, 1254, 1260 and 1262.
Still No. 3 (New)	Aroclor 1242 or 1254
Still No. 4 (New)	Aroclor 1242 or 1254

1.44 Future Expansion

1.441 Anniston

At the completion of this expansion, space will be available to the north of Building 27 for the addition of a complete new solid Aroclor line. Space is available in the tank farm area for additional tankage.

Flaking and drumming capacity can be increased by adding additional personnel and operating on a 2 or 3 shift basis.

1.442 WGK

One of the objectives of this expansion is to provide 25-30% excess production capacity for Aroclors. As we use up the excess capacity provided in this project we must consider the next step in department expansion. If we assume the product split will increase proportionally according to the latest sales forecasts, we can postulate an operation diagrammed as follows:

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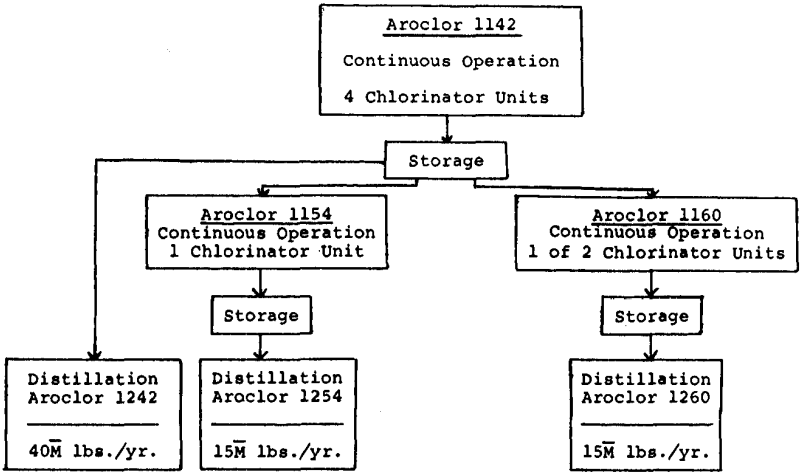


The layout of the new chlorination-distillation facilities at WGK will allow space for the addition of another chlorination unit, intermediate storage tanks and two additional distillation chains. Aroclor 1248 and 1262, because of the smaller requirements, would continue to be made in the batch units.

On this basis, we can postulate a productive capacity as follows for liquid Aroclors, M lbs./year:

Anniston	53.7
WGK batch units	29.5
Cont. 1242 unit	40.0
Cont. 1254 unit	15.0
Cont. 1260 unit	15.0
TOTAL CAPACITY	153.2

1.45 Physical Appearance

1.451 Anniston

Tanks of different heights will be grouped together to provide standardization.

In the flaking and drumming area, provision will be made for moving finished products directly into a new warehouse facility (when built).

0725831

TOWOLDMON0044917

1.452 WGK

Tanks will be grouped together as an extension of the present tank farm.

The new facilities will be a separate structure to the south of the existing unit.

1.46 Storage and Shipping Requirements

1.461 Anniston

Facilities provided are noted in greater detail in other parts of this report. Provision is being made for:

Raw material storage of TTCB and TCB.

Finished product storage for all liquid Aroclors.

Loading docks for tank car and tank trailer loading of products.

Moving filled bags of solid Aroclors and biphenyl to palette loading station, then to warehouse storage.

Moving drums and cans to palette loading station, then to warehouse storage.

Storage in the drumming area of the new manufacturing facility for empty drums and containers.

1.462 WGK

Provision is being made for:

Raw material storage of biphenyl.

Finished product storage for all liquid Aroclors.

Unloading docks for tank cars.

Making an existing unloading dock a loading dock for tank cars of Aroclors.

No extensions or additions are being made to the present blending and drumming facilities. WGK technical service is modifying an existing storage tank to a blend tank and revamping piping in the drumming area.

TOWOLDMON0044918

1.5 UTILITIES AND SERVICES

1.51 Utility and Service Requirements

1.511 Anniston Additions

Steam	- 100 psig	-For Storage Tanks	2,000 lbs./hr.
		-For Process	500 lbs./hr.
Purchased Water		- For Process (Cleanup)	150 GPM
Compressed Air		- For Storage Tanks	20 GPM
Plant Water		- For Process (Flakers)	300 GPM
Nitrogen		- For Storage Tanks	50 SCFM
Electric		- Connected	300 HP
		- Operating	200 HP

1.512 WGK Additions

Steam	- 80 psig	- For Storage Tanks	5,000 lbs./hr.
		- For Process	3,000 lbs./hr.
	200 psig	-For Process	600 lbs./hr.
Natural Gas		- For Process	1,800 SCFH
Purchased Water		- For Process	150 GPM
Compressed Air		- For Process	100 SCFM
		- For Instruments	75 SCFM
Electric		- Connected	315 HP
		- Operating	250 HP
Plant Water		- None Required	
Nitrogen		- None Required	

1.52 Utility and Service Facilities

1.521 Anniston

A new spur track from main track at north of plant to 5th Street, 1700 ft. long.

TOWOLDMON0044919

A new 300 KVA pole line transformer to supply tank farm and warehouse requirements.

A new sewerage lift station to replace existing field which is in the proposed manufacturing area. The lift station will tie into an existing city sewerage line.

Relocating a 24" IPS VC acid sewer.

Installation of a steel frame prefab-type building, 120' long X 60' wide to house the flaking, drumming and bagging facilities. This building will be designed so that it can be attached to a new warehouse building which will be 120' wide X 240' long.

A 15' wide X 80' long tank truck loading station.

Relocation of existing plant parking facilities 70' wide X 120' long.

1.522 WGK

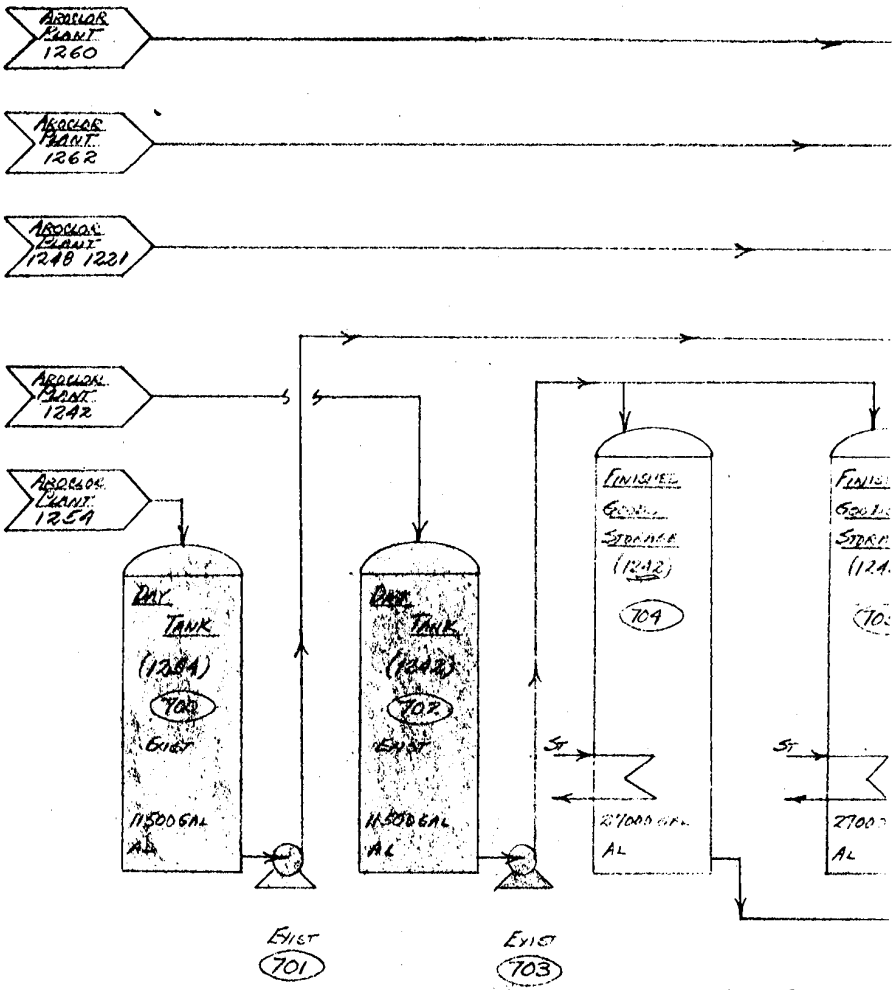
Extension of existing track 10A for 110 feet and installation of a turnover to tie existing track 10A into track 10.

Replace existing gas meter with a larger capacity meter.

Install new pump at department city water break tank with associated piping.

Install new 600 amp breaker in Sub #17. Install fans in Sub #17 transformer. Transfer feeder 8-1 from Sub #8 to Sub #17. Install an overhead feeder from Sub #17 to Building CF. Install feeder cables from breaker 8-1 to Department 246.

TOWOLDMON0044920



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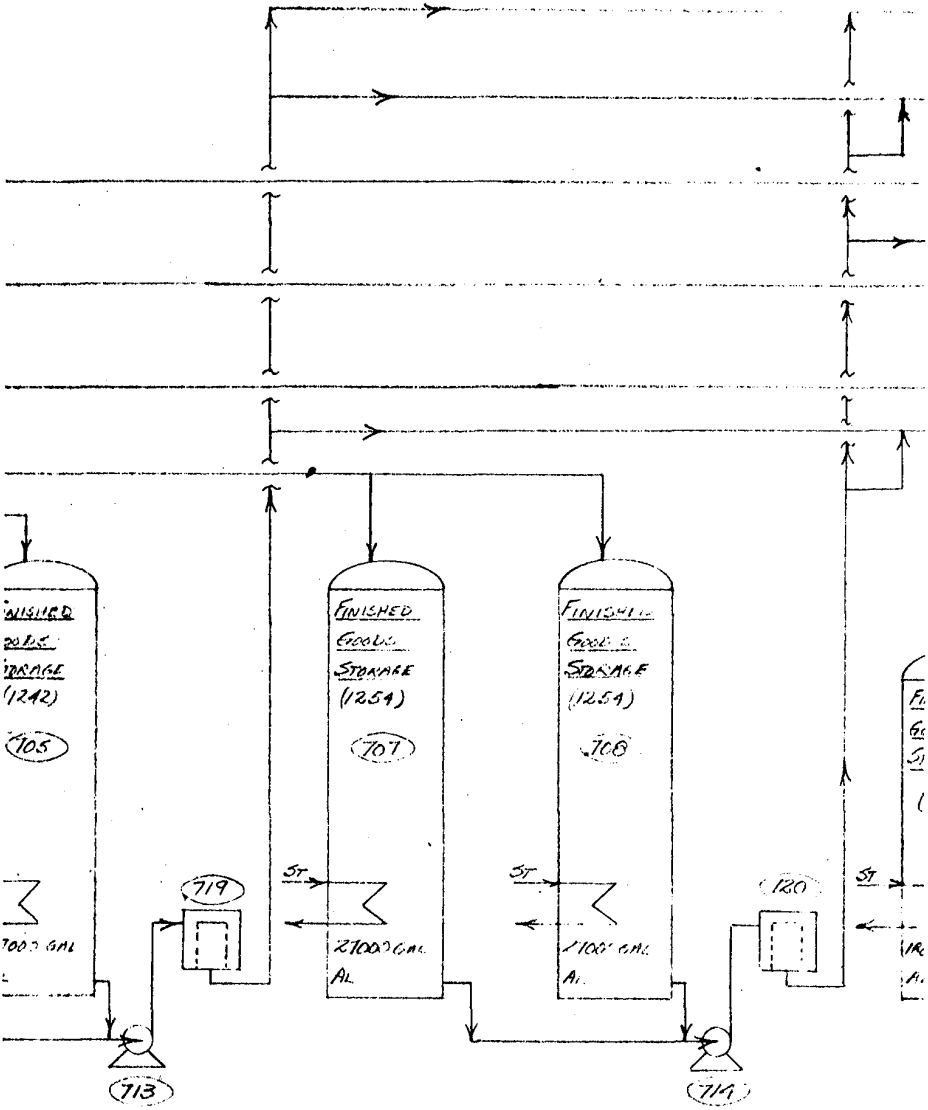

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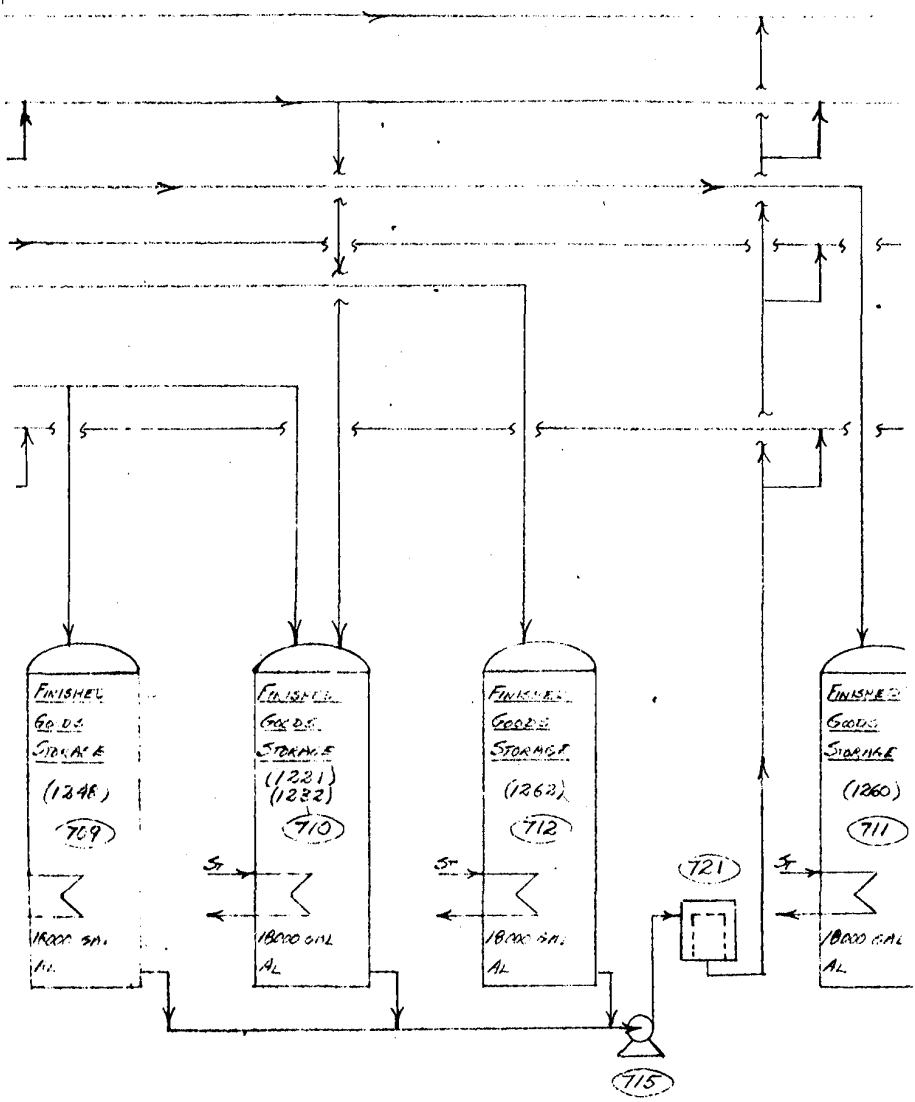

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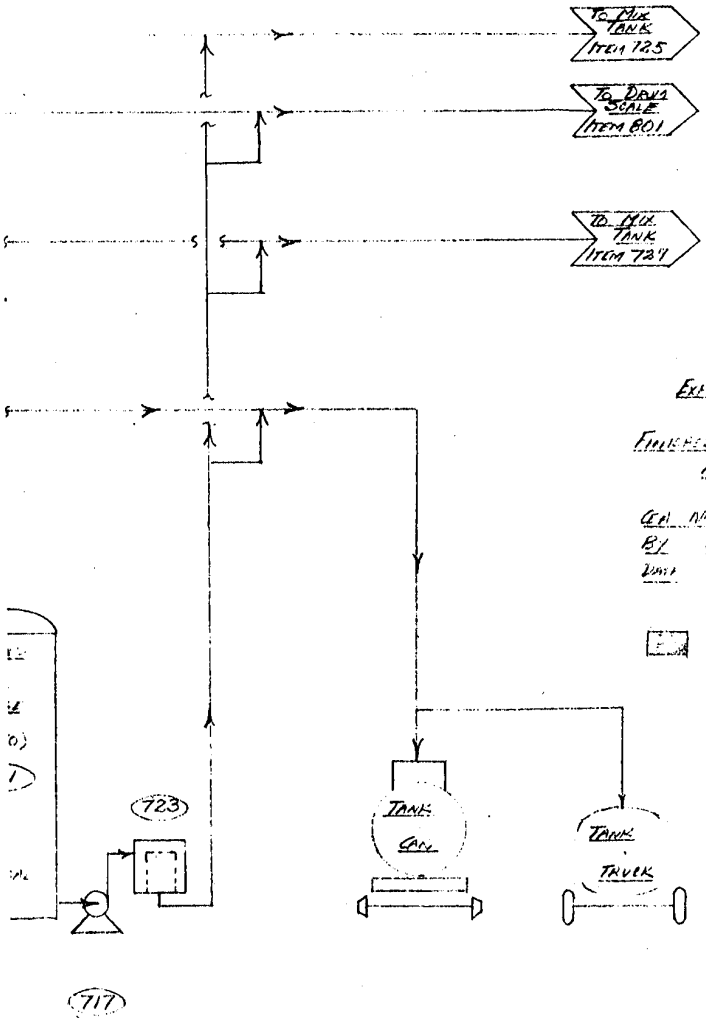
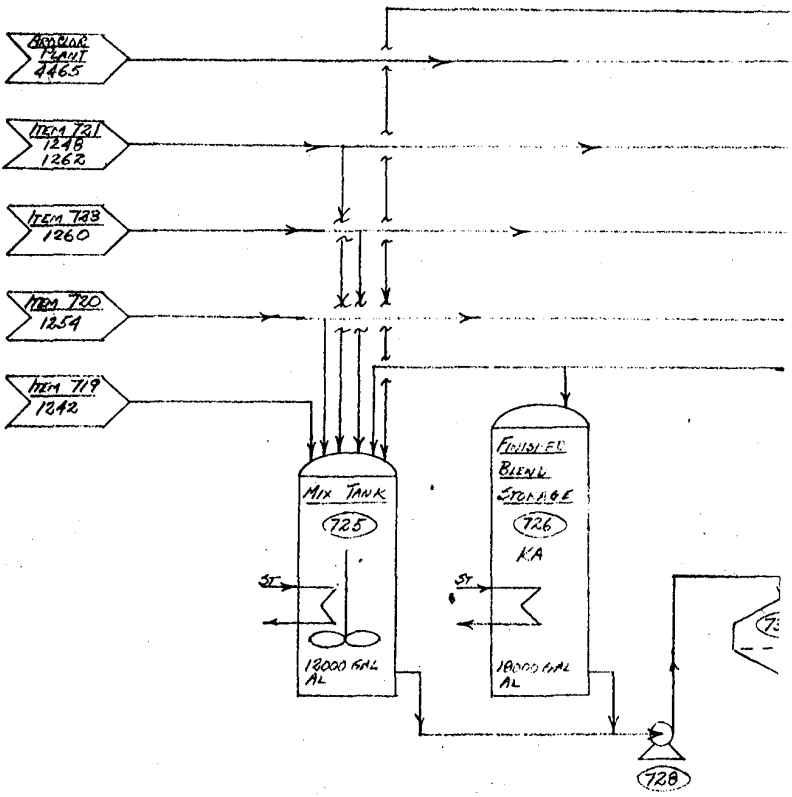
TOWOLDMON0044923



APPENDIX "A"
PAGE 1

0725838

TOWOLDMON0044924



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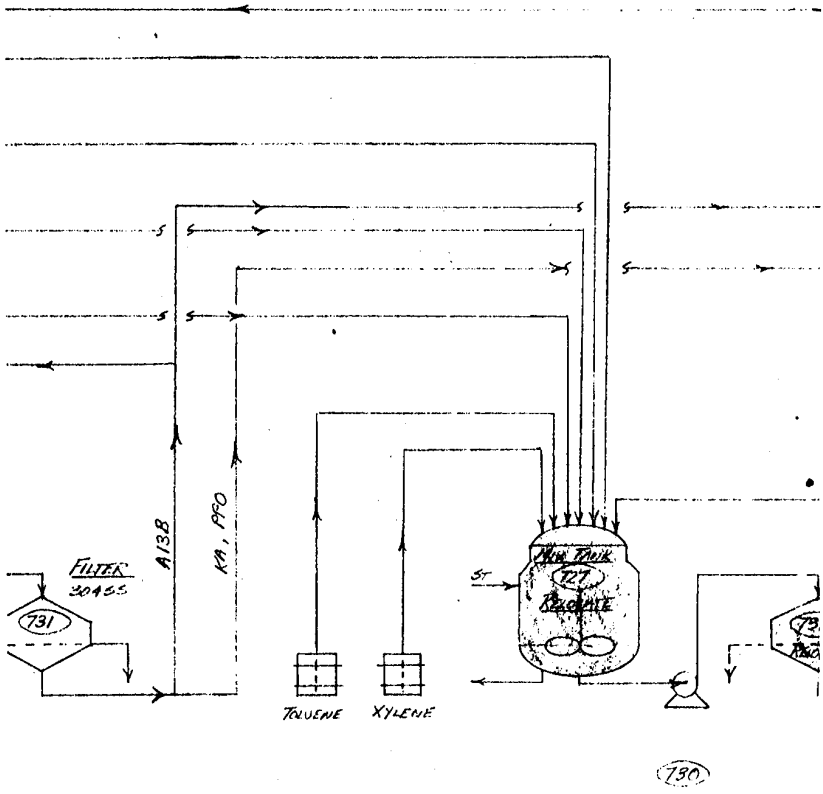

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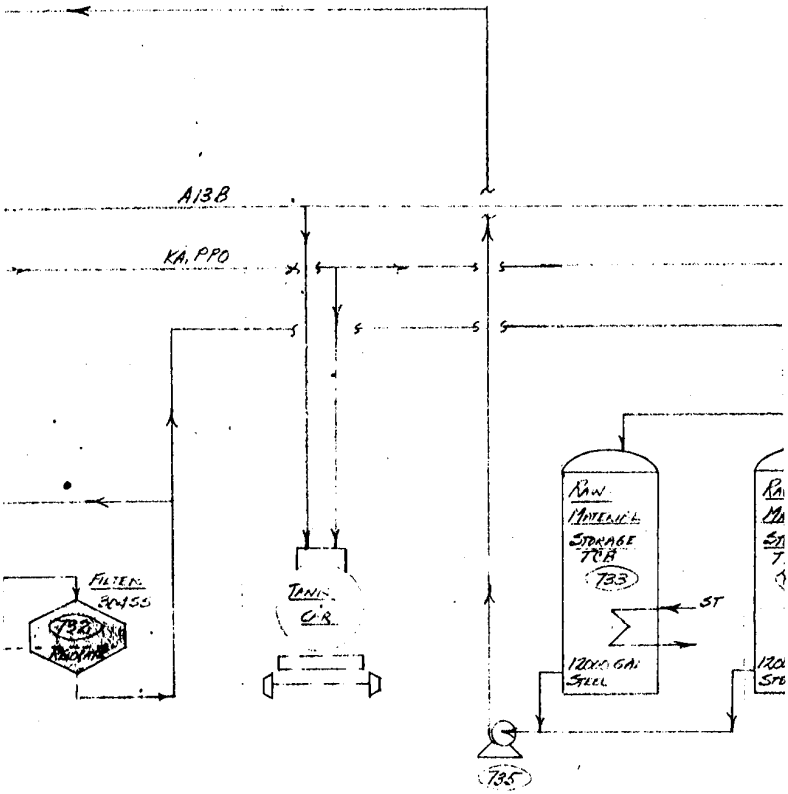

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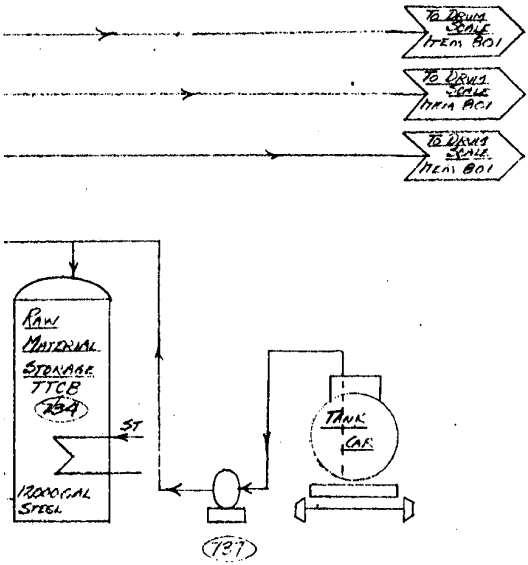


EXPAND ARDOLOR CAPACITY

BLENDING ANNISTON

CEA NO 1430
BY RS YATES
DATE 6-14-67

EXIST OR RELOCATE

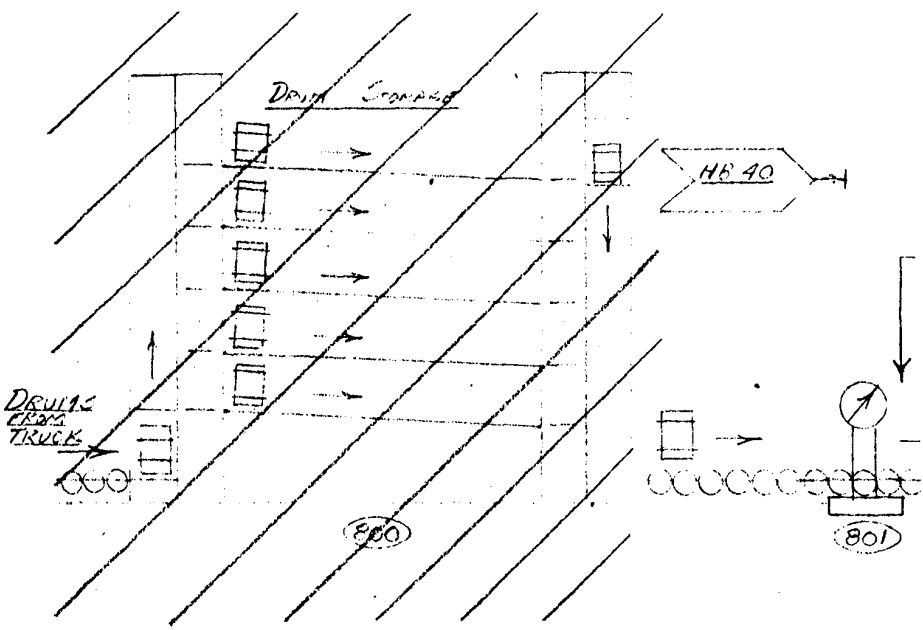
APPENDIX "A"
PAGE 2

0725842

MONSANTO COMPANY
[redacted]
ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

EXPAND AROCLOR CAPACITY
DRUMMING
PLANT ANNISTON
LOCATION ANNISTON, ALA

EQUIPMENT FLOW SH 1



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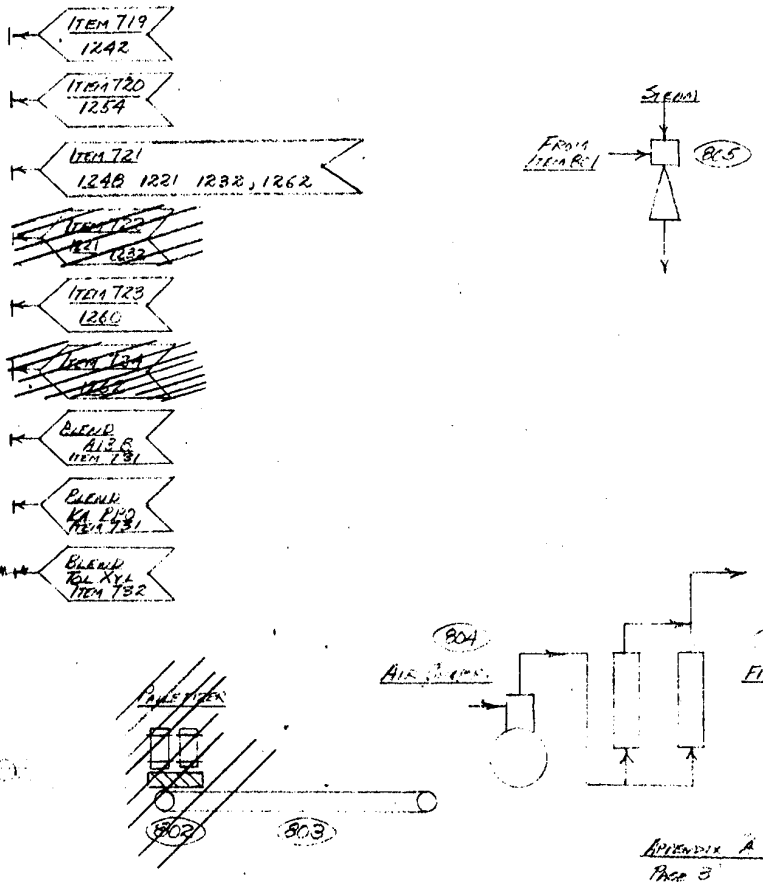
TOWOLDMON0044929

SHEET

DESIGN MANUAL SECTION NO. ____ ITEM NO. ____
ESTIMATE NO. 1430 E.A. NO. ____
PREPARED BY RSY DATE 5-4-67
SHEET 1 OF 1



APPENDIX A
PAGE 3

REV. NO.	DATE	REVISION	BY	APPROVED BY	DATE			
2	8-14-67	ADD IT 802, PRE-FILTER	RSY					
1	6-14-67	ADD IT 806, ONE LINE	RSY					

OE-159 (7/64)

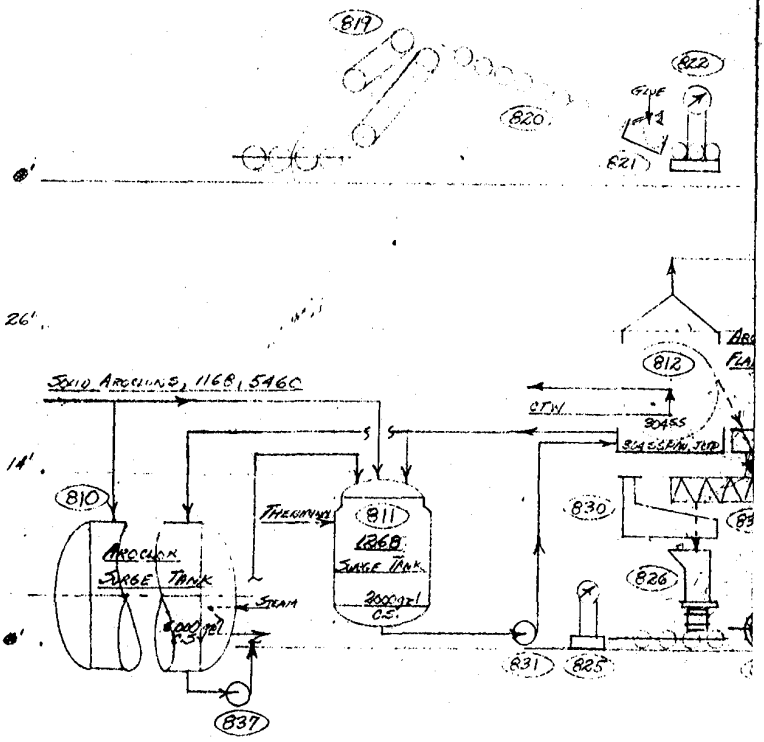
0725844

TOWOLDMON0044930

MONSANTO COMPANY
ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

EXPAND AROCLOR CAPACITY
FLAKING & BAGGING
PLANT ANNISTON
LOCATION ANNISTON, ALA

EQUIPMENT FLOW SHEE



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TOWOLDMON0044931

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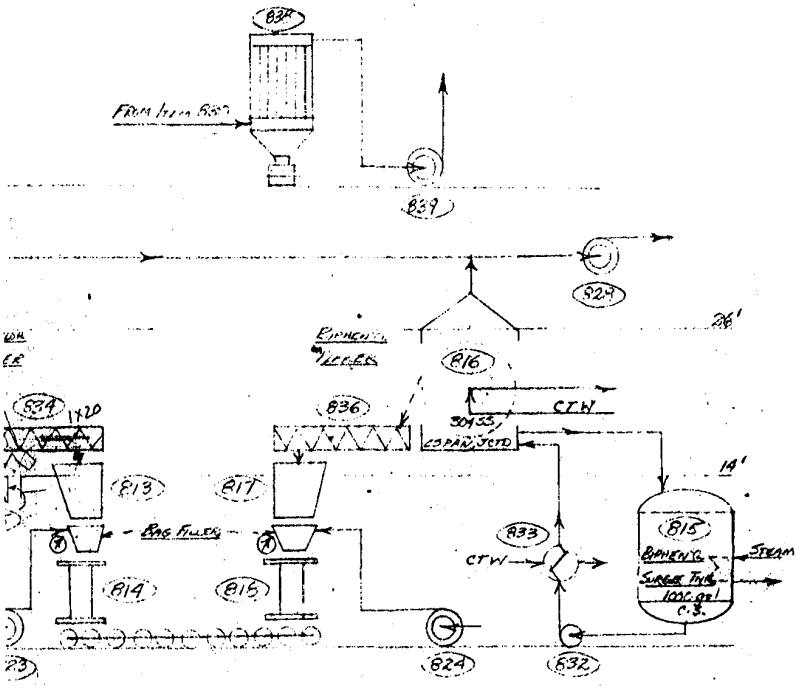
ESTIMATE NO. E.A. NO.
PREPARED BY K. Yates DATE 5-9-67
SHEET 1 OF 1



APPENDIX "A"
PAGE 4

			839 826		APPROVED BY	
2	8-14-67	REVD 837, 839, ADDED 837, 839 CMD 810		RST		
1	7-7-67	COMPLETE REVISION		RST	DATE	
NO.	DATE	REVISION		BY		

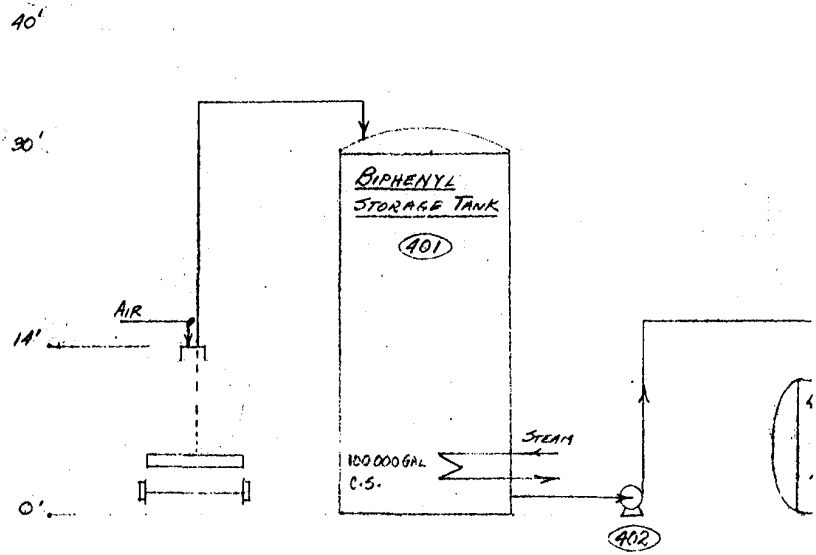
0725846

TOWOLDMON0044932

MONSANTO COMPANY
ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

EXPAND AROCLOR CAPACITY
BIPHENYL SIDE & FEED
PLANT W G KRUMMRICH
LOCATION SAUGET, ILL.

EQUIPMENT FLOW SHEET



0725847

TOWOLDMON0044933

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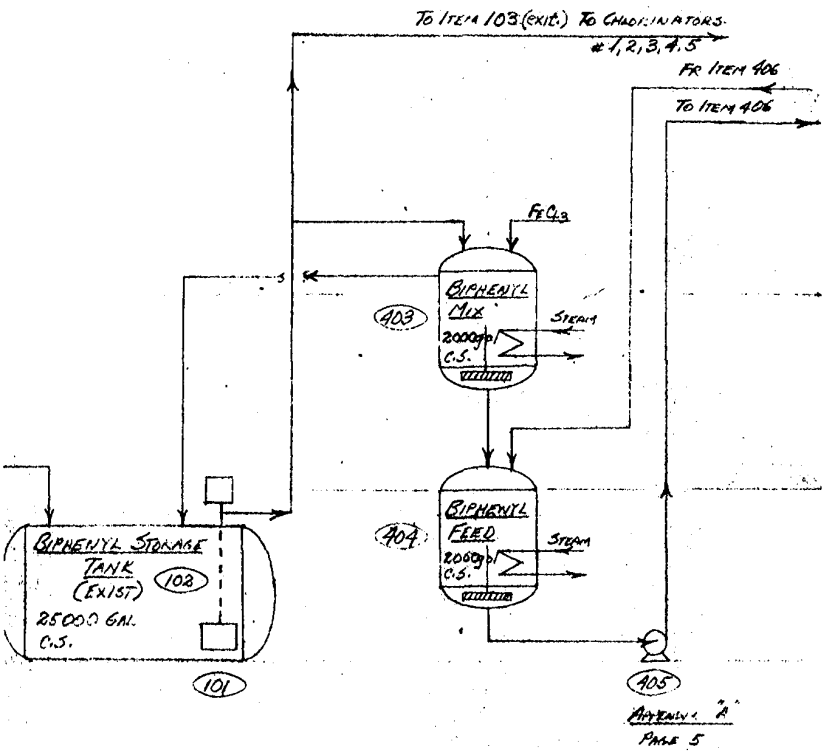
ESTIMATE NO. 1800 E.A. NO.
PREPARED BY KSV DATE 4-11-87
SHEET 1 OF 5



ATTACHMENT "A"
PAGE 5

REV. NO	DATE	REVISION	BY	APPROVED BY / DATE
1	4-15-87	IT 403 & 404 FR 2000 gal to 1450 gal	KSV	

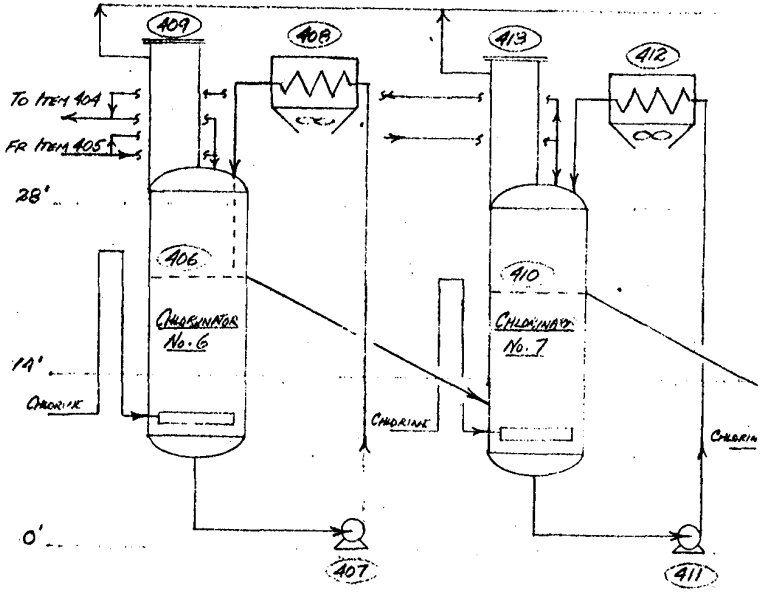
0725848

TOWOLDMON0044934

MONSANTO COMPANY
ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

EXPAND AROCLOR CAPACITY
CHLORINATION
PLANT W G KRUMRICH
LOCATION SAUGET, ILL.

EQUIPMENT FLOW SHEET



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TOWOLDMON0044935

SHEET

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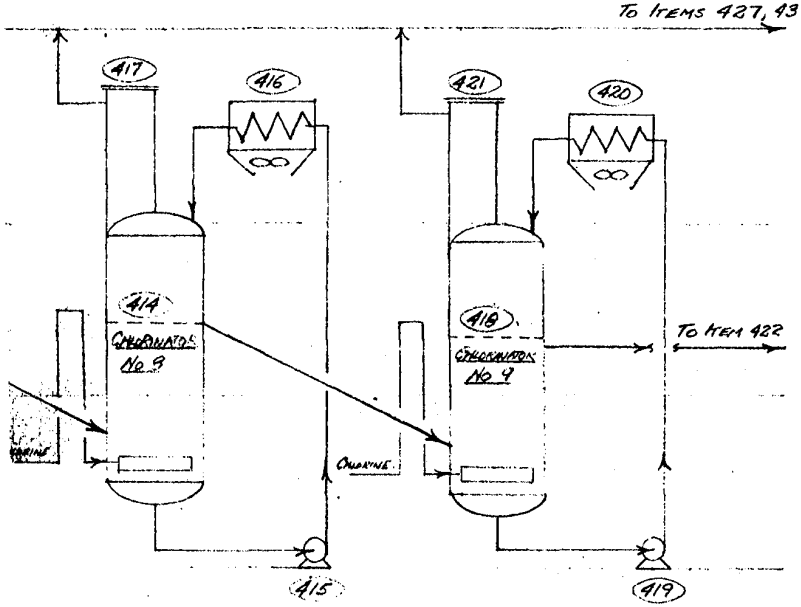
ESTIMATE NO. 1800 E.A. NO.
PREPARED BY RS Yates DATE 4-11-67
SHEET 2 OF 3



Appendix "A"
Page 6

REV. NO.	DATE	REVISION	BY	APPROVED BY	DATE			

OS-199 (7/64)

0725850

TOWOLDMON0044936

MONSANTO COMPANY
ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

EXPAND AROCLOR CAPACITY
BLOWING, INT. STGE. RECOVERY
PLANT W.G. KRUMMRICH
LOCATION SAUGET, ILLINOIS

EQUIPMENT FLOW SHEET

FROM CHLORINATOR NOS 6, 7, 8, 9

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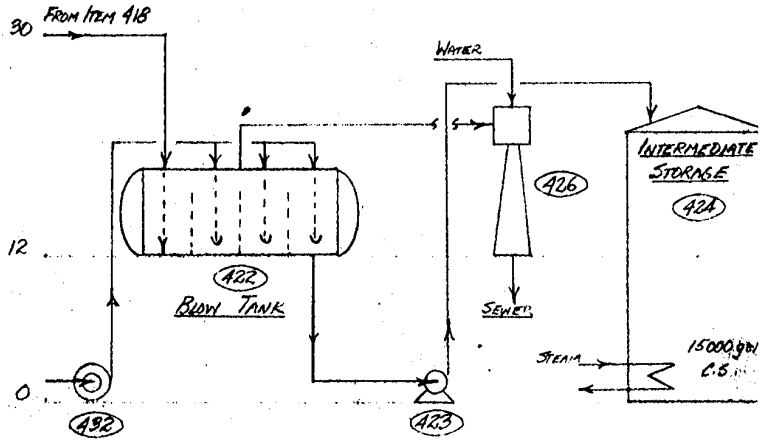
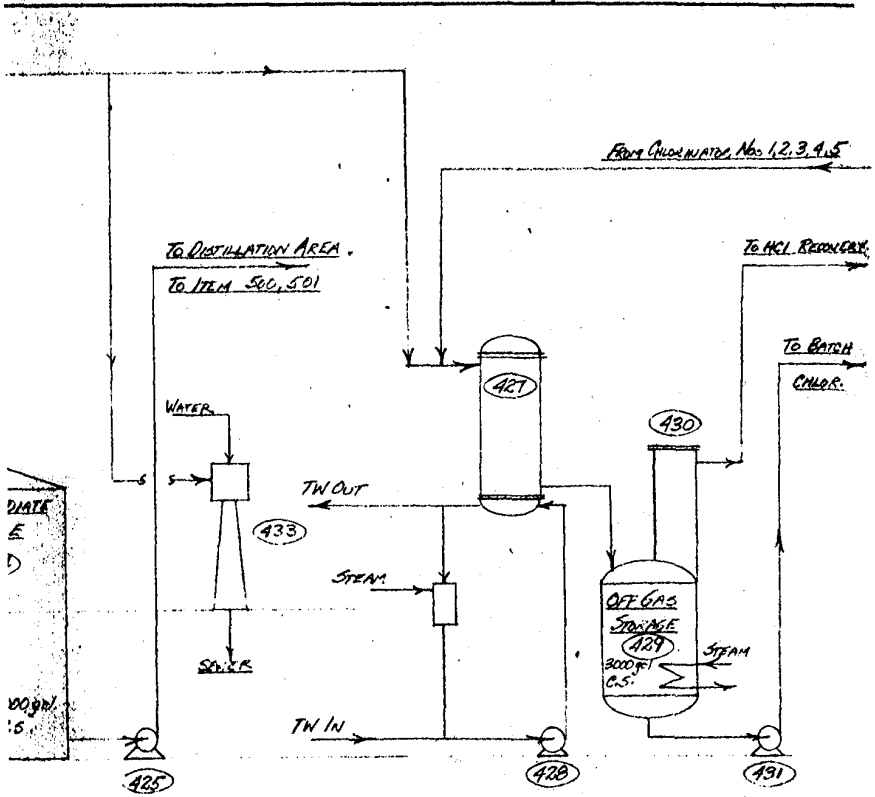


0725851

TOWOLDMON0044937

DESIGN MANUAL SECTION NO. 1800 | ITEM NO.
ESTIMATE NO. | E.A. NO.
PREPARED BY R.J. YATES | DATE 4-11-67
SHEET 3 OF 3



APPENDIX "A" PAGE 7

REV. NO.	DATE	REVISION	BY	APPROVED BY	DATE
1	8-28-67	ADDED ITEM 433	RSY		

OS-180 (7/64)

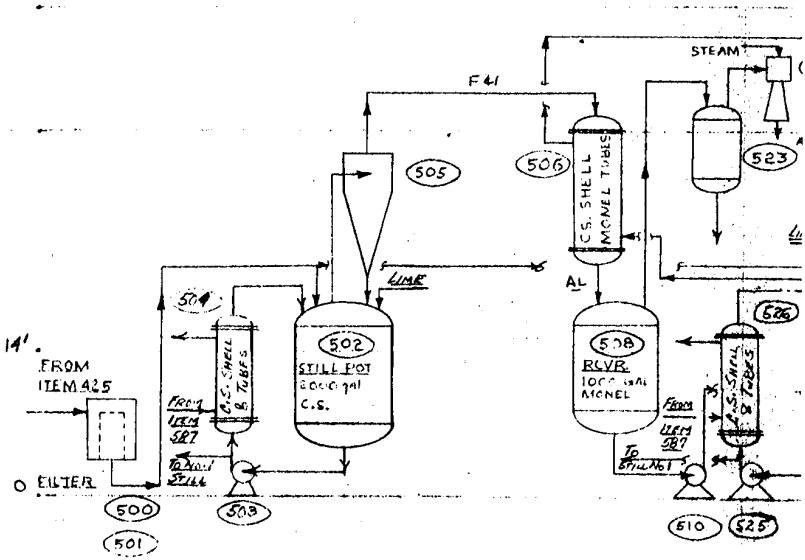
0725852

TOWOLDMON0044938

MONSANTO COMPANY
~~ORGANIC CHEMICALS DIVISION~~
ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

EXPAND AROCLOR CAPACITY
DISTILLATION
PLANT WG KRUMMRICH
LOCATION SAUGET, ILLINOIS

EQUIPMENT FLOW SHEET

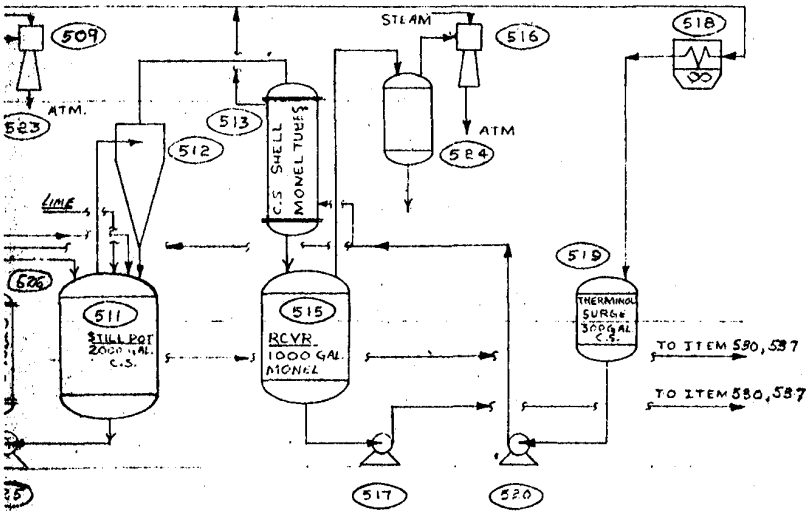


0725853

TOWOLDMON0044939

IEET

DESIGN MANUAL SECTION NO.	ITEM NO.
ESTIMATE NO. 1800	E.A. NO.
PREPARED BY RS YATES	DATE 7-17-67
SHEET 4 OF 5	



APPENDIX "A"
PAGE 8

REV. NO.	DATE	REVISION	BY	APPROVED BY / DATE			
1	8-23-67	ADDED IT 504, 525, 526, 503 RMVD IT 521, 522	RSY				

OE-150 (7/64)

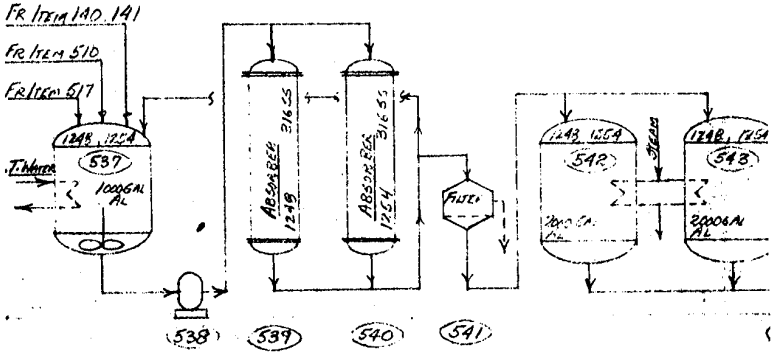
0725854

TOWOLDMON0044940

MONSANTO COMPANY
ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

EXPAND ARoclor CAPACITY
EARTH TREATMENT
PLANT W.G. KRUMMRICH
LOCATION SAUGET ILLINOIS

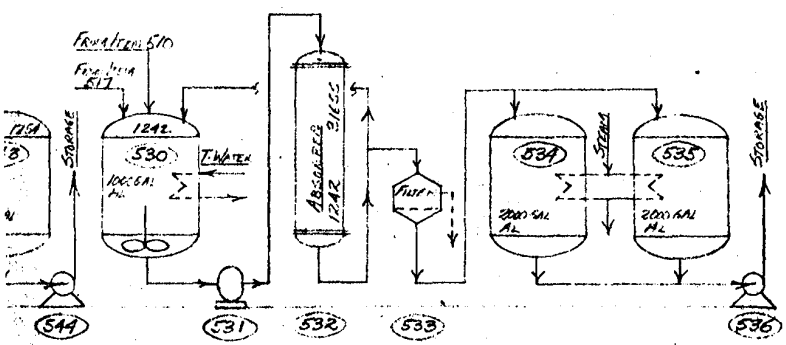
EQUIPMENT FLOW DIAGRAM



0725855

TOWOLDMON0044941

DESIGN MANUAL SECTION NO.	ITEM NO.
ESTIMATE NO. 1800	E.A. NO.
PREPARED BY R.S. YATES	DATE 8-23-67
SHEET 5 OF 5	



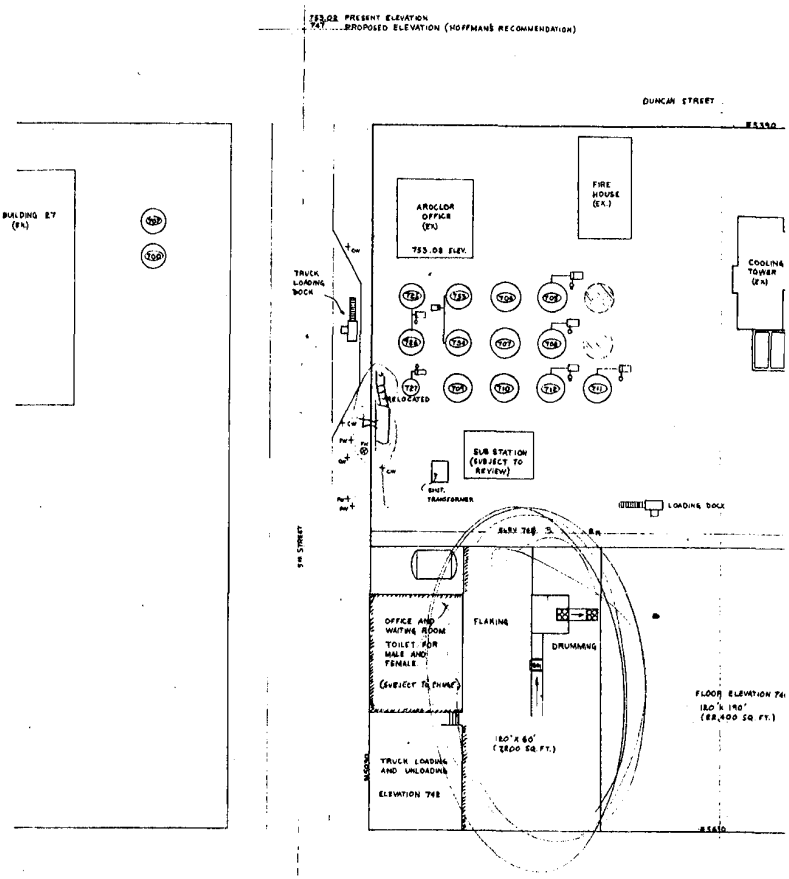
APPENDIX "A"
PAGE 9

REV. NO.	DATE	REVISION	BY	APPROVED BY / DATE			

OE-180 (7/64)

0725856

TOWOLDMON0044942



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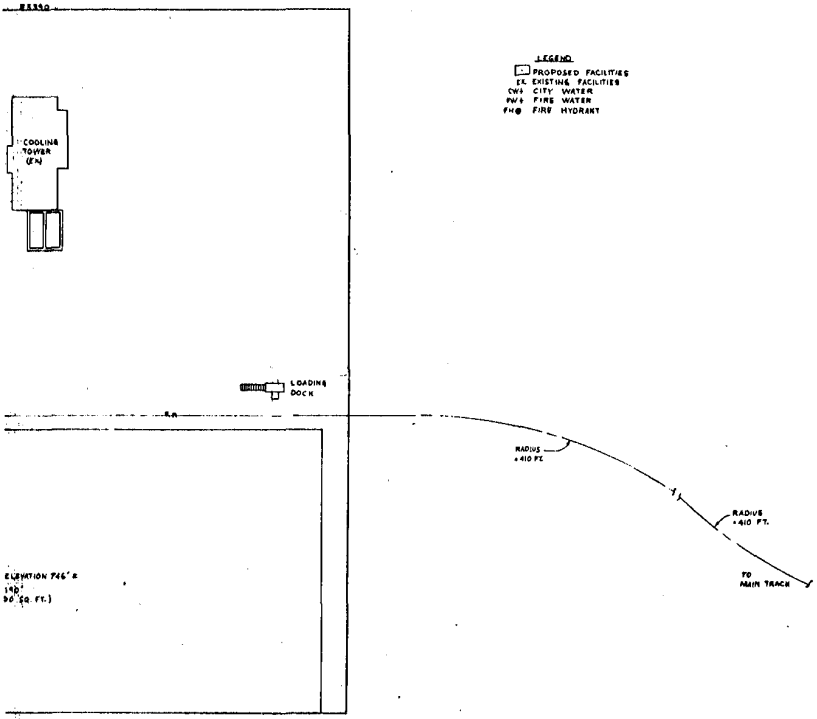

AROCLOR EXPANSION
DRUMMING, FLAKING, TANK FARM
PLANT: ANNISTON
LOCATION: ANNISTON, ALABAMA
C&A 1430
BY: V.D. GABELMAN
DATE: 6-23-67
SCALE: 1" = 20'-0"

APPENDIX B
PAGE 1

DLB 6-23-67

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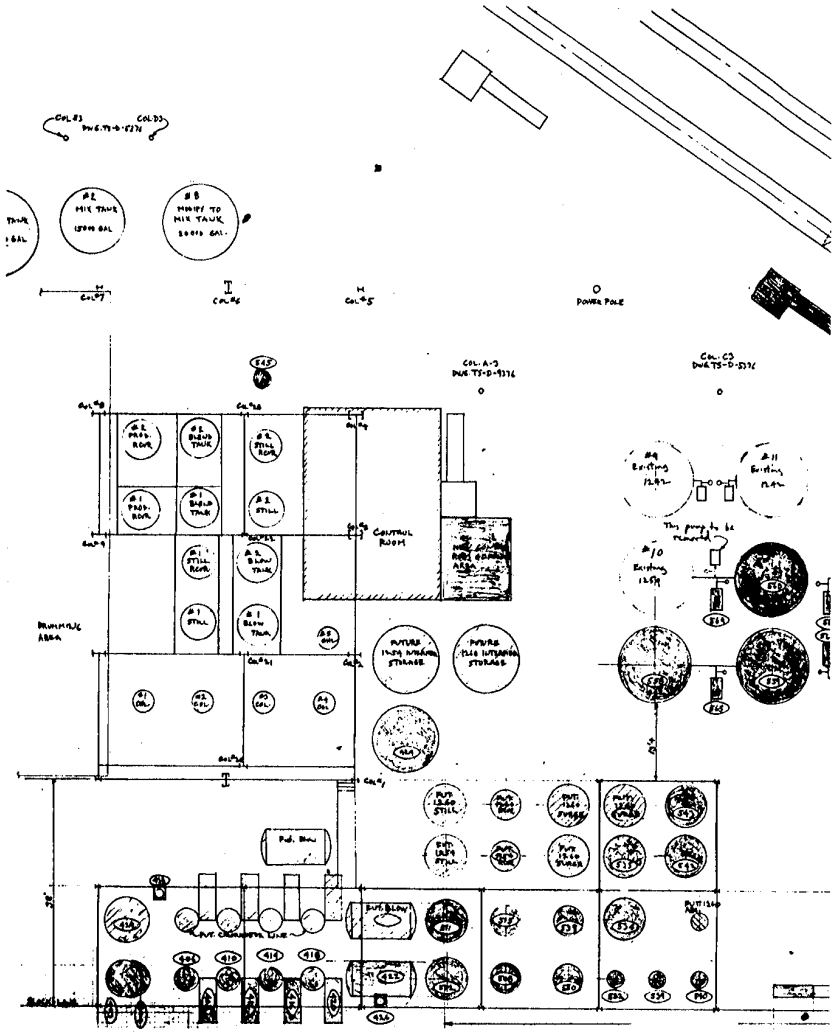
TOWOLDMON0044944



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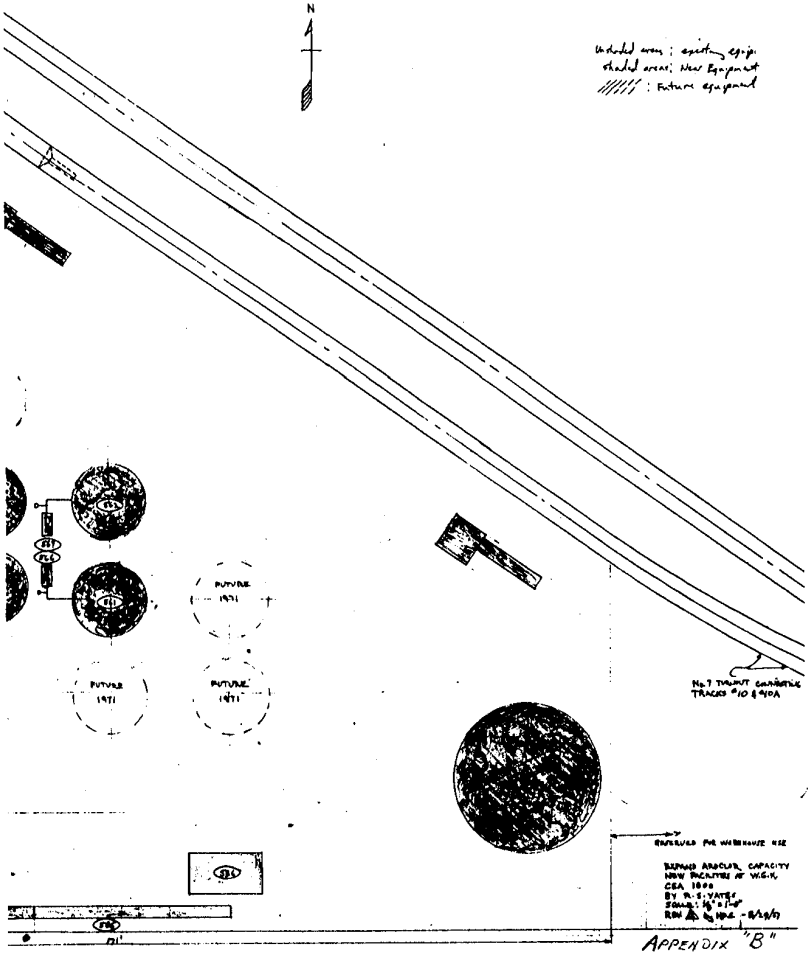

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TOWOLDMON0044946

REV. NO.	DATE	DESCRIPTION
1	7-28-67	GENERAL

MC
CI
ST

AR

REV. NO.	REMARKS	OPERATING TEMP. & PRESS.	MATERIALS OF CONSTRUCTION
	PLANT ITEM 210		ALUMINUM
	PL ITEM 213, DURCO A30, SIZE 3x2-13/11		
	PL ITEM 211		ALUMINUM
	PL ITEM 212, DURCO A30, SIZE 3x2-13/11		
	WITH 4 #70 SINGLE EMB PLATE COILS 18"x119", AREA 62 FT² 7500#	100°C 1/4 PSI	ALUMINUM
	SAME AS IT 704	100°C 1/4 PSI	ALUMINUM
	SAME AS IT 704	100°C 1/4 PSI	ALUMINUM
	SAME AS IT 704	100°C 1/4 PSI	ALUMINUM
	WITH 4 #70 SINGLE EMB PLATE COILS 18"x107", AREA 56 FT² 5500 #	100°C 1/4 PSI	ALUMINUM
	SAME AS IT 707	100°C 1/4 PSI	ALUMINUM
	SAME AS IT 707	100°C 1/4 PSI	ALUMINUM
	SAME AS IT 707	100°C 1/4 PSI	ALUMINUM
	AVS A30, SIZE 3x2-13	100°C	316SS
		TEFC	
	AVS A30, SIZE 3x2-13	100°C	316SS
		TEFC	
	AVS A30, SIZE 3x2-13	100°C	316SS
		TEFC	
	AVS A30, SIZE 3x2-13	100°C	316SS
		TEFC	

CE-178-12 66

0725861

TOWOLDMON0044947

MONSANTO COMPANY
CENTRAL ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

PROJECT: ANNISTON EXPANSION
SUBJECT: FINISHED GOODS STORAGE
PLANT: ANNISTON
LOCATION: ANNISTON, ALA.

DESIGN MANUAL SECTION NO.
PROJ. NO. C.E.A. NO. 1430
PREPARED BY R.S. YATES
DATE 6-19-67 SHEET 1 OF 6

AREA 01

EQUIPMENT LIST AND SUMMARY

APPROX. DIM.	NOMINAL RATING	NEW OR ON HAND	ITEM NO.	NAME
	11,500 GALS	OH	700	DAY TANK 1254
SEAL - #7 CRANE OUTSIDE QP 191	150GPM 120'TDH	OH	701	TRANSFER PUMP
		OH	701-001	MOTOR
	11,500 GALS	OH	702	DAY TANK 1242
SEAL - #7 CRANE OUTSIDE QP 191	150GPM 120'TDH	OH	703	TRANSFER PUMP
		OH	703-001	MOTOR
13'DIA x 29'0"	27000 GALS	N	704	FINISHED GOODS 1242
13'DIA x 29'0"	27000 GALS	N	705	FINISHED GOODS 1254
			706	CANCELLED
13'DIA x 29'0"	27000 GALS	N	707	FINISHED GOODS 1254
13'DIA x 29'0"	27000 GALS	N	708	FINISHED GOODS 1254
12'DIA x 22'0"	18000 GALS	N	709	FINISHED GOODS 1248
12'DIA x 22'0"	18000 GALS	N	710	FINISHED GOODS 1221, 1232
12'DIA x 22'0"	18000 GALS	N	711	FINISHED GOODS 1263
12'DIA x 22'0"	18000 GALS	N	712	FINISHED GOODS 1262
WITH MECH SEAL	200 GPM 100'TDH	N	713	TRANSFER PUMP
	15 HP 1800 RPM	N	713-001	MOTOR
WITH MECH SEAL	200 GPM 100'TDH	N	714	TRANSFER PUMP
	15HP 1800 RPM	N	714-001	MOTOR
WITH MECH SEAL	200GPM 100'TDH	N	715	TRANSFER PUMP
	15HP 1800 RPM	N	715-001	MOTOR
			716	CANCELLED
WITH MECH SEAL	200GPM 100'TDH	N	717	TRANSFER PUMP
	15HP 1800 RPM	N	717-001	MOTOR

APPENDIX "C" PAGE 1

0725862

TOWOLDMON0044948

REV. NO.	DATE	DESCRIPTION
1	7-28-67	GENERAL

REV. NO.	REMARKS	OPERATING TEMP. & PRESS.	MATERIALS OF CONSTRUCTION
	ALSIP PAK - # 12 S-6 WITH # 90 MEDIA MOUNT IN PARALLEL	100°C 50PSI	316 SS
	SEE IT 719	100°C 50PSI	316 SS
	SEE IT 719	100°C 50PSI	316 SS
	SEE IT 719	100°C 50PSI	316 SS
	WITH 4 #70 SINGLE EMB PLATECOILS 18"x107" - AREA 56 FT² 4500 #	100°C 1/4 PSI	ALUMINUM
	LIGHTNING MODEL 108-RCES-5.2 WITH MECH SEAL		
		TEFC	
	WITH 4 #70 SINGLE EMB PLATECOILS 18"x107" - AREA 56 FT² 5500 #	100°C 1/4 PSI	ALUMINUM
	PLANT ITEM 206 JETD TANK	100°C 1/4 PSI	C.S. AND 0.012" S-1
	AVS A20 - SIZE 3x1½-13		316 SS
		TEFC	
	AVS A20 - SIZE 3x1½-13		316 SS
		TEFC	
	SPANKLER # 33D-12 - 65 FT² AREA	100°C 50PSI	304 SS
	PLANT ITEM 643 - SPANKLER # 18 S 28 - 37.26 FT² AREA	100°C 50PSI	304 SS
	WITH 4 #70 SINGLE EMB PLATECOILS 18"x107" - AREA 56 FT² 10000 #	30°C 1/4 PSI	CARBON STEEL

CR-178 - 12/65

0725863

TOWOLDMON0044949

MONSANTO COMPANY
CENTRAL ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

PROJECT: ARSOCLOR EXPANSION
SUBJECT: FINISHED GOODS STORAGE
PLANT: ANNISTON
LOCATION: ANNISTON, ALA

DESIGN MANUAL SECTION NO.
PROJ. NO. C.E.A. NO. 1430
PREPARED BY RE YATES
DATE 6-19-67 SHEET 2 OF 6

AREA 01

EQUIPMENT LIST AND SUMMARY

F N	APPROX. DIM.	NOMINAL RATING	NEW OR ON HAND	ITEM NO.	NAME
				718	CANCELLED
	18"DIA x 5'LONG		N	719	PRODUCT FILTER
	18"DIA x 5'LONG		N	720	PRODUCT FILTER
	18"DIA x 5'LONG		N	721	PRODUCT FILTER
				722	CANCELLED
	18"DIA x 5'LONG		N	723	PRODUCT FILTER
				724	CANCELLED
	11'DIA x 13'0"	12000 GAL	N	725	MIX TANK
			N	725-001	DRIVE
		280 RPM	N	725-002	AGITATOR
		7½ HP 1800 RPM	N	725-003	MOTOR
	12'DIA x 22'0"	18000 GAL	N	726	FINISHED BLEND STORAGE
SEAL	6'6"DIA x 8'2"	2100 GAL	OH	727	MIX TANK
			OH	727-001	DRIVE
			OH	727-002	AGITATOR
			OH	727-003	MOTOR
		150 GPM 100'TDH	N	728	TRANSFER PUMP
		10 HP 1800 RPM	N	728-001	MOTOR
				729	CANCELLED
		150 GPM 100'TDH	N	730	TRANSFER PUMP
		10 HP 1800 RPM	N	730-001	MOTOR
	3'8"x 5'6"	65 GPM	N	731	FILTER
	[illegible]	80 GPM	ON	732	FILTER
SEAL	11'DIA x 18'0"	12000 GAL	N	733	TCB STORAGE TANK

APPENDIX 'C' PASTE

0725864

TOWOLDMON0044950

REV. NO.	DATE	DESCRIPTION
1	7-28-67	GENERAL
2	8-23-67	ADDED IT 739, 740, 741

REV. NO.	REMARKS	OPERATING TEMP. & PRESS.	MATERIALS OF CONSTRUCTION
	See Item 733	90°C 1/4 PSI	CARBON STEEL
	AVS A20, SIZE 3x1½-13		DUCTILE IRON
		TEFC	
	WORTH 36R HERR GEAR PUMP WITH DEEP STUFFING BOX		CAST IRON
		TEFC	
2	AVS A30, SIZE 3x2-13, REPL IT 605	100°C	316 SS
2		TEFC	
2	AVS A30, SIZE 3x2-13, REPL IT 603	100°C	316 SS
2		TEFC	
2	AVS A30, SIZE 3x2-13, REPL IT 601	100°C	316 SS
2		TEFC	

CE-176-12 66

0725865

TOWOLDMON0044951

MONSANTO COMPANY
CENTRAL ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

PROJECT: ANNULAR EXPANSION
SUBJECT: FINISHED GOODS STORAGE
PLANT: ANNISTON
LOCATION: ANNISTON, ALA.

DESIGN MANUAL SECTION NO.
PROJ. NO. C.E.A. NO. 1435
PREPARED BY R. E. YATES
DATE 6-19-67 SHEET 5 OF 6

AREA 01

EQUIPMENT LIST AND SUMMARY

APPROX. DIM.	NOMINAL RATING	NEW OR ON HAND	ITEM NO.	NAME
11'0" DIA x 18'0"	12000 GAL	N	734	TTCB STORAGE TANK
	150 GPM 100' TDH	N	735	TRANSFER PUMP
	10 HP 1800 RPM	N	735-001	MOTOR
			736	CANCELLED
	150 GPM 100' TDH	N	737	UNLOAD PUMP
	15 HP	N	737-001	MOTOR
			738	CANCELLED
WITH ALLEN SEAL	150 GPM 120' TDH	N	739	NO. 1 BL TNK PUMP
	15 HP 1800 RPM	N	739-001	MOTOR
WITH ALLEN SEAL	150 GPM 120' TDH	N	740	NO. 2 BL TNK PUMP
	15 HP 1800 RPM	N	740-001	MOTOR
WITH ALLEN SEAL	150 GPM 120' TDH	N	741	NO. 3 BL TNK PUMP
	15 HP 1800 RPM	N	741-001	MOTOR

APPENDIX "C" PAGE 3

0725866

TOWOLDMON0044952

REV. NO.	DATE	DESCRIPTION
1	6-14-67	GENERAL
2	8-23-67	REVD IT 802

MONSANTO
CENTRAL
ST. LOUIS

AREA

REV. NO.	REMARKS	OPERATING TEMP. & PRESS.	MATERIALS OF CONSTRUCTION
	TOLEDO MODEL 9116-A SUB-SURFACE HI SPEED LIQUID SCALE FILLER	100°C	STEEL, S.S. LAMPE
	CHAIN OPERATED		C.S.
		TEFC	
	JOY MODEL, INCL AIR RCVR AND COOLER		
		TEFC	
	WORTHINGTON 2½ NPA WITH No 15 STAGE		NOZZLE MONEL BODY CI
	TRINITY MODEL # SD HA2		C.S.
	INCL TANK, CONTR, COMPR, MAN HOLE		
		TEFC	
		TEFC	
	GRAVITY TYPE		

CE-176-12 66

0725867

TOWOLDMON0044953

NSANTO COMPANY
NTRAL ENGINEERING DEPARTMENT
LOUIS, MISSOURI

PROJECT AROCLOR EXPANSION
SUBJECT DRUMMING
PLANT ANNISTON
LOCATION ANNISTON, ALA

DESIGN MANUAL SECTION NO.
PROJ. NO. C.E.A. NO. 1430
PREPARED BY R S YATES
DATE 5-8-67 SHEET 4 OF 6

EQUIPMENT LIST AND SUMMARY

EA 01

	APPROX. DIM.	NOMINAL RATING	NEW OR ON HAND	ITEM NO.	NAME
				800	CANCELLED
E	24"x30" PLATFORM	1 TO 2 DRUMS/MIN	N	801	DRUM FILLER
				802	CANCELLED
	48" WIDE x 90' LONG	STORAGE FOR 20 PALETTES	N	803	DRUM CONVEYOR
		15HP 1800RPM	N	803-001	MOTOR
		50 SCFM 100 PSIG	N	804	COMPRESSOR
		25HP 1800RPM	N	804-001	MOTOR
EL		50 LBS AIR AT 25" HG VAC	N	805	EJECTOR
		45 SCFM 100 PSIG	N	806	INSTR AIR DRYER
		30GPM	N	807	SEWERAGE EJECTOR
		1½ HP	N	807-001	MOTOR
		1½ HP	N	807-002	MOTOR
	26" WIDE x 30' LONG		N	808	CONVEYOR FOR EMPTIES

APPENDIX "C" PAGE 4

0725868

TOWOLDMON0044954

REV. NO.	DATE	DESCRIPTION
1	8-14-67	ADDED IT 826, REV IT 810

MONSAN
CENTRA
ST. LOU

AREA -

REV. NO.	REMARKS	OPERATING TEMP. & PRESS.	MATERIALS OF CONSTRUCTION
1	WITH 10 # 70 SINGLE EMB PLATECOILS 36" x 12" 7000 #	200°C ATM	CARBON STEEL
	WITH JACKET 7000# TNK	200°C ATM	CARBON STEEL
	JCT	300°C 50PSI	
	AREA 125FT² (4'Ø x 10')	300°C ATM	PAN 304SS DRUM CR PLATED
		TEFC	
			304SS
		TEFC	
		70°C ATM	304 SS
	ST REGIS FORCE FLOW PACKER		304 SS
	WITH 85FT 1½" IPS SCH 80 COIL 1550#	100°C ATM	CARBON STEEL
	AREA 75FT² (4'Ø x 6')	100°C ATM	PAN C.S DRUM 304 SS
		TEFC	
		70°C ATM	304SS
	ST REGIS FORCE FLOW PACKER		304 SS
		TEFC	
	GRAVITY TYPE		
			CARBON STEEL
	TOLEDO MODEL 2091		
	ROOTS - CONN #42AF		
		TEFC	
	R-C #42AF		
		TEFC	
	PL ITEM 639 TOLEDO MODEL 2881		

CE-176-12/68

0725869

TOWOLDMON0044955

MONSANTO COMPANY
CENTRAL ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

PROJECT ARCELOR EXPANSION
SUBJECT FLAKING & DRUMMING
PLANT ANNISTON
LOCATION ANNISTON, ALA.

DESIGN MANUAL SECTION NO.
PROJ. NO. C.E.A. NO. 1430
PREPARED BY R. YATES
DATE 2-16-67 SHEET 3 OF 6

SA - 01

EQUIPMENT LIST AND SUMMARY

APPROX. DIM.	NOMINAL RATING	NEW OR ON HAND	ITEM NO.	NAME
10'DIA x 10' LONG	6000 GAL	N	810	ARCELOR STORAGE TANK
6'6"DIA x 7'9"	2000 GAL	N	811	5960-1166 SURGE TANK
5'WIDE x 16' LONG	6900 #/HR	N	812	ARCELOR FLAKER
	10 HP	N	812-001	MOTOR
		N	812-002	ARCELOR FLAKER PREMIXER
	2HP	N	812-003	MOTOR
3'x6'x6' HIGH		N	813	STORAGE HOPPER
6'x6'x7' HIGH	2 BAGS/MIN	N	814	ARCELOR BAG FILLER
6'DIA x 6'7"	1000 GAL	N	815	BIPHENYL SURGE TANK
5'WIDE x 10' LONG	3050 #/HR	N	816	BIPHENYL FLAKER
	5HP	N	816-001	MOTOR
3'x6'x6' HIGH		N	817	STORAGE HOPPER
6'x6'x9' HIGH	2 BAGS/MIN	N	818	BIPHENYL BAG FILLER
26"WIDE x 6' LONG	4 BAGS/MIN	N	819	BAG FLATTENER
	3HP	N	819-001	MOTOR
26"WIDE x 30' LONG	4 BAGS/MIN	N	820	BAG CONVEYOR
1'8" x 1'8"		N	821	GLUE APPLICATOR
1'8" x 1'8"	200 LB MAX	N	822	CHECK SCALE
	45 CFM 10 PSIG	N	823	FLUIDIZING AIR BLOWER
	5HP 1800 RPM	N	823-001	MOTOR
	45 CFM 10 PSIG	N	824	FLUIDIZING AIR BLOWER
	5HP 1800 RPM	N	824-001	MOTOR
		OH	825	DRUMMING SCALE, AR 126 B

APPENDIX "C" PAGE 5

0725870

TOWOLDMON0044956

REV. NO.	DATE	DESCRIPTION
1	8-14-67	ADDED IT 837, 838, 839

MONSANTO
CENTRAL
ST. LOUIS

AREA -

REV. NO.	REMARKS	OPERATING TEMP. & PRESS.	MATERIALS OF CONSTRUCTION
1			
1			
			CARBON STEEL
			304 SS
	WITH JCTD EP AND ST. BOX		
		TEFC	
	WITH JCTD EP AND ST BOX		
		TEFC	
	ONE DP COOLER - 10FT LONG		
			304 SS
		TEFC	
			304 SS
		TEFC	
			304 SS
		TEFC	
1	WITH JCTD EP AND ST BOX		
1		TEFC	
1			CARBON STEEL
1		TEFC	
1			
1		TEFC	

CE-175-12-66

0725871

TOWOLDMON0044957

MONSANTO COMPANY
CENTRAL ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

PROJECT: ARVIDA EXPANSION
SUBJECT: FLAKING - BAGGING
PLANT: ANNISTON
LOCATION: ANNISTON, ALA.

DESIGN MANUAL SECTION NO.
PROJ. NO. C.E.A. NO. 430
PREPARED BY R.S. YATES
DATE 6-16-67 SHEET 6 OF 6

AREA - 01

EQUIPMENT LIST AND SUMMARY

APPROX. DIM.	NOMINAL RATING	NEW OR ON HAND	ITEM NO.	NAME
		N	826	1268 MILL
	15HP	N	826-001	MOTOR
			827	CANCELLED
	2000 CFM	N	828	SUCTION BLOWER
	5HP	N	828-001	MOTOR
			829	CANCELLED
6'WIDE x 6'LONG		N	830	FUME REMOVAL HOOD
	50GPM 50'TDH	N	831	1268 TRANSFER PUMP
	3HP 1800RPM	N	831-001	MOTOR
	50GPM 50'TDH	N	832	BIPH TRANSFER PUMP
	3HP 1800RPM	N	832-001	MOTOR
12"x10'LONG		N	833	BIPH BOLLER
12"x20'LONG	6900 CB/HR	N	834	AROCLOR CONVEYOR
	3HP	N	834-001	MOTOR
12"x20'LONG		N	835	126B CONVEYOR
	3HP	N	835-001	MOTOR
12"x15'LONG		N	836	BIPH CONVEYOR
	3HP	N	836-001	MOTOR
	50GPM 50'TDH	N	837	TRANSFER PUMP
	3HP 1800RPM	N	837-001	MOTOR
	750 CFM	N	838	DUST COLLECTOR
	3/4 HP	N	838-001	SHAKER MOTOR
	1000 CFM	N	839	SUCTION BLOWER
	5HP	N	839-001	MOTOR

APPENDIX "C" PAGE 6

0725872

TOWOLDMON0044958

REV. NO.	DATE	DESCRIPTION

MONSANTO
CENTRAL
ST. LOUIS

AREA C

REV. NO.	REMARKS	OPERATING TEMP. & PRESS.	MATERIALS OF CONSTRUCTION
	Shell E = 1/4" Bottom E = 3/8" Head E = 3/16" With 250 Ft of 2" Sch 80 P/Lc	85°C Atm	Carbon Steel
	AVS A60, Size 3x2-10, Jetd EP	85°C	Cast Steel
		TEFC	
		200°F Atm	Carbon Steel
	Shell E = 3/16" With 100 Ft of Head E = 1/4" 2" Sch 80 Pipe Coil 2600 #	85°C Atm	Carbon Steel
	Falk Model 4ELH2 Reducer		
			Carbon Steel
		TEFC	
	Shell E = 3/16" With 100 Ft of Head E = 1/4" 2" Sch 80 Pipe Coil 2600 #	85°C Atm	Carbon Steel
	Falk Model 4ELH2 Reducer		
			Carbon Steel
		TEFC	
	AVS A50, Size 3x 1½-10, Jetd EP	85°C	Cast Steel
		TEFC	
	With SS sparger	150°C 5PSI	Carbon Steel
	AVS A30, Size 3x2-13	150°C	Ductile Iron
		TEFC	
	Disler Model 1-38 S32	150°C 50PSI	Steel Tubes Alum Fins
		TEFC	
	Brinks Type	150°C 5PSI	Carbon Steel
	With SS sparger	150°C 5 PSI	Carbon Steel
	AVS A30, Size 3x2-13	150°C	Ductile Iron
		TEFC	
	Taber Submerged # C-3 2½" inlet 2" outlet	TEFC	Monel Shaft Brinze Fittings

0725873

TOWOLDMON0044959

MONSANTO COMPANY
CENTRAL ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

PROJECT: AROCLOR EXPANSION
SUBJECT: 40M LB PLANT
PLANT: INRK
LOCATION: SAUGET, ILLINOIS

DESIGN MANUAL SECTION NO.
PROJ. NO. ____ C.E.A. NO. 1800
PREPARED BY RS/ATE
DATE 4-10-67 SHEET 1 OF 7

EQUIPMENT LIST AND SUMMARY

AREA 01

OF ON	APPROX. DIM.	NOMINAL RATING	NEW OR ON HAND	ITEM NO.	NAME
EL	25'DIA x 30'	100,000 GAL	N	401	BIPHENYL STORAGE
	WITH MECH SEAL	1000GPM 80'TDH	N	402	TRANSFER PUMP
		7½ HP 1800 RPM	N	402-001	MOTOR
EL	10'6"DIA x 40'6"	25000 GAL	OH	102	BIPHENYL STORAGE
EL	6'6"DIA x 7'9"	2000 GAL	N	403	BIPH ENYL MIX TANK
		125 RPM	N	403-001	DRIVE
EL	26"DIA TURBINE 3½"DIA SHAFT	125 RPM	N	403-002	AGITATOR
		10 HP, 1800 RPM	N	403-003	MOTOR
EL	6'6"DIA x 7'9"	2000 GAL	N	404	BIPHENYL FEED TANK
		125 RPM	N	404-001	DRIVE
EL	26"DIA TURBINE 3½"DIA SHAFT	125 RPM	N	404-002	AGITATOR
		10HP, 1800RPM	N	404-003	MOTOR
	WITH MECH SEAL	750GPM 60'TDH	N	405	BIPH FEED TRSF PUMP
		5HP, 1800 RPM	N	405-001	MOTOR
EL	4'DIA x 20'	1200 GAL	N	406	CHLOR NO 6
ON	WITH MECH SEAL	250GPM 100'TDH	N	407	NO 6 CHLOR PUMP
		15HP 1800 RPM	N	407-001	MOTOR
	8'x8'x6'	1,100,000 BTU/HR	N	408	NO 6 CHLOR COOLER
		2 HP 1200 RPM	N	408-001	MOTOR
EL			N	409	NO 6 CHLOR MIST ELIMINATOR
EL	4'DIA x 20'	1200 GAL	N	410	CHLOR NO 7
ON	WITH MECH SEAL	250 GPM 100'TDH	N	411	NO 7 CHLOR PUMP
		15HP 1800RPM	N	411-001	MOTOR
P INES			OH	101	BIPH STORAGE TRANSFER PUMP
3		3HP 1800RPM	OH	101-001	MOTOR

APPENDIX "C" PAGE 7

0725874

TOWOLDMON0044960

REV. NO.	DATE	DESCRIPTION

MONSANTO
CENTRAL E
ST. LOUIS,

REV. NO.	REMARKS	OPERATING TEMP. & PRESS.	MATERIALS OF CONSTRUCTION
	DISLER # 1-38 S32	150°C 50PSI	STEEL TUBES ALUM FINS
		TEFC	
	BRINKS TYPE	150°C 5PSI	CARBON STEEL
	WITH S.S. SPARGER	150°C 5PSI	CARBON STEEL
	AVS A30, SIZE 3x2-13	150°C	DUCTILE IRON
		TEFC	
	DISLER # 1-39 S32	150°C 50PSI	STEEL TUBES ALUM FINS
		TEFC	
	BRINKS TYPE	150°C 5PSI	
	WITH S.S. SPARGER	150°C 5PSI	CARBON STEEL
	AVS A30, SIZE 3x2-13	150°C	DUCTILE IRON
		TEFC	
	DISLER # 1-38 S32	150°C 50PSI	STEEL TUBES ALUM FINS
		TEFC	
	BRINKS TYPE	150°C 5PSI	CARBON STEEL
	Shell + head t = 1/4" WITH 3-1/4" t. baffles 4, 1 1/2" Ø Sparger pipes	150°C ATM	CARBON STEEL
	AVS A50, SIZE 3x1 1/2-10	100°C	DUCTILE IRON
		TEFC	
	Shell + head t = 1/4" 11,500#	65°C ATM	CARBON STEEL
	AVS A50, SIZE 3x1 1/2-10	100°C	DUCTILE IRON
		TEFC	
	STK SCRUBBER # 4014		HAVEG POLY ESTER
	426-3/4 x 14 BWG x 8'-2 LONG TUBES AREA - 695 FT² (4 PASS UNIT)	150°C 75PSI	CARBON STEEL

0725875

TOWOLDMON0044961

ONSANTO COMPANY
ENTRAL ENGINEERING DEPARTMENT
. LOUIS, MISSOURI

PROJECT Aroclor Expansion
SUBJECT 40 M LB PLANT
PLANT WGK
LOCATION Sauget, Illinois

DESIGN MANUAL SECTION NO.
PROJ. NO. C.E.A. NO. 1800
PREPARED BY R S Yates
DATE 4-10-67 SHEET 5 OF 7

EQUIPMENT LIST AND SUMMARY

	APPROX. DIM.	NOMINAL RATING	NEW OR ON HAND	ITEM NO.	NAME
	8' x 8' x 6'	1,100,000 BTU/HR	N	412	No 7 Chlor Cooler
		2HP 1200 RPM	N	412-001	Motor
			N	413	No. 7 Chlor Mist Eliminator
	4' DIA x 20'	1200 GAL	N	414	Chlor No 8
	With Mech Seal	250GPM 100' TDH	N	415	No 8 Chlor Pump
		15HP 1800RPM	N	415-001	Motor
	8' x 8' x 6'	1,100,000 BTU/HR	N	416	No 8 Chlor Cooler
		2HP 1200 RPM	N	416-001	Motor
			N	417	No 8 Chlor Mist Eliminator
	4' DIA x 20'	1200 GAL	N	418	Chlor No 9
	With Mech Seal	250GPM 100' TDH	N	419	No 9 Chlor Pump
		15HP 1800 RPM	N	419-001	Motor
	8' x 8' x 6'	1,100,000 BTU/HR	N	420	No 9 Chlor Cooler
		2HP 1200RPM	N	420-001	Motor
			N	421	No 9 Chlor Mist Eliminator
	6' DIA x 10'		N	422	Blow Tank
	With Mech Seal	25GPM 60' TDH	N	423	Transfer Pump
		3HP 1800RPM	N	423-001	Motor
	11' DIA x 22'	15000 GAL	N	424	Inter Storage Tank
	With Mech Seal	100GPM 60' TDH	N	425	Transfer Pump
		5HP 1800RPM	N	425-001	Motor
TER	8" Suct x 8" Disch	425 CFM 1" Draft	N	426	Scrubber
	2' DIA x 12' Long		N	427	Off Gas Condenser

Appendix "C" Page 8

0725876

TOWOLDMON0044962

REV. NO.	DATE	DESCRIPTION
1	8-23-67	ADDED Lt 433, 434

MONSANT
CENTRAL
ST. LOUI

REV. NO.	REMARKS	OPERATING TEMP. & PRESS.	MATERIALS OF CONSTRUCTION
	AVS A30, SIZE 3x2-13	30°C	DUCTILE IRON
		TEFC	
	HEAD E-1/4" WITH 125 FT SHELL - 3/16" OF 2" SCH 80 PIPE NO. 1 8400 #	60°C 5PSI	CARBON STEEL
	BRINKS TYPE	40°C 5PSI	CARBON STEEL
	AVS A60, SIZE 3x2-10	50°C	DUCTILE IRON
		TEFC	
			CARBON STEEL
		TEFC	
1	S+K SCRUBBER # 4014		HAVEG POLYESTER
1	AVS A80, SIZE 3x 2-13		DUCTILE IRON
1		TEFC	

0725877

TOWOLDMON0044963

MONSANTO COMPANY
CENTRAL ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

PROJECT: ARCLOR EXPANSION
SUBJECT: 40 M LB PLANT
PLANT: WGK
LOCATION: SAUGET, ILLINOIS

DESIGN MANUAL SECTION NO.
PROJ. NO. C.E.A. NO. 1800
PREPARED BY R S YATES
DATE 4-10-67 SHEET 3 OF 7

EQUIPMENT LIST AND SUMMARY

	APPROX. DIM.	NOMINAL RATING	NEW OR ON HAND	ITEM NO.	NAME
N	WITH MECH SEAL	350GPM 80'TDH	N	428	CIRCULATING PUMP
		15HP 1800RPM	N	428-001	MOTOR
EL	7'6" DIA × 8'9"	3000 GAL	N	429	OFF GAS STGE TANK
EL			N	430	MIST ELIMINATOR
		150GPM 70'TDH	N	431	TRANSFER PUMP
		7½HP 1800RPM	N	431-001	MOTOR
L		200CFM 10PSIG	N	432	AIR BLOWER
		15HP 1800RPM	N	432-001	MOTOR
R	12" SUCT × 12" DISCH	840 CFM	N	433	SCRUBBER
	WITH MECH SEAL	200GPM 100'TDH	N	434	WATER PUMP
		10HP 1800RPM	N	434-001	MOTOR

APPENDIX "C" PAGE 9

0725878

TOWOLDMON0044964

REV. NO.	DATE	DESCRIPTION
1	8-23-67	Cng'd rating of Item 504, 505, 506, 508, 515

MONSANT
CENTRAL
ST. LOUI

REV. NO.	REMARKS	OPERATING TEMP. & PRESS.	MATERIALS OF CONSTRUCTION
	FILTERITE #6CM S1-2 WITH 6 TUBES	65°C 15PSI	CARBON STEEL
	SAME AS IT 500	65°C 15PSI	CARBON STEEL
	SERIES "B" STD TNK 4100 #	250°C FV	CARBON STEEL
	AVS A40, SIZE 4x3-13	250°C	DUCTILE IRON
		TEFC	
	140 - 3/4" OD x 16 GA x 8' LONG TUBES AREA - 220 FT² WITH F&F EXP JOINT	250°C 50PSI	STEEL TUBES & SHELL
1	14" INLET & 16" OUTLET NOZZLE	250°C FV	CARBON STEEL
1	32 - 1 1/2" OD x 16 GA x 8' LONG TUBES AREA - 100 FT² WITH F&F EXP JOINT	250°C FV	STEEL SHELL MONEL OR AL TUBES, HD
1	SERIES "B" TYPE MONEL WT WITH 40 FT OF 1 1/2" IPS PIPE COIL 2200 #	150°C FV	MONEL OR AL
	WORTHINGTON 2 1/2 CPA 2 1/2 WITH NO 5+6 STAGES		MONEL NOZZLE CI BODY
	AVS A50, SIZE 3x1 1/2-10	100°C	316 SS
		TEFC	
	SERIES "B" STD TNK 4100 #	250°C FV	CARBON STEEL
	WITH 14" INLET & 16" OUTLET NOZZLE	250°C FV	CARBON STEEL
	32-1 1/2" OD x 16 GA x 8' LONG TUBES AREA 100 FT² WITH F&F EXP JOINT	250°C FV	STEEL SHELL MONEL OR AL TUBES, HD
1	SERIES "B" TYPE WITH MONEL WT 40 FT OF 1 1/2" IPS PIPE COIL 2200 #		MONEL OR AL
	WORTHINGTON 2 1/2 CPA 2 1/2 WITH NO 5+6 STAGES		MONEL NOZZLE CI BODY
	AVS A50, SIZE 3x1 1/2-10	100°C	316 SS
		TEFC	
	DILLER MODEL # 2VH	100°C 50PSI	STEEL TUBES AL FINS
		TEFC	
	925 #		CARBON STEEL

CB-378 (REV 8/68)

0725879

TOWOLDMON0044965

NSANTO COMPANY
NTRAL ENGINEERING DEPARTMENT
LOUIS, MISSOURI

PROJECT AROCLOR EXPANSION
SUBJECT 40 MLB PLANT
PLANT WGK
LOCATION SAUGET, ILLINOIS

DESIGN MANUAL SECTION NO.
PROJ. NO C.E.A. NO. 1800
PREPARED BY RS/ATES
DATE 4-26-67 SHEET 4 OF 7

EQUIPMENT LIST AND SUMMARY

	APPROX. DIM.	NOMINAL RATING	NEW OR ON HAND	ITEM NO.	NAME
	8"DIA x 1'7"	30 GPM	N	500	CLEANUP FILTER
	8"DIA x 1'7"	30 GPM	N	501	CLEANUP FILTER
	6'6"DIA x 7'9"	2000 GALS	N	502	STILL POT #1
		300GPM 100'TDH	N	503	STILL #1 CIRC PUMP
		20HP 1800RPM	N	503-001	MOTOR
ELL	1'2"DIA x 12'	650000 BTU/HR	N	504	STILL EXT HEAT EXCH.
	3'6"DIA x 10'OAH	3500 #/HR	N	505	CYCLONE SEPARATOR
HDS	1'4"DIA x 12'	400 000 BTU/HR	N	506	STILL CONDENSER
				507	CANCELLED
	5'0"DIA x 6'9"	1000 GAL	N	508	RECEIVER #1
		20 LB/HR at 40 MM	N	509	STILL #1 EJECTOR
		100GPM 60'TDH	N	510	TRANSFER PUMP
		5HP 1800 RPM	N	510-001	MOTOR
	6'6"DIA x 7'9"	2000 GALS	N	511	STILL POT #2
	3'6"DIA x 10'OAH	3500 #/HR	N	512	CYCLONE SEPARATOR
DS	1'4"DIA x 12'	400000 BTU/HR	N	513	STILL CONDENSER
				514	CANCELLED
	5'0"DIA x 6'9"	1000 GAL	N	515	STILL RECEIVER #2
		20 LB/HR AT 40 MM	N	516	STILL #2 EJECTOR
		100GPM 60'TDH	N	517	TRANSFER PUMP
		5HP 1800 RPM	N	517-001	MOTOR
	3'x3'6"x 5'9"	788000 BTU/HR	N	518	THERMINOL COOLER
		2HP	N	518-001	MOTOR
	3'6"DIA x 4'3"	300 GAL	N	519	THERMINOL SURGE TANK

APPENDIX "C" PAGE 10

0725880

TOWOLDMON0044966

REV. NO.	DATE	DESCRIPTION
1	8-23-67	Rmvd lt 521, 521-002, 522, Chgd Mtls-lt 523, 524
		Added-lt 525, 526
2	8-28-67	General revision lt 530-545

MONSANT
CENTRAL
ST. LOUI

REV. NO.	REMARKS	OPERATING TEMP. & PRESS.	MATERIALS OF CONSTRUCTION
	AVS A50, SIZE 3x1½-10	100°C	DUCTILE IRON
		TEFC	
1			
1			
1	925#	100°C FV	CARBON STEEL
1	925#	100°C FV	CARBON STEEL
1	AVS A40, SIZE 4x3-13	250°C	DUCTILE IRON
1		TEFC	
1	140-¾+10 x 16 GA x 6' LONG TUBES AREA-220 FT² WITH FT F EXP JOINT	250°C 50PSI	STEEL TUBES & SHELL
2	WITH 50 FT OF 2" IPS PIPE COIL-SERIES "A" TNK AL WT 1000#	100°C ATM	ALUMINUM
2	FALK MODEL 4ELHZ REDUCER		
2			316SS SHAFT AL TURBINE
2		TEFC	
	VIKING # K4288, 2" SUCT & DISCH WITH 4.14/1 REDUCTION - 420 RPM	100°C 100PSI	316 SS
		TEFC	
2	WITH 18" MA, 10" CHARGE NOZZLE - SUPPORT PLATE	65°C 100PSI	316 SS
	SPARKLER # 18D12	65°C 60PSI	304 SS
2	WITH 50 FT OF 2" IPS PIPE COIL SERIES "A" TNK 1500#		ALUMINUM
2	WITH 50 FT OF 2" IPS PIPE COIL SERIES "A" TNK 1500#		ALUMINUM
	AVS A50, SIZE 3x1½-10		316 SS
		TEFC	
2	WITH 50 FT OF 2" IPS PIPE COIL-SERIES "A" TNK AL WT 1000#	100°C ATM	ALUMINUM
	FALK MODEL 4ELHZ REDUCER		316SS SHAFT AL TURBINE

0725881

TOWOLDMON0044967

MONSANTO COMPANY
CENTRAL ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

PROJECT ARLOGA EXPANSION | DESIGN MANUAL SECTION NO.
SUBJECT 40M LB PLANT | PROJ. NO. C.E.A. NO. 1800
PLANT W&K | PREPARED BY RJ YATES
LOCATION SAUGET, ILLINOIS | DATE 4-10-67 SHEET 3 OF 7

EQUIPMENT LIST AND SUMMARY

	APPROX. DIM.	NOMINAL RATING	NEW OR ON HAND	ITEM NO.	NAME
	WITH MECH SEAL	100 GPM 60' TDH	N	520	THERMINOL CIRC PUMP
		5 HP 1800 RPM	N	520-001	MOTOR
				521	CANCELLED
				522	CANCELLED
	3'6" DIA x 4'3"	800 GAL	N	523	CATCH POT
	3'6" DIA x 4'3"	800 GAL	N	524	CATCH POT
		300 GPM 100' TDH	N	525	STILL #2 CIRC PUMP
		20 HP 1800 RPM	N	525-001	MOTOR
HELL	12" DIA x 12'	650 000 BTU/HR	N	526	STILL #2 EXT HEAT EX
				527-529	NOT USED
	5'6" DIA x 6'9"	1000 GAL	N	530	SURGE TANK FOR 1242
		100 RPM	N	530-001	DRIVE
	26" DIA TURBINE 8" DIA SHAFT	100 RPM	N	530-002	AGITATOR
		10 HP 1800 RPM	N	530-003	MOTOR
		376 GPM 100 PSI	N	531	TRANSFER PUMP
		10 HP 1800 RPM	N	531-003	MOTOR
	8'0" DIA x 15'	FLOW - 10 GPM	N	532	ABSORBER FOR 1242
	2'7" DIA x 5'1"	FLOW - 15 GPM	N	533	POLISHING FILTER
	6'6" DIA x 7'9"	2000 GAL	N	534	SURGE TANK FOR 1242
	6'6" DIA x 7'9"	2000 GAL	N	535	SURGE TANK FOR 1242
	WITH MECH SEAL	100 GPM - 60' TDH	N	536	TRANSFER PUMP
		5 HP 1800 RPM	N	536-001	MOTOR
	5'6" DIA x 6'9"	1000 GAL	N	537	SURGE TANK FOR 1254
	26" DIA TURBINE 8" DIA SHAFT	100 RPM	N	537-001	DRIVE

APPENDIX C PAGE 11

0725882

TOWOLDMON0044968

REV. NO.	DATE	DESCRIPTION
2	8-23-67	General revision lt 530-545
3	8-23-67	Added seals to lt 564, 565, 566, 567

MONSANT
CENTRAL
ST. LOUI

REV. NO.	REMARKS	OPERATING TEMP. & PRESS.	MATERIALS OF CONSTRUCTION
2			Aluminum turbine 316 SS shaft
2		TEFC	
2	Viking # K 4286, 2" suct & disch with 4.19/1 reduction, RPM-420	100°C 100PSI	316 SS
2		TEFC	
2	See Item 532	65°C 100PSI	316 SS
2	See Item 532	65°C 100PSI	316 SS
2	Sparkler # 18212	65°C 100PSI	304 SS
2	See Item 534	65°C Atm	Aluminum
2	See Item 535	65°C Atm	Aluminum
2	AVS A50, Size 3x1½-10	65°C	316 SS
2		TEFC	
2	See Item 532	65°C 100PSI	316 SS
	With 4 # 70 platecoils, 22"x119", SE	65°C ¼PSI	Aluminum
	Same As lt 558	65°C ¼PSI	Aluminum
	" " " 558	65°C ¼PSI	Aluminum
	" " " 558	65°C ¼PSI	Aluminum
	" " " 558	65°C ¼PSI	Aluminum
3	AVS A30, Size 3x2-13	100°C 50PSI	316 SS
		TEFC	
3	AVS A30, Size 3x2-13	100°C 50PSI	316 SS
		TEFC	

CE-176-12-66

0725883

TOWOLDMON0044969

ONSANTO COMPANY
ENTRAL ENGINEERING DEPARTMENT
T. LOUIS, MISSOURI

PROJECT: AROCLOR EXPANSION
SUBJECT: 40 MT LB PLANT
PLANT: WGK
LOCATION: SAUGET, ILLINOIS

DESIGN MANUAL SECTION NO.
PROJ. NO. C.E.A. NO. 1800
PREPARED BY R S YATES
DATE 4-10-67 SHEET 6 OF 7

EQUIPMENT LIST AND SUMMARY

	APPROX. DIM.	NOMINAL RATING	NEW OR ON HAND	ITEM NO.	NAME
NE T	26" DIA TURBINE 3" DIA SHAFT	100 RPM	N	537-002	AGITATOR
		10HP 1800RPM	N	537-003	MOTOR
		37GPM 100PSI	N	538	TRANSFER PUMP
		10HP 1800RPM	N	538-001	MOTOR
	3'0" DIA x 15'	FLOW - 10 GPM	N	539	ABSORBER FOR 1248
	3'0" DIA x 15'	FLOW - 10 GPM	N	540	ABSORBER FOR 1254
	2'7" DIA x 5'1"	FLOW - 15 GPM	N	541	POLISHING FILTER
	6'6" DIA x 7'9"	2000 GAL	N	542	SURGE TANK FOR 1254
	6'6" DIA x 7'9"	2000 GAL	N	543	SURGE TANK FOR 1254
	WITH MECH SEAL	100GPM 80' TDH	N	544	TRANSFER PUMP
		5HP 1800RPM	N	544-001	MOTOR
	3'0" DIA x 15'	FLOW - 10 GPM	N	545	ABSORBER FOR 1260
				546 - 557	NOT USED
	12'6" DIA x 24'	22000 GAL	N	558	FINISHED STORAGE 1242
	12'6" DIA x 24'	22000 GAL	N	559	FINISHED STORAGE 1242
	12'6" DIA x 24'	22000 GAL	N	560	FINISHED STORAGE 1254
	12'6" DIA x 24'	22000 GAL	N	561	FINISHED STORAGE 1260
	12'6" DIA x 24'	22000 GAL	N	562	FINISHED STORAGE 1248
				563	CANCELLED
	WITH MECH SEAL	200GPM 100' TDH	N	564	TRANSFER PUMP
		15HP 1800RPM	N	564-001	MOTOR
	WITH MECH SEAL	200 GPM 100' TDH	N	565	TRANSFER PUMP
		15HP 1800 RPM	N	565-001	MOTOR

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0725884

TOWOLDMON0044970

REV. NO.	DATE	DESCRIPTION

MONSANTO
CENTRAL
ST LOUIS

REV. NO.	REMARKS	OPERATING TEMP. & PRESS.	MATERIALS OF CONSTRUCTION
B	AVS A30, SIZE 3x2-13	100°C 50 PSI	316 SS
		7EFC	
B	AVS A30, SIZE 3x2-13	100°C 50 PSI	316 SS
		7EFC	
	R NO 125-6 ALSCO PAK FILTERS MTD IN PARALLEL - WITH # 90 MEDIA	100°C 50 PSI	316 SS
	See Item 567	100°C 50 PSI	316 SS
	" " 567	100°C 50 PSI	316 SS
	" " 567	100°C 50 PSI	316 SS
	BROWN FINTUBE No 102 HEATER	575°F 75 PSI	CARBON STEEL
	WITH 20FT OF 3" IPS PIPE COIL	575°F AIR	CARBON STEEL
	TRACK VEAT SYSTEM # 346 CCG		CAST STEEL
		7EFC	
	BRINKS UNIT - SAME AS EXISTING UNIT WITH # 1542 ELEMENT	100°C 18 PSI	

0725885

TOWOLDMON0044971

SANTO COMPANY
TRAL ENGINEERING DEPARTMENT
LOUIS, MISSOURI

PROJECT: ARCHER EXPANSION
SUBJECT: 40 M LB PLANT
PLANT: W/SK
LOCATION: SAUGET, ILLINOIS

DESIGN MANUAL SECTION NO.
PROJ. NO. C.E.A. NO. 1800
PREPARED BY RS/ATES
DATE 2-10-67 SHEET 2 OF 7

EQUIPMENT LIST AND SUMMARY

APPROX. DIM.	NOMINAL RATING	NEW OR ON HAND	ITEM NO.	NAME
	200 GPM 100' TDH	N	566	TRANSFER PUMP
	15HP 1800 RPM	N	566-001	MOTOR
	200 GPM 100' TDH	N	567	TRANSFER PUMP
	15HP 1800 RPM	N	567-001	MOTOR
			568	CANCELLED
18" x 5' LONG		N	569	PRODUCT FILTER
18" x 5' LONG		N	570	PRODUCT FILTER
18" x 5' LONG		N	571	PRODUCT FILTER
18" x 5' LONG		N	572	PRODUCT FILTER
			573-584	NOT USED
10" DIA x 30' LONG	1,200,000 BTU/HR	N	585	THERMINOL HEATER
5'0" DIA x 10' LONG	1500 GAL	N	586	THERMINOL SURGE TANK
	350 GPM 165' TDH	N	587	THERMINOL CIRC PUMP
	50HP 1800 RPM	N	587-001	MOTOR
			588-589	NOT USED
1'8" DIA x 6'3"	4500 LB/HR Cl2	N	590	CHLORINE MIST ELIMINATOR

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0725886

TOWOLDMON0044972

CEA 1430
Date: August 28, 1967
By: H. D. Gabelman

SCOPE OF WORK

Aroclor Expansion at Anniston

Storage Tank Farm and Mixing Station

Appendix "D"

0725887

TOWOLDMON0044973

General:

The facilities included in this project are intended to:

1. Assure storage capacity for minimum inventories of the various Aroclors and blends so that bulk shipments can be made on demand.

2. Provide for blending of several Aroclors with other components without holding up primary production facilities.

3. Minimize the potential for cross contamination of products.

4. Provide loading facilities for tank cars, tank trucks and unloading facilities for raw materials in tank cars.

Major Equipment Includes

2 - 27,000 gallon Aluminum Storage Tanks for 1242.

2 - 27,000 gallon Aluminum Storage Tanks for 1254.

1 - 18,000 gallon Aluminum Storage Tank for 1248.

1 - 18,000 gallon Aluminum Storage Tank for 1221/1232.

1 - 18,000 gallon Aluminum Storage Tank for 1260.

1 - 18,000 gallon Aluminum Storage Tank for 1262.

1 - 12,000 gallon Steel Storage Tank for TCB.

1 - 12,000 gallon Steel Storage Tank for TTCB.

1 - 11,500 gallon Aluminum Day Tank for 1242 (Existing).

1 - 11,500 gallon Aluminum Day Tank for 1254 (Existing).

1 - 12,000 gallon Aluminum Blend Tank for A13B.

1 - 18,000 gallon Aluminum Storage Tank for KA-PPO.

1 - Existing and relocated 2,000 gallon Aluminum Blend Tank for Toluene and Xylene Blends.

All storage tanks to have plate coil heaters and to be insulated on lower half. Existing day tanks will be left "as is". The 2,000 gallon blend tank will be left "as is" except it will be relocated. The 12,000 gallon Aluminum Blend Tank for A13B will have plate coils, heaters, insulation and an agitator. The 18,000 gallon Aluminum Blend Tank will have plate coil heaters and insulation.

0725888

TOWOLDMON0044974

Pumps

All 316 SS except TCB and TTCB which are cast iron.

1242 - Common loading pump for 2 storage tanks to loading spots; existing transfer pump from day tank to storage. See Code 93 paragraph 5 concerning pumps.

1254 - Common loading pump for 2 storage tanks to loading spots; existing transfer pump from day tank to storage. See Code 93 paragraph 5 concerning pumps.

1248/1221 - Existing transfer pump from receiver to storage - common pump. See Code 93 paragraph 5 concerning pumps.

1262 - Existing transfer pump from receiver to storage. See Code 93 paragraph 5 concerning pumps.

1248/1221/1232/1262 - Common loading pump from storage to loading spot.

1260 - Existing transfer pump from receiver to storage - loading pump from storage to loading spot. See Code 93 paragraph 5 concerning pumps.

TCB and TTCB have one common pump for unloading from tank cars and one common pump for transfer to blend tanks.

Blend tank for A13B and storage tank for KA-PPO will have common transfer pump from tanks to loading spot or drumming.

Blend tank for Toluene and Xylene blends will have a transfer pump from tank to drumming.

Filters

All 316 SS or 304 SS.

Separate filters (Alsop) are provided for 1242, 1254, 1260 and 1248/1262/1221/1232.

A new filter (Sparkler) is provided for A13B/KA-PPO from mix and finished blend storage tanks. An existing Sparkler filter will be relocated for the Toluene and Xylene blends.

Piping

Separate transfer lines are provided for:

1242 - From day tank to storage to loading docks.

1254 - From day tank to storage to loading docks.

1260 - From receiver to storage to loading docks.

TOWOLDMON0044975

1262 - From receiver to storage to loading docks.

1221/1248 - Common line from receiver to storage to loading docks.

All above lines are 3" aluminum, traced and insulated.

Piping is provided for circulating the contents of each finished goods tank.

Piping from tank cars for TCB and TTCB to storage and from storage to mix tanks will be steel.

Utilities

1. Spur track from main track to 5th Street with 2 covered loading docks for tank cars. One of these will be used for unloading TCB and TTCB.

2. One covered loading dock on 5th Street for loading tank trucks.

3. 6" steam main from Building 27 to tank farm.

4. 2" N_2 transfer line from existing N_2 storage tank to tank farm (all tanks except TCB and TTCB are N_2 blanketed.)

5. Electrical:

   Existing HB40 transformer will be dismantled and scrapped; HB40 load will be picked up on Aroclor motor control center. New load in the tank farm-warehouse area will be supplied from pole line transformer supplied from the existing HB40 overhead feeder.

Roads

An approximate 80' X 15' wide loading area at side of 5th Street will be provided as a loading area for tank trucks.

Structures and Foundations

Two tank car spots and one tank truck loading spot are weather protected by roofing.

All storage tanks will be on ring walls with compacted sand fill except the 2000 gallon blend tank which will be on a concrete pad. Area between tanks will be covered with chat.

TOWOLDMON0044976

01 - Equipment

As per Equipment List and Summary.

02 - Instruments

As per Instrument List and Summary.

03 - Setting and Testing Equipment

Tank farm is immediately adjacent to 5th Street and east of Aroclor office. Truck deliveries can be made directly to site.

04 - Setting and Testing Instruments

Nothing unusual.

05 - Piling

None allowed for.

06 - Excavation

For railroad spur track	=	7,000 yd^3
Tank foundations - 12 @ 9-1/4 yd^3 each	=	111 yd^3
Tank pad for 2000 gallon mix tank	=	15 yd^3
Pump foundations - 8 @ 1 yd^3 each	=	8 yd^3
Filter foundations - 6 @ 2/3 yd^3 each	=	4 yd^3
2 Tank car loading docks @ 2 yd^3 each	=	4 yd^3
1 Tank truck loading dock	=	2 yd^3
Pipe support foundations	=	15 yd^3

All excavated earth will be spoiled in immediate area.

07 - Foundations

Tanks

12 ring walls @ 3 yd^3 each	=	36 yd^3 conc.
Forms 155 ft^2 each	=	1860 ft^2
Crushed rock and sand fill	=	95 yd^3
Pad for mix tank	=	15 yd^3 conc.
Form	=	80 ft^2

Pipe Support Foundations

6 @ 2-1/2 yd^3 each	=	15 yd^3
Forms @ 100 ft^2 each	=	600 ft^2

TOWOLDMON0044977

3 Loading Docks	=	6 yd^3	conc.
Forms	=	120 ft^2	
8 Pump Foundations @ 1 yd^3 each	=	8 yd^3	conc.
Forms @ 60 ft^2	=	480 ft^2	
6 Filter Foundations @ 2/3 yd^3 each	=	4 yd^3	conc.
Forms @ 20 ft^2 each	=	120 ft^2	

Approximately 6 borings for soil bearing determination will be made.

08 - Supports, Platforms and Structures

1 Pipe bridge over 5th Street	=	3-1/2	ton steel
Pole supports to loading dock structure	=	3	ton steel
Miscellaneous steel at ground level pipe supports	=	2	ton steel

2 - 20' high ladders with safety cages.

Platforms over tanks in farm

Platform	=	5	ton steel
Stair Treads		50	
Grating	=	1050 ft^2	
Double pipe hand rail	=	750 ft	
Toe plate	=	700 ft	
3 loading docks (with covers over)	=	6	ton steel
Galbestos roofing	=	600 ft^2	

10 - Sprinklers and Fire Protection

None

TOWOLDMON0044978

11 - Piping - Process and Service

750' - For 1242 - From Bldg. 27 to storage tanks to loading docks
A-11 const. - 3" Sch. 40 - I.P.S. - Aluminum

750' - For 1254 - From Bldg. 27 to storage tanks to loading docks
A-11 const. - 3" Sch. 40 - I.P.S. - Aluminum

750' - For 1260 - From Bldg. 27 to storage tanks to loading docks
A-11 const. - 3" Sch. 40 - I.P.S. - Aluminum

600' - For 1262 - From Bldg. 27 to storage tanks to loading docks
A-11 const. - 3" Sch. 40 - I.P.S. - Aluminum

700' - 1221/1248/1232 - From Bldg. 27 to storage tanks to loading docks

All above 3" aluminum pipe to be single traced with 1/2"
~~copper~~ tubing. Trap condensate each 200' of tracing.
#5050 ADM w/ 55 FITTINGS

300' - 125# steam from Bldg. 27 - F-41 const. - 6" Sch. 40 steel pipe

300' - 125# steam - F-41 const. - 2" Sch. 40 steel pipe

500' - N_2 Nitrogen unit east of Chlorine - 2" vinyl covered
Sch. 40 steel

For TCB and TTCB from loading dock to storage - F-11 const. 350'
Sch. 40 3" steel pipe

For TCB and TTCB from storage to mix tanks - F-11 const. - 100'
Sch. 40 3" steel pipe

Toluene to mix tank - A-11 const. - 20' - 3" Sch. 40 I.P.S. Aluminum

Xylene to mix tank - A-11 const. - 20' - 3" Sch. 40 I.P.S. Aluminum

KA-PPO to loading dock A-11 const. - 320' - 3" Sch. 40 I.P.S. Aluminum

A13B to loading dock A-11 const. - 320' - 3" Sch. 40 I.P.S. Aluminum

12 - Ductwork

None

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TOWOLDMON0044979

13 - Electrical

Yard lighting for tank farm area - 13 tanks - approx. 60' X 100' area.

Lighting for two tank car loading docks and one tank truck loading dock area.

6 - Street light type Mercury Arc fixtures for loading dock and tank farm perimeter plus 8 - 175 watt Mercury Arc lighting fixtures over tank farm area.

8 - 15 HP motors on pumps

2 - 7½ HP motors on agitators

Pushbuttons at each pump and at remote location.

Install 300 KVA pole type transformer for warehouse and tank farm load.

14 - Site Preparation

Grade area east of Aroclor office to an elevation of 746'±. Area equals approx. 120' north from 5th Street X 60' east of Aroclor office.

Terrace down from 746' elevation to 742' immediately to east of leveled area.

Earth moved approximates 300 yd^3 and will be spoiled in immediate area.

15 - Sewers and Drains

None required.

16 - Underground Mains

None required.

17 - Yards and Roads

1. Establish tank truck loading spot on 5th Street adjacent to tank farm. Area approx. 1200 ft^2 (80' X 15').

   Grade off approx. 50 yd^3 earth.

   Crushed rock ballast for loading spot (8" thick) = 35 yd^3

   1200 ft^2 2" thick asphalt paving.

2. Tank Farm Area (120' X 60')

   Crushed Rock = 70 yd^3

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TOWOLDMON0044980

3. Repair construction damage to 5th Street. Assume resurfacing of 3000 ft^2 (30' X 100') 2" asphalt paving.

18 - Railroads

Install approximately 1700' rail spur from main line at north side of plant. Spur to extend along west side of Parkwin to 7th Street. Then offset to west approximately 130' and extend to 5th Street. This includes switch, bumper, ties, track, ballast and 4 crossings. Excavation for this spur is included in Code 06.

19 - Insulation

Tank insulation to be 1-1/2" thick calcium silicate - Std K11.2 Std 100 with weather barrier.

Tanks as follows:

4 - 13' diameter @ 600 ft^2 each = 2400 ft^2
5 - 12' diameter @ 400 ft^2 each = 2000 ft^2
2 - 11' diameter @ 300 ft^2 each = 600 ft^2

Pipe insulation to be the same spec Std as tanks.

For 1242	1-1/2"	-	100 - 750'	-	4" pipe
For 1254	1-1/2"	-	100 - 750'	-	4" pipe
For 1260	1-1/2"	-	100 - 750'	-	4" pipe
For 1262	1-1/2"	-	100 - 600'	-	4" pipe
For 1221/1248	1-1/2"	-	100 - 700'	-	4" pipe
For Steam	1-1/2"	-	100 - 300'	-	6" pipe
For Steam	1-1/2"	-	100 - 300'	-	2" pipe

Pump and filter insulation to be same K11.2 Std 100 insulating system with weather barrier.

6 - Pumps to be traced and insulated.
5 - Filters to be traced and insulated @ 25 ft^2 = 125 ft^2

20 - Painting

All structural steel to be hot dipped galvanized. Touch-up damaged areas with inorganic zinc coatings in field. (Carbo Zinc #11)

TOWOLDMON0044981

90 - Dismantling

Remove and scrap 3 X 15,000 gallon and 1 X 11,000 gallon horizontal storage tanks and 1 X 10,000 gallon vertical mix tank:

Item No.	Equipment No.	Description
201	22-0077	10' X 26' long horizontal tank
202	22-0089	8' X 30' long horizontal tank
203	22-0076-01	10' X 26' long horizontal tank
204	-	10' X 26' long horizontal tank
205	22-0108	14' X 10' high tank
208	-	Taber vertical subm. pump
209	-	Taber vertical subm. pump
214	-	Taber vertical subm. pump
215	-	Taber vertical subm. pump

Remove and scrap existing HB-40 transformer.

93 - Relocations and Modifications Expense

1. Existing feeder cable from existing HB-40 transformer to Aroclor motor control center.
2. 360' of 8' high cyclone fencing.
3. Existing Sparkler filter (18"), from building 27 to new tank farm.
4. Existing 2000 gallon jacketed SS mix tank with agitator, from building 27 to new tank farm.
5. Money for replacing three existing transfer pumps is to be included in this scope. The existing pumps referred to are those noted in the "General" section of this scope under "Pumps" for transferring 1248/1221,1262 and 1260 from existing day tanks and/or receivers to new storage facilities.

TOWOLDMON0044982

CEA 1430
Date: August 28, 1967
By: H. D. Gabelman

SCOPE OF WORK

Aroclor Expansion at Anniston

Drumming and Flaking

Appendix "E"

0725897

TOWOLDMON0044983

General

This scope covers the installation of drumming and flaking facilities in a new prefab structure north of 5th Street and at eastern boundary of block 4 (east of tank farm, see Appendix D). Space and detail design will allow for attaching a warehouse to the north of this structure. The warehouse is a separate project covered by CEA 1452.

These facilities are intended to

1. Provide for drumming and flaking in an area, removed, but adjacent to the manufacturing area, so as to allow for greater efficiency in use of manpower, both in the manufacturing area and in packaging and warehousing.

2. Rail and truck loading and unloading facilities at point of packaging to minimize handling will be provided (see Appendix D).

3. Provide storage space for bags and a limited number of drums both empty and full.

01 - Equipment

See Drumming and Flaking equipment lists.

02 - Instruments

See Instrument list.

03 - Set and Test Equipment

04 - Set and Test Instruments

05 - Piling

None

06 - Excavation

Building foundation	= 80 yd^3
Intermediate building foundations	= 40 yd^3
Pipe Supports	
15 @ 2-1/3 yd^3 each	= 35 yd^3
City Water - 50' @ 6 ft^3/ft = 300 ft^3	= 11 yd^3
C.T.W. - 30' @ 12 $ft^3/1$ = 360 ft^3	= 14 yd^3
Fire Water - 120' @ 6 $ft^3/1$ = 720 ft^3	= 45 yd^3

0725898

TOWOLDMON0044984

Backfill (CW, CTW, FW) - 70 yd^3

Spoil in immediate area - 177 yd^3 (use for building fill)

Building fill - 1600 yd^3 (needed fill available from) (R.R. excavation for tank farm)

Excatation and backfill for 500' of 4" pressure sewer - 225 yd^3 each

Excavation for sewage ejector - 14' deep - 52 yd^3

Excavation and backfill for 4" connecting sewers - 93 yd^3 each

07 - Foundations

Building Foundations and Floor - 300 yd^3 concrete
Forms - 5000 ft^2

Pipe Supports - 35 yd^3 concrete
Forms - 750 ft^2

6 Borings for soil bearing analysis.

Drumming: Air Compressor - 2 yd^3 concrete

Pad for sewage ejector - 1.5 yd^3

Concrete fill around ejector - 2000 psi concrete 7 yd^3

08 - Supports, Platforms and Structures

Flaking: - Structural Steel - 30 ton
- Grating - 1800 ft^2
- Stair Treads - 80
- Double Pipe Handrail - 150 ft.
- Toe Plate - 90 ft.
- Miscellaneous Steel - 2 ton

Drumming: - Miscellaneous Steel - 2 ton

All structural steel to be hot dipped galvanized; building steel to be painted (see Code 20).

09 - Building

A 120' clear span structure 60' long with 23' eave height will be provided. A canopy will be extended over the railroad tracks. The side next to tracks will be open for loading and unloading rail cars. One half of south side will be open to serve as a truck loading and unloading dock. East, north and part of south side will be covered with corrugated transite and corrugated vinyl.

Walls

Corrugated transite - 5000 ft^2

Corrugated vinyl - 1200 ft^2

0725899

TOWOLDMON0044985

Roof and Roofing

Corrugated "Galbestos" and Vinyl panels with 8' overhang over railroad tracks and 6' canopy over truck loading area.

Corrugated Galbestos = 7500 ft^2
Corrugated Vinyl = 1000 ft^2

Gutters and Downspouts

240' - 6" Aluminum guttering
120' - 6" Aluminum downspouts

10 - Sprinklers and Fire Protection

Structure - Provide an automatic dry pipe sprinkler fire protection system designed for extra hazard spacing and pipe sizing for approximately 7200 ft^2 (1 head each 100 ft^2) = 72 heads.

11 - Piping

Drumming

2" parallel traced and insulated aluminum for 1242, 1254, 1248/1221/1232/1262, 1260, blend A13B, blend KA-PPO all originating at battery limits (connected to lines running to loading docks) - 6 lines @ 120' each = 720'.

2" parallel traced and insulated aluminum for Xylene and Toluene blends - 1 line = 300'

3" steel insulated line for HB-40 = 600'

4" steel insulated line for steam = 200'

2" steel miscellaneous piping (for Jet, air comp. etc.) = 200' assumed

Flaking

3" X 2" jacketed steel line for 1168 & 5460 = 450'

2" steel traced and insulated for Biϕ = 500'

3" steel insulated line for Therminol = 900'

4" steel for CTW, S&R - 2 lines @ 150' each = 300'

2" steel insulated steam for Biϕ surge tank = 200'

2" steel insulated steam for Miscellaneous piping = 200'

12 - Ductwork

Flaking

12" ϕ - 304 SS 18 gauge = 100 ft.

0725900

TOWOLDMON0044986

13 - Electrical

Power from pole line transformer into motor control center in building (approx. 50' distance).

Power from motor control center to following motors:

Drumming:

1 - 25 HP Air Compressor Motor

Flaking:

1 - 15 HP 1268 Mill
1 - 10 HP Aroclor Flaker Motor
1 - 5 HP Biϕ Flaker Motor
1 - 3 HP Bag Flattener Motor
2 - 5 HP Fluidizing Air Blower Motors
2 - 5 HP Suction Blower Motors
2 - 3 HP Transfer Pump Motors
3 - 3 HP Conveyor Motors
1 - 3/4 HP Shaker Motor
2 - 1½ HP Ejector Compressor Motors

Lighting for ground level - area 120' X 60' (7200 ft^2)
18 - 175 watt mercury arc lights

Lighting for 14' level - area 30' X 60' (1800 ft^2)
5 - 175 watt mercury arc lights

14 - Site Preparation

Grade truck loading and unloading area at southeast corner of drumming and flaking structure.

40' X 50' area - Move approx. 80 yd^3 earth.

15 - Sewers and Drains

300' - 12" V.C. storm sewer
(Along east side of structure to Snow Creek)

200' - 8" V.C: storm sewer for gutters

3 - Floor Drains

200' - 4" V.C. connecting sewers to floor drains.

Provide 30 GPM sewage ejector with tank, controls, etc.

500 lineal feet 4" CI pressure sewage line from ejector to pipe shop service line.

140 lineal feet of 4" CI sewer to connect existing sewers to ejector.

1 manhole at ejector, 10' deep with cover, 1 manhole at pipe shop, 5' deep with cover.

TOWOLDMON0044987

16 - Underground Mains

50' 2" C.I. City Water Main

60' 12" C.I. Fire Main

60' 6" C.I. Fire Main

60' 4" Steel C.T.W. - Supply and Return

17 - Yards and Roads

2000 ft^2 X 8" thick concrete truck pad = 50 yd^3 concrete.

700 ft^2 asphalt - street repair at sewage ejector.

18 - Railroads

None

19 - Insulation

Pipe insulation to be 1½" thick calcium silicate K11.2 Std 100 with weather barrier. Quantities as follows:

Drumming:

4" - 200'
3" - 1620'
2" - 200'

Flaking:

3" - 1400'
2" - 400'

20 - Painting

Building steel to have 3 coat vinyl system.

90 - Dismantling

Disconnect and remove 4 septic tanks.

Item No.	Equipment No.	Description
631	22-0700	Flaker hold tank with agitator, drive and motor.
690	14-0031	Model VMG 5-56, Flaker, size 24" X 48" with 5HP motor.
-	-	Biphenyl Flaker
646	17-0027	2DH Micro Pulverizer with 1/3HP motor

TOWOLDMON0044988

93 - Relocation

1. Relocate 520' of existing 24" acid sewer. Excavate and install new V.C. sewer between two existing manholes.

2. Relocate parking lot, extend to north of existing parking lot, 70' X 120', 8400 ft.^{2} of asphalt paving with parking stalls.

TOWOLDMON0044989

CEA 1800
Date: August 28, 1967
By: R. S. Yates

SCOPE OF WORK

Aroclor Expansion at W. G. Krummrich

New 40 $\overline{M}$ lbs./yr. Plant

Appendix "F"

0725904

TOWOLDMON0044990

General

The facilities included in this project are

1. Installation of a new continuous chlorination system.
2. Installation of two distillation units with a capacity of 25 M lbs./yr. in each system.
3. Porocel/bauxite treatment for four different Aroclors.
4. Replacement of present off-gas recovery system with a new system.

Major Equipment Includes

A biphenyl mix (2000 gallon) and feed tank (2000 gallon) to supply continuous chlorinator line.

4 - 1200 gallon (4' Dia. X 20') chlorinator units with attached coolers, pumps and entrainment system.

1 - 2500 gallon continuous blow tank.

1 - 15,000 gallon intermediate storage tank.

2 - Flash distillation systems consisting of still pot, entrainment separator, condenser, receiver, and external therminol heater.

Off-gas system consisting of gas cooler-condenser, surge tank (3000 gallon).

Therminol cooling system for still condensers.

4 - Fixed bed absorbers (3' Dia. X 15') with associated tankage, filters and pumps.

External therminol heating system for supplying therminol to the still pot heaters.

TOWOLDMON0044991

01 - Equipment

See Equipment List and Summary.

02 - Instrument Items

See Instrument List and Summary.

03 - Setting and Testing Equipment

Area is accessible for truck and train unloading. High lift can be used advantageously.

04 - Setting and Testing Instruments

A control room is available for the instruments and panel.

05 - Piling

For Structural Steel

14 Concrete piles X 3 cu.yds. 42 cu.yds.
Size 24" dia. X 25' long

For Blow Tank, Item 422

4 Concrete piles X 3 cu.yds. 12 cu.yds.

For Inter Storage Tank, Item 424

7 Concrete piles X 3 cu.yds. 21 cu.yds.

For Aroclor Surge Tank, Item 586

4 Concrete piles X 3 cu.yds. 12 cu.yds.

06 - Excavation

For Floor of Operating Area 85 cu.yds.

2300 ft^2 X 1' deep

For Motor Control Center and Foreman'Office 5 cu.yds.
6' deep X 5' wide X 40'

07 - Foundations

For Structural Steel 4.2 cu.yds.

14-20" square pads 3' deep

TOWOLDMON0044992

For Blow Tank	1.75 cu.yds.
1 - 1' X 3' high X 7' long support 1 - 1½' X 2' deep X 8' long support	
For Inter Storage Tank, Item 424	6.4 cu.yds.
18" thick X 12' dia.	
For Floors	85 cu.yds.
Miscellaneous Supports, etc.	5 cu.yds.
Pipe Supports 6 X 2 cu.yds.	12 cu.yds.
For Motor Control Center & Foreman's Office	6 cu.yds.
Support 5' X 1.5' X 80' = 600 ft^2	
Floor 800 ft^2	

08 - Supports

Structure Supports	65 tons
Grating	4500 sq.ft.
Handrail	500 ft.
Toe Plate	500 ft.
Stairway (15 ft. elev.)	4
For Motor Control Center & Foreman's Office	5 tons
For Item 545	5 tons

09 - Building Items

5 unit heaters with associated piping for operating structure.

For Motor Control Center and Foreman's office

2 personnel doors (3' X 6'8")
Windows for office, 3 units 4' X 10'

10 - Sprinklers

None

0725907

TOWOLDMON0044993

11 - Piping

Note: * With 2 - 1/2" O.D. copper tracers and insulated - 1-1/2" thick insulation.

** With 1 - 1/2" O.D. copper tracer and insulated - 1-1/2" thick insulation.

Item 403 - Biphenyl Mix

* Charge - 50 ft. of 2" IPS C.S. pipe with 2 No. CD3 valves.

* Overflow - 50 ft. of 3" IPS C.S. pipe.

* Vent - 15 ft. of 3" IPS C.S. pipe with spark arrestor jacketed.

Steam - 30 ft. of 1" IPS C.S. pipe to coil with 2 valves.
- 30 ft. of 1" IPS C.S. pipe from coil with 2 valves.

Item 404 - Biphenyl Feed

* Charge - 20 ft. of 2" IPS C.S. pipe with 1 No. CD3 valve.

* Overflow - 25 ft. of 2" IPS C.S. pipe.

* To Item 405 - 20 ft. of 3" IPS C.S. pipe with 2 No. CD3 valves.

Items 406, 410, 414 and 418 - Continuous Chlorinators

Chlorine Charge Line	200 ft. of 4" IPS C.S. pipe with 6 DE6 valves.
* Circ. lines	280 ft. of 3" IPS C.S. pipe with 28 CD3 valves.
* Transfer to Item 422	75 ft. of 3" IPS C.S. pipe with 4 CD3 valves.
Vent Lines	50 ft. of 3" IPS C.S. pipe with 2 CD3 valves.

Trace chlorinators to allow for winter operation - 400 ft. of 1/2" copper tracing per chlorinator.

Item 405 - Biphenyl Feed Pump

* Chlorinator Charge - 80 ft. of 2" IPS C.S. pipe with 4 No. CD3 valves.

* Chlorinator Return - 70 ft. of 2" IPS C.S. pipe with 1 No. CD3 valve.

TOWOLDMON0044994

Item 422 - Blow Tank

*	Charge	30 ft. of 4" IPS C.S. pipe with 1 No. CD3 valve.
	Vent	35 ft. of 6" IPS Saran lined steel pipe.
	Blow Line	30 ft. of 2" IPS C.S. pipe with 4 valves.
**	To Item 423	10 ft. of 3" IPS C. S. pipe with 1 No. CD3 valve.

Item 424 - Intermediate Storage

**	From Item 423	75 ft. of 2" IPS C.S. pipe with 1 No. CD3 valve.
**	Overflow	25 ft. of 3" IPS C.S. pipe.
	Vent	10 ft. of 3" IPS C.S. pipe.
**	To Item 425	10 ft. of 3" IPS C.S. pipe.

Item 425 - Transfer Pump

** To Item 502 & 511 - 50 ft. of 2" IPS C.S. pipe with 2 No. CD3 valves.
** To Existing Chlorinators - 75 ft. of 2" IPS C.S. pipe with 3 No. CD3 valves.

Off-Gas System

Present HCl header at southwest section of 12 ft. level to be modified and new line run from this header to new off-gas condenser, Item 427.

**	Piping Required	30 ft. of 6" IPS C.S. pipe.
**	From Chlor. 6-9	100 ft. of 6" IPS C.S. pipe with 2 CD3 valves.
	Circ. Water System	75 ft. of 3" IPS C.S. pipe.
	Drain From Item 427	15 ft. of 4" IPS C.S. pipe.
	To HCl Recovery	40 ft. of 6" IPS C.S. pipe.
	HCl Transfer	1300 ft. of 8" IPS C.S. pipe from Dept. 246 to Dept. 218.
	Steam to Item 429	60 ft. of 2" IPS C.S. pipe.
**	To Item 431	20 ft. of 3" IPS C.S. pipe.
**	From Item 431	90 ft. of 2" IPS C.S. pipe.

TOWOLDMON0044995

Aroclor Circulating System

To Items 504 & 526 — 125 ft. of 4" IPS C.S. pipe.

From Items 504 & 526 — 125 ft. of 4" IPS C.S. pipe

With 4 valves.

Item 502 - Still Pot

Item 511 - Still Pot

Montar Drawoff 2 - 15 ft. of 2" IPS C.S. pipe = 30 ft.
With 4 valves

To Items 505 & 512

2 - 15 ft. of 14" IPS C.S. pipe = 30 ft.

From Items 505 & 512

2 - 25 ft. of 10" IPS C.S. pipe = 50 ft.

Above lines insulated with 2" thick insulation.

Item 506 - Still Condenser

Item 513 - Still Condenser

To Item 508 & 515

2 - 15 ft. of 3" IPS S.S. pipe = 30 ft.

Item 508 & 515 - Still Receivers

To Items 523 & 524

2 - 30 ft. of 4" IPS C.S. pipe = 60 ft. with 2 valves

** To Items 510 & 517

2 - 15 ft. of 3" IPS S.S. pipe = 30 ft. with 1 valve

Item 523 & 524 - Catch Tanks

Drain Lines — 2 - 35 ft. of 2" IPS C.S. pipe = 70 ft. with 2 valves

To Ejectors Items 509 & 516 — 2 - 15 ft. of 4" IPS C.S. pipe = 30 ft. with 2 valves.

Item 509 & 516 - Ejectors

Steam Lines — 60 ft. of 1-1/2" IPS C.S. pipe

Drain Line — 30 ft. of 3" IPS C.S. pipe

TOWOLDMON0044996

Item 518, 519 & 520 - Aroclor Cooling System

From Item 519 to Item 520	30 ft. of 2" IPS C.S. pipe with 2 valves.
From Item 520 to Items 506 & 513	60 ft. of 2" IPS C.S. pipe with 2 valves.
From Items 506 & 513 to Item 518	30 ft. of 2" IPS C.S. pipe
From Item 518 to Item 519	30 ft. of 2" IPS C.S. pipe

Item 503 & 525 - Circulating Pumps

** 2 - 15 ft. of 4" IPS C.S. pipe = 30 ft. with 4 valves

** 2 - 10 ft. of 4" IPS C.S. pipe = 20 ft. with 2 valves

* 1 - 150 ft. of 2" IPS C.S. pipe for transfer to Still No. 2.

Item 530 & 537 - Surge Tanks

** From Items 510 & 517	2 - 25 ft. of 2" IPS Al pipe with 2 valves
** To Items 531 & 538	2 - 20 ft. of 2" IPS Al pipe with 2 valves
Water/Steam	100 ft. of 2" IPS C.S. pipe
Overflow	2 - 15 ft. of 3" IPS Al pipe
From #2 Still Receiver	200 ft. of 2" IPS Al pipe with 2 valves

Items 532, 539 & 540 - Absorbers

* To Absorbers	100 ft. of 2" IPS Al pipe with 5 valves
* From Absorbers	100 ft. of 2" IPS Al pipe with 5 valves

Items 541 & 533 - Filters

** 75 ft. of 2" IPS Al pipe with 4 valves

Items 534 & 535 - Surge Tanks

* Vent Lines	2 - 25 ft. of 3" IPS Al pipe
* To Item 544	20 ft. of 3" IPS Al pipe
* To Item 536	20 ft. of 3" IPS Al pipe
* From Item 544	100 ft. of 3" IPS Al pipe
* From Item 536	125 ft. of 3" IPS Al pipe
Steam Line	100 ft. of 1-1/2" IPS C.S. pipe

Items 426 & 433 - Scrubbers

Water Inlet	100 ft. of 2" C.S. pipe with 3 valves
Drain Line	30 ft. of 8" Saran lined steel pipe
	30 ft. of 12" Saran lined steel pipe

TOWOLDMON0044997

Miscellaneous

Feed line from batch blow tank to Items 502 & 511

** 125 ft. of 2" C.S. pipe with 4 valves

To Item 434 - 20 ft. of 3" C.S. pipe with 1 valve

12 - Ductwork

None required.

13 - Electrical

Motors to be installed and wired

5	-	2 HP
1	-	3 HP
7	-	5 HP
1	-	7½ HP
7	-	10 HP
6	-	15 HP
2	-	20 HP
1	-	50 HP

Allow for remote pushbuttons and alarms for 15 motors.

Lighting required:

Operating area:	16 - 20 ft. X 20 ft. bays
Foreman's office:	225 ft^2
Motor Control Center:	225 ft^2

Install 600 ampere breaker in Sub. No. 17.

Install fans in Sub. No. 17 transformer.

Transfer feeder 8-1 from Sub. #8 to #17.

Install overhead feeder cable from Sub. #17 to Bldg. CF, capacity 600 amperes, length 400 ft.

Install 400 ft. of feeder cable from breaker 8-1 to Dept. 246, capacity 600 amperes.

14 - Site Preparation

None allowed for.

TOWOLDMON0044998

15 - Sewers

Floor drains	- 6 surface drains.
Sewer pipe	- 130 ft. of 4" permanite sewer pipe with two tie-ins to existing 8" sewer which runs directly south of Dept. 246.
Excavation	- 2 ft. X 4 ft. X 130 ft. = 40 cu.yds.
Sewer tie-in	- Two for scrubbers.
Drinking fountains	- Two required.

16 - Underground Mains

None allowed for.

17 - Yards

Allow for gravel surfacing approximately 2000 ft^2 of access areas.

18 - Railroads

None allowed for.

19 - Insulation

Piping - Refer to Code 11.

Equipment - As below - Material Std #100, Weather-proof Std #65.

	Item	Area	Thickness
Vessels	403	235 ft^2	1½"
	404	235 ft^2	1½"
	422	540 ft^2	1½"
	424	855 ft^2	1½"
	429	428 ft^2	1½"
	430	100 ft^2	1½"
	500	20 ft^2	1½"
	501	20 ft^2	1½"
	502	330 ft^2	2"
	505	130 ft^2	2"
	508	205 ft^2	1½"
	511	330 ft^2	2"
	512	130 ft^2	2"
	515	205 ft^2	1½"
	519	100 ft^2	1½"

0725913

TOWOLDMON0044999

Item	Area	Thickness
537	205 ft^2	1½"
539	160 ft^2	1½"
540	160 ft^2	1½"
541	50 ft^2	1½"
542	330 ft^2	1½"
543	330 ft^2	1½"
530	205 ft^2	1½"
532	160 ft^2	1½"
533	50 ft^2	1½"
534	330 ft^2	1½"
535	330 ft^2	1½"
585	120 ft^2	3"
586	200 ft^2	2½"
409	60 ft^2	1½"
413	60 ft^2	1½"
417	60 ft^2	1½"
421	60 ft^2	1½"
504	100 ft^2	1½"
526	100 ft^2	1½"
545	160 ft^2	1½"
20 Pumps	--	1½"

20 - Painting

Coating Std #502, Epoxy system

Supports for Items 408, 412, 416, 420, 426, 433, 427, 509, 516, 518, 523 and 524.

Items 406, 410, 414, and 418

Uninsulated piping - air, water, gas

21 - Walls, Masonry, Roofs

Concrete block structure attached to existing control room. Allow for 4 walls 15' X 20' high, total area - 1200 ft^2.

Concrete roof deck with tar paper coating - area 250 ft^2.

0725914

TOWOLDMON0045000

90 - Dismantling

Item No.	Equipment No.	Description
172	21-5150	Mist eliminator, 30" X 13' Brinks unit
173	38-5588	Heat exchanger, 16" O.D. X 8' long

Present 6" HCl line to Dept. 218 will be dismantled.

93 - Relocations and Modifications Expense

Move and relocate one power line pole and electric wires now in conflict with the new structure.

Move and relocate the following pipe lines which are south of the existing plant and which will interfere with the new structure.

Air line	- 40 ft. of 4" C.S. pipe
Chlorine line	- 40 ft. of 4" C.S. pipe
Instrument air line	- 40 ft. of 1½" C.S. pipe
Water line	- 40 ft. of 3" city water line

TOWOLDMON0045001

CEA 1800
Date: August 28, 1967
By: R. S. Yates

SCOPE OF WORK

Aroclor Expansion at W. G. Krummrich

Storage Tank Farm

Appendix "G"

0725916

TOWOLDMON0045002

General

The facilities included in this project are intended to:

1. Insure adequate supply of biphenyl.
2. Assure storage capacity for minimum inventories of various Aroclors so that bulk shipments can be made on demand.
3. Minimize the potential for cross contamination.
4. Provide additional unloading facilities for biphenyl.
5. Remove existing underground storage tanks.

Major Equipment Includes

1 - 100,000 gallon Steel Tank for Biphenyl.

2 - 22,000 gallon Aluminum Tanks for Aroclor 1242.

1 - 22,000 gallon Aluminum Tank for Aroclor 1254.

1 - 22,000 gallon Aluminum Tank for Aroclor 1260.

1 - 22,000 gallon Aluminum Tank for Aroclor 1248.

All storage tanks to have plate coil heaters and to be insulated over the lower half. Tank for 1260 to be completely insulated.

Pumps

All 316 SS.

1242 - Common pump for two storage tanks.

1254 - Pump for two storage tanks.

1260 - Pump for one storage tank.

1248 - Pump for one storage tank.

Filters

All 316 SS.

Separate filters for 1242, 1254, 1260.

Piping

Separate transfer lines from existing transfer pump (Item 144) to each tank and to truck dock as follows:

TOWOLDMON0045003

1242 - From day tank to storage - to manifold station

1254 - From day tank to storage - to manifold station

1260 - From day tank to storage - to manifold station

1248 - From day tank to storage - to manifold station

Separate circulating lines on each tank.

Lines to be 2" & 3" IPS aluminum with single 1/2" copper tracer and insulated.

Railroad

1. Extend spur track #10A, 125 feet and tie into existing track 10.

01 Equipment

See Equipment List and Summary

02 Instrument Items

See Instrument List and Summary

03 Setting and Testing Equipment

Area is accessible for truck and train unloading. High lift can be used advantageously.

04 Setting and Testing Instruments

Normal conditions.

05 Excavations

For 100,000 gallon tank - 25' x 30' high

For good soil (30'Ø x 15 feet deep)	400 cu yds
Ring Wall (25'Ø)	10 cu yds
Sandfill	19 cu yds

Pump Foundations

3 x 2 cu yds	6 cu yds

Pipe Supports

9 x 3 cu yds	27 cu yds

0725918

TOWOLDMON0045004

For 5 storage tanks

For good soil — 880 cu yds

35' x 35' x 15' = 18,400 ft^3
20' x 18' x 15' = 5,400 ft^3
23,800

Total Excavation

Spoil — 1,369 cu yds
Backfill — 1,300 cu yds

07 Foundations

Pumps 4 x 2' x 3' x 2' — 2 cu yds

Pipe Supports 9 x 2-1/2 cu yds — 25 cu yds

Loading Dock — 5 cu yds

Miscellaneous — 5 cu yds

Base for 5 tanks — 55 cu yds

5 x .78 x 14^2 x 10/12 = 635 ft^3
5 x 3.14 x 14 x 4' x 10/12 = 735 ft^3
1370 ft^3

Soil tests will be required.

08 Supports, Platforms and Structures

Loading Dock - (2 required for biphenyl cars) — 2 ton

Tank Platforms — 4 ton

Ladder to top of biphenyl storage tank - 30 ft

Grating — 700 sq ft

Handrail — 350 lin ft

Toe Plate — 350 lin ft

09 Building Items

None

11 Sprinklers and Fire Protection

None required.

0725919

TOWOLDMON0045005

A. Piping

Item 401 - Biphenyl Storage Tank

15 ft of 4" IPS CS pipe for pump suction with one valve.

10 ft of 2" IPS CS pipe for circ. line with one valve.

100 ft of 2" IPS CS pipe from unloading spot to tank with two valves.

20 ft of 2" IPS CS pipe from pump discharge to Item 102, existing biphenyl storage tank, with two valves.

200 ft of 3" IPS CS pipe from Building CR to storage tank with two valves for steam supply.

200 ft of 1" IPS CS pipe for miscellaneous steam services at storage tank.

Process Piping - 1 x 1/2" OD copper tubing tracers with 2-1/2" insulation, 2" thick.

Steam Piping - 2" thick insulation.

Storage Tanks (Item 558-562)

5 Circ. Lines - 250 ft of 2" IPS Al2 pipe with 5 AL valves.

5 Vent Lines - 50 ft of 3" IPS Al2 pipe with 5 AL valves.

200 ft of 1-1/2" IPS CS pipe for steam to plate coils with 16 valves.

Piping - 1 x 1/2" OD copper tubing tracer with 2-1/2" & 3-1/2" diameter insulation 2" thick. Steam piping - 2" insulation.

Nitrogen Piping

250 ft of 1-1/2" IPS CS pipe with 10 valves from existing nitrogen station.

Instrument Air Piping

200 ft of 1-1/2" IPS galvanized pipe with 16 valves.

Transfer Piping to Storage Tanks

Tie into existing lines at Tanks 9, 10, 11, (Items 117, 118, 119).

Piping required:

200 ft of 2" IPS aluminum pipe with 8 valves.

(Note for 1254, 1242, 1262)

TOWOLDMON0045006

New 1248 line from existing transfer pump (Item 144) piping required:

150 ft of 2" IPS aluminum pipe with 2 valves.

Piping: 1 x 1/2" OD copper tubing tracer with 2-1/2" diameter insulation 2" thick.

Transfer Piping to Loading Station (Tank Car)

For 1242: 225 ft of 3" IPS aluminum pipe with 3 valves and aluminum loading arm for tank cars.

For 1254: 225 ft of 3" IPS aluminum pipe with 3 valves and aluminum loading arm for tank cars.

For 1260: 250 ft of 3" IPS aluminum pipe with 3 valves.

For 1248: 250 ft of 3" IPS aluminum pipe with 3 valves.

Piping: 1 x 1/2" OD copper tubing tracer with 3-1/2" diameter insulation 2" thick.

Transfer Piping to Loading Station (Truck Dock)

For 1242: 100 ft of 3" IPS aluminum pipe with 1 valve.

For 1254: 100 ft of 3" IPS aluminum pipe with 1 valve.

For 1260: 100 ft of 3" IPS aluminum pipe with 1 valve.

For 1248: 100 ft of 3" IPS aluminum pipe with 1 valve.

Piping: 1 x 1/2" OD copper tubing tracer with 3-1/2" diameter insulation 2" thick.

Transfer Piping to Drumming Station

For 1242: 100 ft of 2" IPS aluminum pipe with 2 valves.

For 1254: 100 ft of 2" IPS aluminum pipe with 2 valves.

For 1260: 100 ft of 2" IPS aluminum pipe with 2 valves.

For 1248: 100 ft of 2" IPS aluminum pipe with 2 valves

Piping: 1 x 1/2" OD copper tubing tracer with 2-1/2" diameter insulation 2" thick.

12. Duct Work

None

TOWOLDMON0045007

13 Electrical

Install 4 x 15 HP motors for pumps.

No interlocks or alarms required.

Install 8 street light type, 400 watt mercury arc fixtures for loading dock, tank farm perimeter and area lighting.

Install 8-175 watt mercury arc fixtures over tank farm area.

14 Site Preparation

None

15 Sewers and Drains

None

16 Underground Mains

None

17 Yards, Roads, Fencing

Chat will be placed around storage tank area, depth 12".

For Item 401 2,500 ft^2

For 5 Storage Tanks 1,600 ft^2

18 Railroads

Spur track #10A will be extended 125 ft and a switch installed at the end to bring the spur back into main track #10. Existing bumper will be removed.

19 Insulation

Piping: Insulation is covered in the category #11 - Piping.

Tanks:

Item 401 - Thick, 1-1/2", Insul. Spec. No. 100 (Calc. Silicate) with weather barrier.

Side Wall - $\pi DH = 3.14 \times 25' \times 30' = 2,360\ ft^2$

Top - $\frac{\pi D^2}{4} = \frac{3.14}{4} \times (25)^2 = 490\ ft^2$

$2,850\ ft^2$

Item 558 - Thick, 1-1/2", Insul. Spec. No. 100 (Calc. Silicate) with weather barrier.

Side Wall - $\pi DH = 3.14 \times 13' \times 12' = 490\ ft^2$

Remaining area to be spray covered with cork filled asphalt mastic, Spec. No. 700

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TOWOLDMON0045008

Side Wall		490 ft^2
Top	$\frac{\pi D^2}{4} = .78 \times (13)^2$	132 ft^2
		622 ft^2

Item 559 - Same as Item 558

Item 560 - Same as Item 558

Item 562 - Same as Item 558

Item 561 - Thick, 1-1/2", Insul. Spec. No. 100 (Calcium Silicate) with weather barrier.

Side Wall - $\pi DH = 3.14 \times 13 \times 24 =$ 980 ft^2

Top area to be spray covered with cork filled asphalt mastic, Spec. #700.

Top 132 ft^2

20 Painting

Spec 502 for all steel items.

90 Dismantling

Remove pump 4247 and motor 9905 now on Tank #10, (Item 118).

Dismantle 3 X 14,000 gallon underground storage tanks and associated equipment:

Item No.	Equipment No.	Description
148	21-0768	10' Dia. X 26' long U.G. Hor. Tank
149	19-0585, 66-0853	Pump and Motor
150	21-0769	10' Dia. X 26' long U.G. Hor. Tank
151	19-0584, 66-1501	Pump and Motor
152	21-1310	10' Dia. X 26' long U.G. Hor. Tank
153	19-0929, 66-0856	Pump and Motor

93 Relocation

Replace two existing pipe supports going out to present tank car loading dock.

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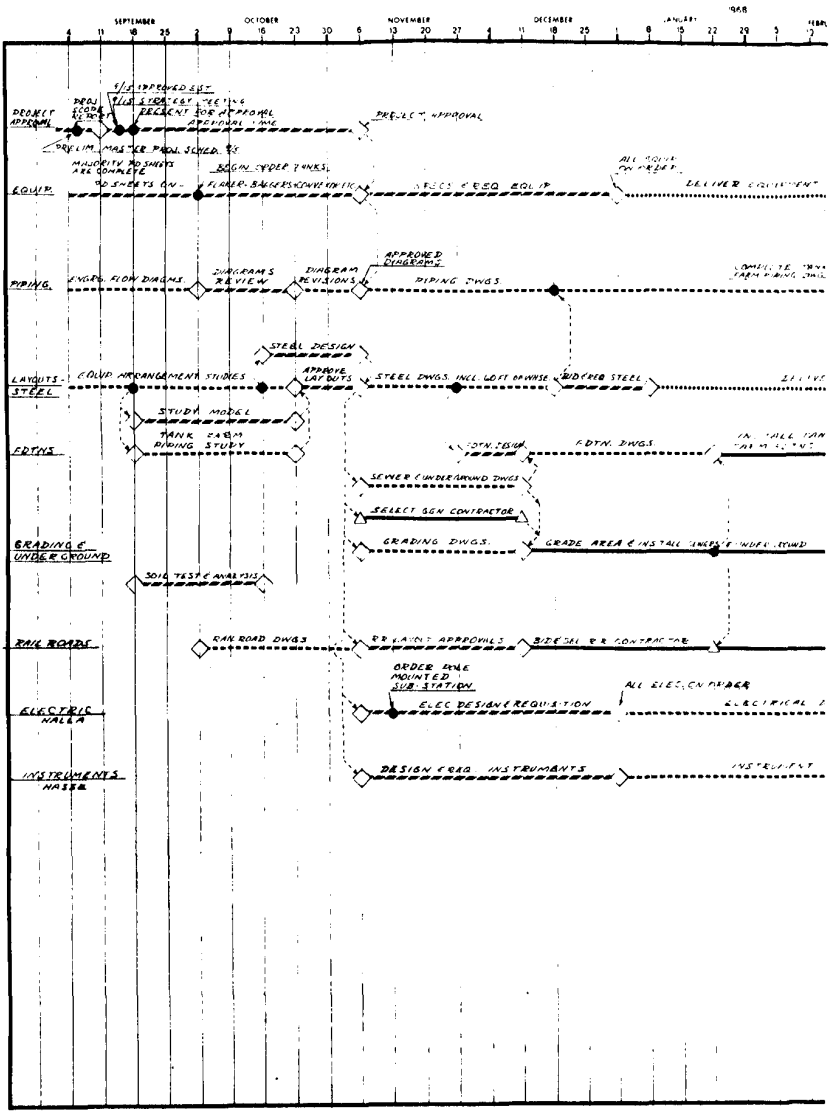

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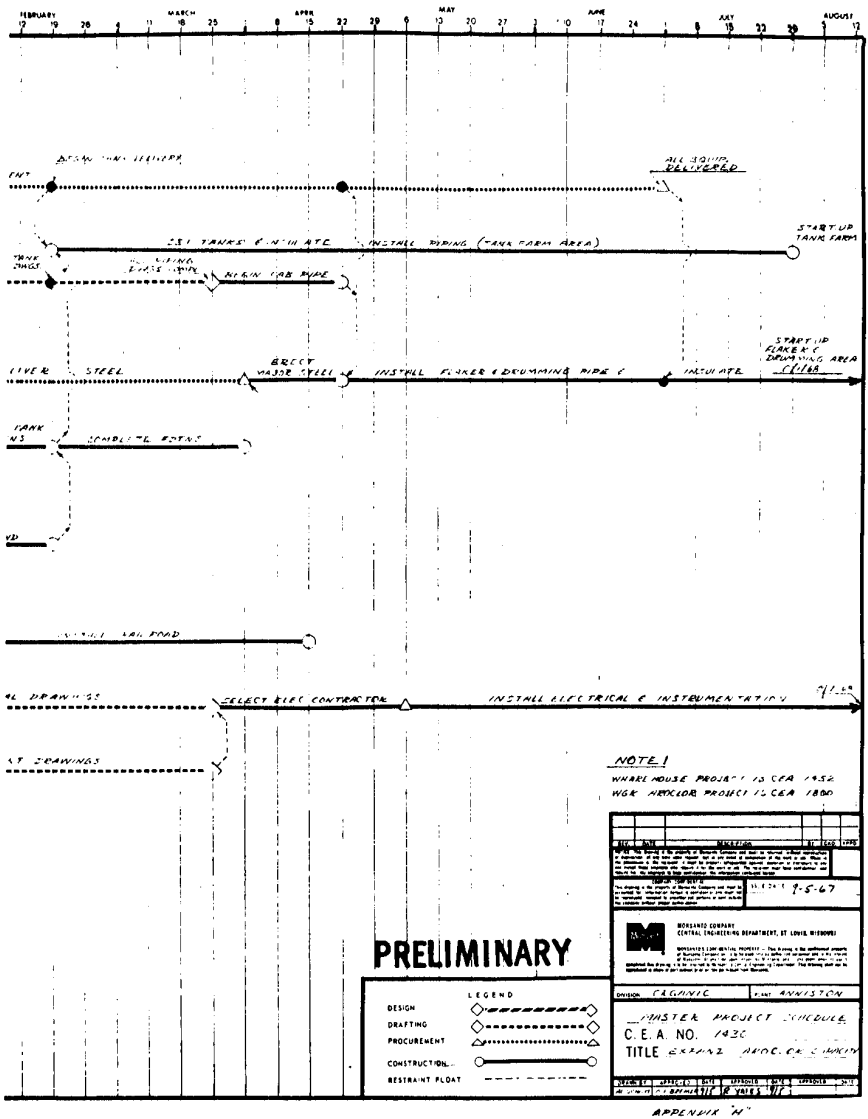
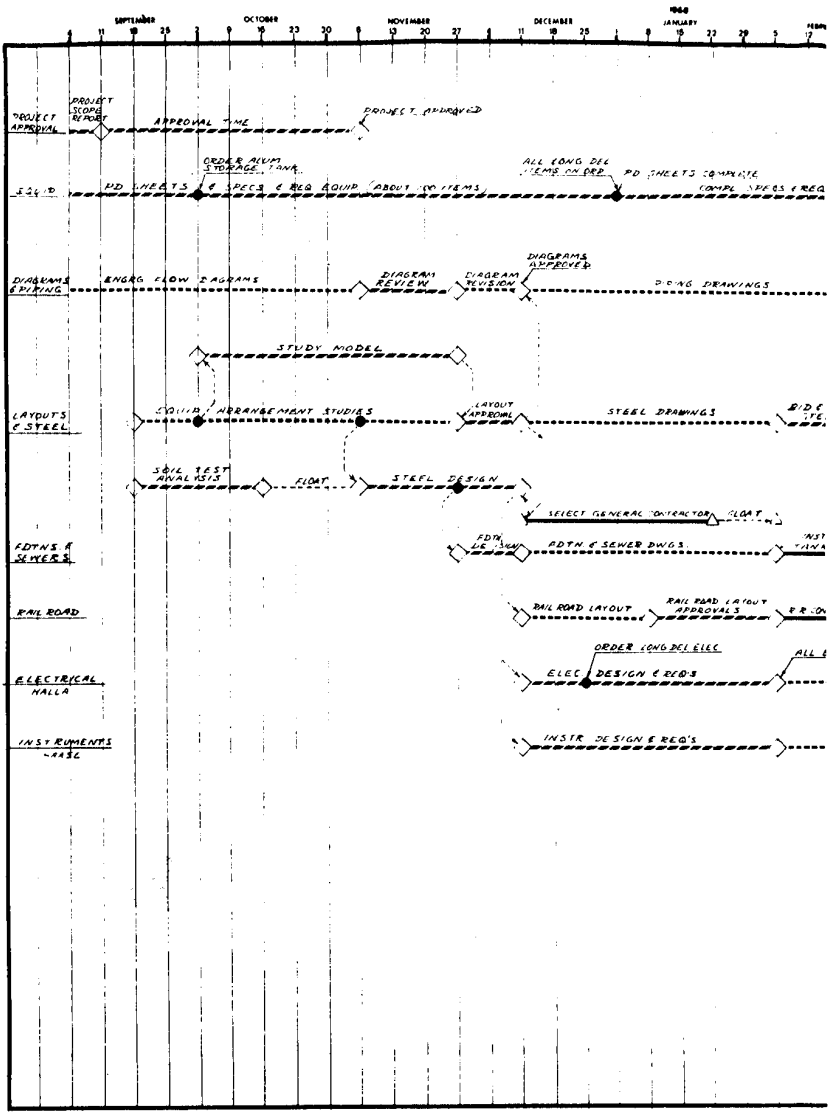


APPENDIX "N"

0725925

TOWOLDMON0045011



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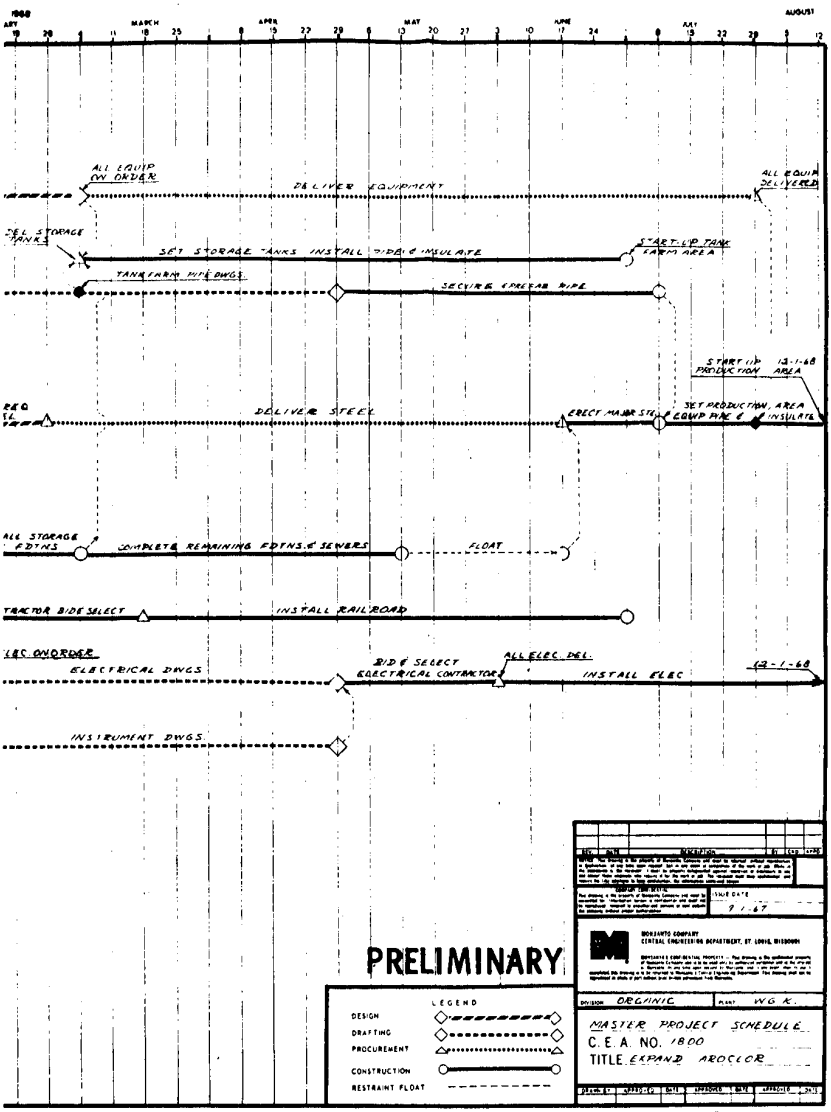
TOWOLDMON0045012



APPENDIX "H"

0725927

TOWOLDMON0045013

Monsanto

FROM (NAME & LOCATION) W. B. Howard - St. Louis

DATE August 28, 1967

SUBJECT PROJECT LOSS PREVENTION REPORT 67-65

REFERENCE CEA-1800

cc: R. E. Doerr
R. E. Howard
J. L. Mathews
H. B. Patrick - WGK
S&PP Project File
S&PP Location File

TO : R. S. Yates (Project Manager)

COPIES TO THOSE PRESENT

J. R. Fullgraf
H. D. Gabelman
R. J. Green
W. B. Howard
J. MacPherson - Anniston
M. J. Pistek - WGK
H. F. Ray - WGK
R. P. Stevens
R. S. Yates

DATE AND PLACE OF MEETING August 15, 1967, Creve Coeur, Missouri.

CEA-1800 Increase Liquid Aroclors' Capacity, WGK Plant, Sauget, Illinois.

This project is for installing a new aroclor manufacturing plant and a tank farm. The capacity will be 40M ppy. The capital is approximately $1.4M; completion target is approximately January, 1969.

The project includes installation of a 100M gallon biphenyl storage tank and extension of trackage for access to this tank. Two biphenyl unloading docks will be provided. The drainage from the 100M gallon biphenyl tank will be away from the process.

PROCESS

1. Biphenyl Storage Tank This storage tank will be air blanketed; it was stated that contact of the biphenyl with air will not result in deleterious effects on the biphenyl. The flash point of biphenyl is 235°F. It was therefore agreed that low pressure steam (5 psig max.) would be used for heating the large storage tank, the 25,000 gallon tank, and tank cars, in order to avoid heating above the flash point.

0725928

APPENDIX "I" (1)

IN-10 REV. 11-65

TOWOLDMON0045014

2. Addition of Ferric Chloride to Biphenyl Mix Tanks The ferric chloride is added batchwise to the mix tanks by opening the tanks and dropping in the solid. It was agreed that, in order to prevent formation of any flammable mixtures above the biphenyl in these tanks (Nos. 403 and 404), the temperature of material in the mix tanks will be held below the flash point.

3. Chlorination System The chlorination proceeds at a temperature of about 150°C; approximately 550 BTU's are evolved per pound of chlorine added. Heat removal is accomplished by circulating batch material through an external air cooler and back into the chlorinator. Safety provisions include the following:

   (a) A high temperature sensing element in the chlorinator mass detects high temperature, shuts off chlorine, and alarms.

   (b) Circulating pump shutdown (motor circuit detection) shuts off chlorine feed.

   (c) A temperature detector in the circulating line is used for temperature control in the system. When this element detects low temperature it alarms and also shuts off the air cooler fan.

   (d) A temperature detector in the chlorinator mass (separate from No. a. above) alarms at a high temperature which is lower than the temperature at which the element in a. alarms and shuts off chlorine.

FIRE PROTECTION A new open type structure will be erected adjacent to Building CR.

No automatic sprinkler protection is required for this structure. It should be noted, however, that a spill of biphenyl at a temperature above its flash point (235°F) has resulted in fires.

The existing hydrant protection is considered adequate to extinguish such a fire.

LOSS EXPOSURE The therminol furnace consists primarily of a cylindrical combustion chamber containing finned tubes. Although an explosion in the combustion chamber is possible, the combustion chamber could in all probability contain the explosion pressure. There appears to be no major hazard from this source. The stack might of course be blown off.

0725929

APPENDIX "I" (2)

TOWOLDMON0045015

A more likely source of loss exposure would appear to be the burning of a tube in the therminol furnace. A tube could be replaced within about two days if one is in stock. On a sold-out basis the business interruption loss would be approximately $20M. The repair cost was approximated at $3M.

LOSS PREVENTION GUIDE Attached to R. S. Yates' copy of this report is a copy of Form G-1425, Loss Prevention Review Guide, which can be used as a safety checklist for this project.

LOSS PREVENTION REVIEW BY PLANT The S&PP Branch of CED does not plan a complete review of design prints for safety provisions. S&PP requests plant personnel, including plant safety personnel, to follow the development of design prints and to check the progress of construction with particular emphasis on personnel safety and loss prevention.

SAFETY MANAGER R. J. Green will be Safety Manager for this project. Please contact him for reviews during the design phase of this project.

R. J. Green

R. J. Green

W. B. Howard

W. B. Howard

js

0725930

APPENDIX I (3)

TOWOLDMON0045016

Monsanto

FROM (NAME & LOCATION): W. B. Howard - General Offices

DATE: August 29, 1967

SUBJECT: PROJECT LOSS PREVENTION REPORT 67-64

REFERENCE: CEA-1430

TO: Mr. R. S. Yates (Project Manager)

CC: R. E. Doerr
R. E. Howard
J. L. Mathews
P. K. Ward - Anniston
S&PP Project File
S&PP Location File

COPIES TO THOSE PRESENT

J. R. Fullgraf
H. D. Gabelman
R. J. Green
W. B. Howard
J. MacPherson - Anniston
M. J. Pistek - WGK
H. F. Ray - WGK
R. P. Stevens
R. S. Yates

DATE AND PLACE OF MEETING August 15, 1967, Creve Coeur, Missouri.

CEA-1430 Increase Liquid Aroclors Capacity, Anniston Plant, Anniston, Alabama.

This project is for a new tank farm, mixing area, flaking area, and drumming area. Capital will be approximately $1.6M; completion target is January, 1969. Although no additional capacity is claimed under this project, the operation will be changed from three shift, seven day, to one shift, seven day.

A flaker will be added for solid aroclors and another flaker for biphenyl. Exhaust systems will be provided to remove fumes from the flakers.

PROCESS

1. Mix Tank Solutions of aroclors are prepared in toluene and xylene in a mix tank. The toluene and xylene used for this purpose are pumped from drums directly into the 2,000 gallon mix tank. This tank is jacketed for steam and for water. The tank will be nitrogen padded.

2. Biphenyl Surge Tank The flash point of biphenyl is 235°F. The biphenyl surge tank in the flaking area will be heated, but only to approximately 80°C. The biphenyl will thus be below the flash point.

APPENDIX I (4)

0725931

IN-10 REV. 11-65

TOWOLDMON0045017

3. Scale-up of Flaker Size The new flakers will be of significantly larger size than the present flakers. The aroclors are expected to perform on the new flakers as well as, or better than, they do on the present flakers. The biphenyl gives some problems in flaking with the present flakers, and some of these problems may continue with the new flakers. Although there is a scale-up factor with the new flakers, no significant scale-up problems are anticipated.

FIRE PROTECTION A 120' x 60' x 1 story metal siding on steel frame prefabricated type building will be erected north of Bldg. 27 for flaking and drumming of aroclors.

It is recommended that this building be provided with an ordinary hazard wet pipe system of automatic sprinklers. The system should be supplied from a feed connected to the fire main in Fifth Street with a post indicator type shut-off valve located at least 25 ft. from the proposed building.

LOSS EXPOSURE The maximum probable loss is anticipated to occur from the scarring of an aroclor flaker roll. Resurfacing of the roll would require about one month. On this basis the BI loss would be approximately $100M. Equipment repair costs for the resurfacing would be approximately $4,000.

LOSS PREVENTION GUIDE Attached to R. S. Yates' copy of this report is a copy of Form G-1425, Loss Prevention Review Guide, which can be used as a safety check list for this project.

LOSS PREVENTION REVIEW BY PLANT The S&PP Branch of CED does not plan a complete review of design prints for safety provisions. S&PP requests plant personnel, including plant safety personnel, to follow the development of design prints and to check the progress of construction with particular emphasis on personnel safety and loss prevention.

SAFETY MANAGER R. J. Green will be Safety Manager for this project. Please contact him for reviews during the design phase of this project.

R. J. Green

W. B. Howard

W. B. Howard

ps

APPENDIX "I" (5)

0725932

TOWOLDMON0045018