CENTRAL ENGINEERING DEPARTMENT

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 40$\overline{M}$ 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

0014052

TOWOLDMON0043843

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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 29.5$\overline{M}$ lbs./year to 69.5$\overline{M}$ 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.

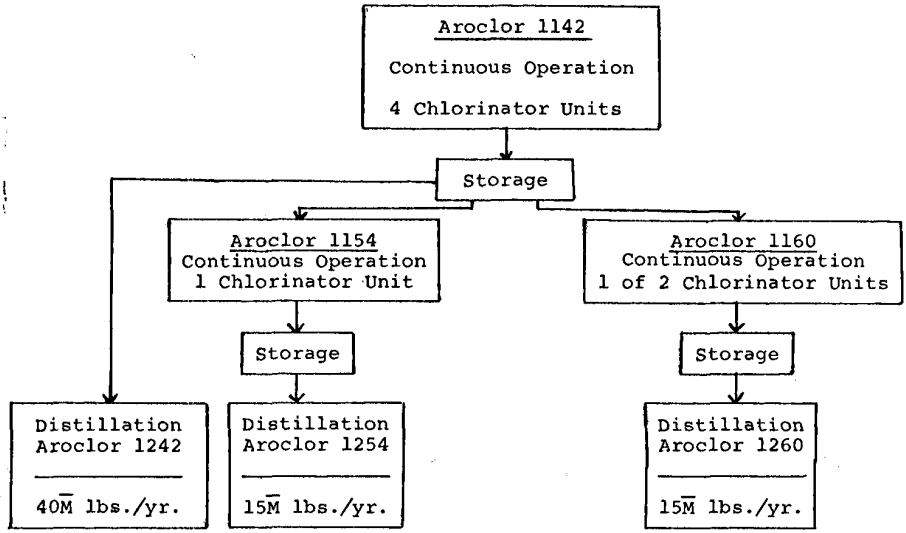
Flaking and drumming capacity can be increased by adding additional personnel and operating on a 2 or 3 shift basis.

### 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:



TOWOLDMON0043862




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).

0014072

TOWOLDMON0043863

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.



TOWOLDMON0043864

## 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.



TOWOLDMON0043865

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.

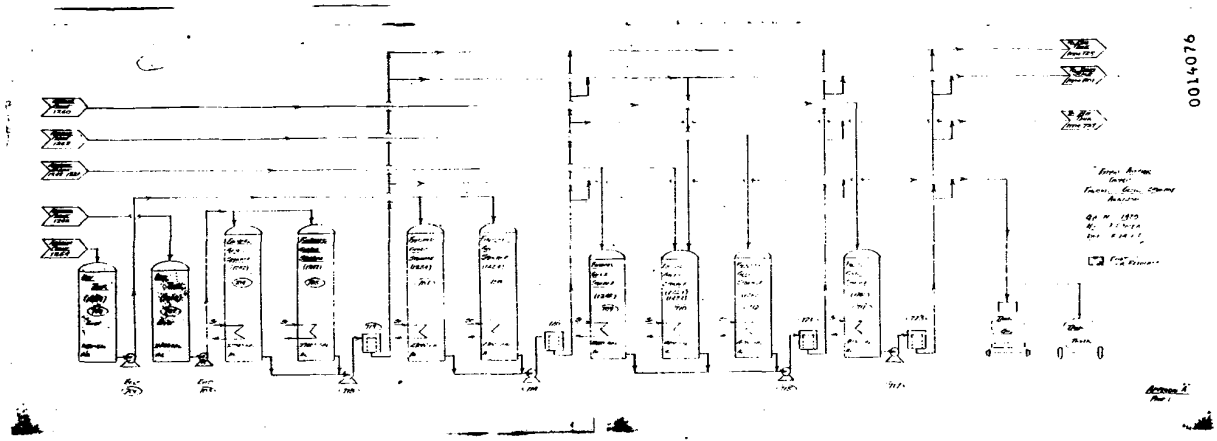
Replace existing gas meter with a larger capacity meter.

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

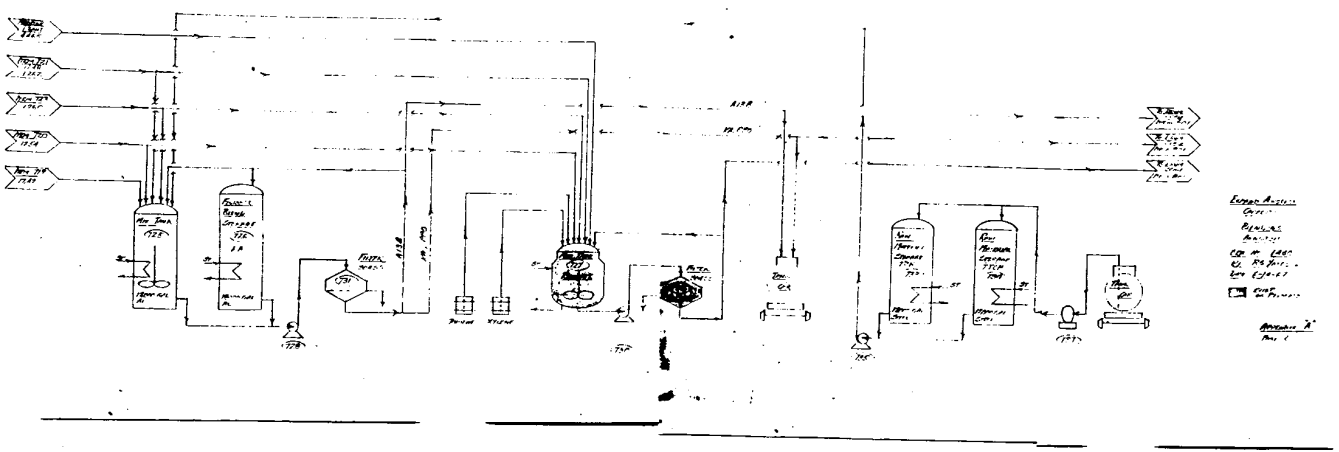
Install new 600 amp breaker in Sub #17. Install fans in Sub #17 transformer. Transfer feeder 8-1 from Sub #8 to Sub #17. Install an overhead feeder from Sub #17 to Building CF. Install feeder cables from breaker 8-1 to Department 246.



TOWOLDMON0043866



0014076



0014077

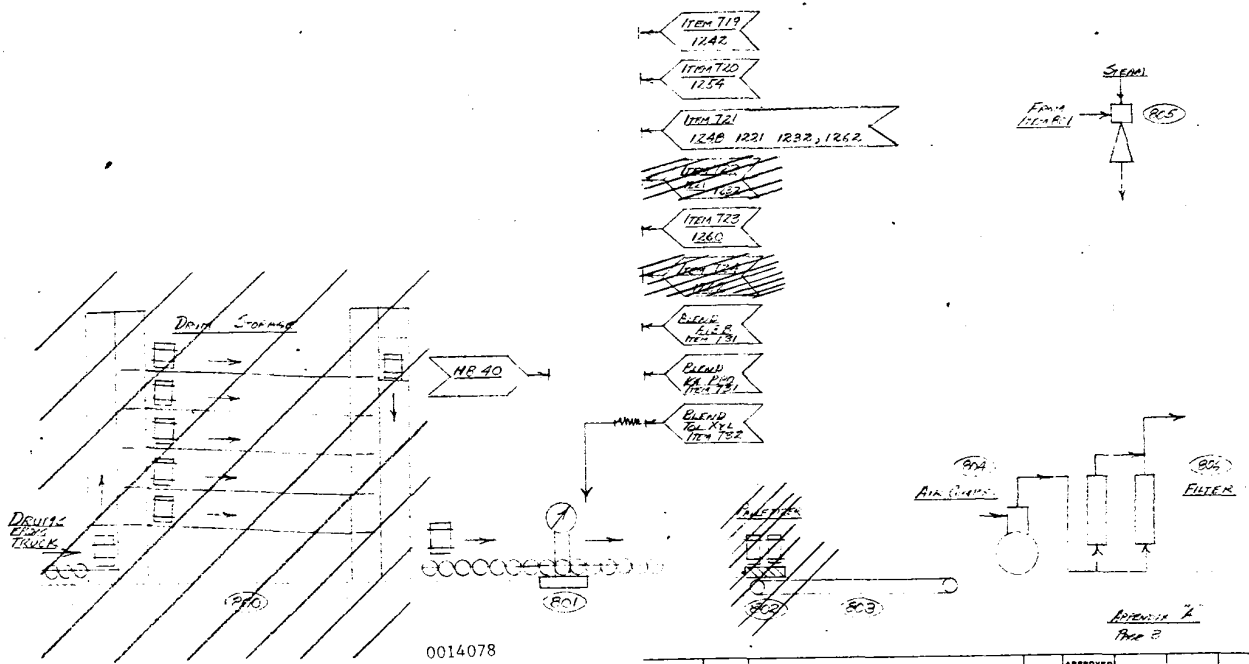
TOWOLDMON0043868

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

EXPAND AROCLOR CAPACITY
DRUMMING
PLANT ANNISTON
LOCATION ANNISTON, ALA

EQUIPMENT FLOW SHEET

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




APPENDIX "A"
PAGE 3

0014078

| REV. NO. | DATE | REVISION | BY | APPROVED BY | DATE |
|---|---|---|---|---|---|
| 2 | 8-14-67 | RMVD ITEM 802, FILTERIZER | RSY | | |
| 1 | 6-14-67 | RMVD ITEM 803, CONC LINES | RSY | | |

OE-199 (7/64)

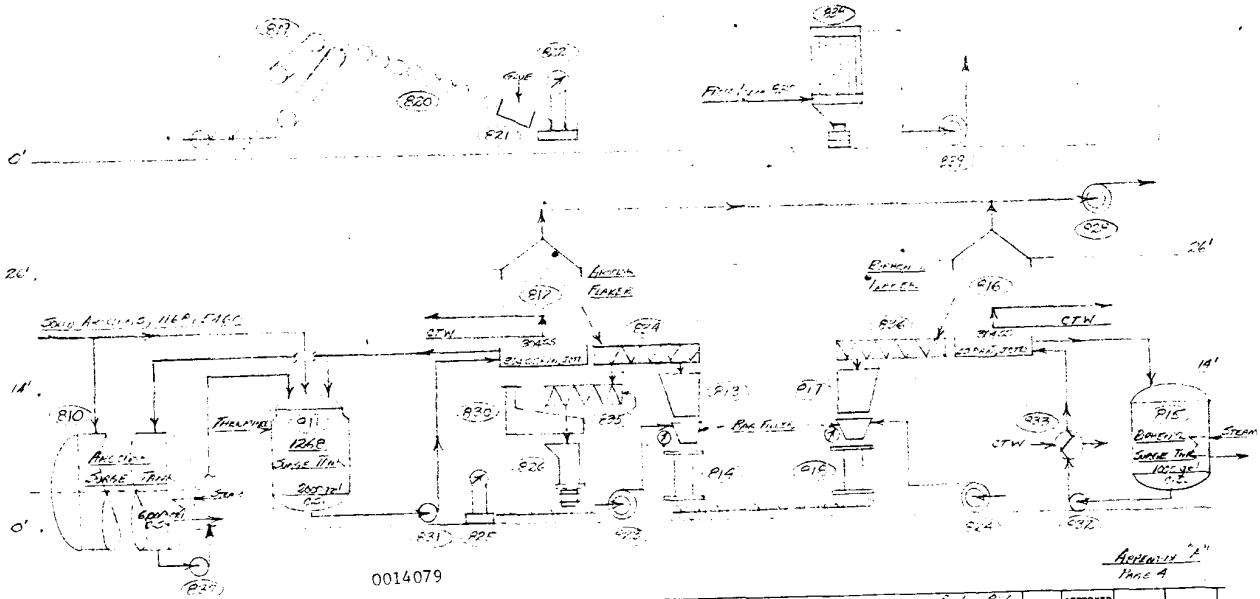
TOWOLDMON0043869

MONSANTO COMPANY
ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

EXPAND ANCHOR CAPACITY
FLAKING & CASSING
PLANT ANNISTON
LOCATION ANNISTON, ALA

EQUIPMENT FLOW SHEET

DESIGN MANUAL SECTION NO.
ITEM NO.
ESTIMATE NO. 1430
E.A. NO.
PREPARED BY R G YATES
DATE 5-9-67
SHEET 1 OF 1




0014079

APPENDIX "A"
PAGE 4

| REV. NO. | DATE | REVISION | BY | APPROVED BY | DATE |
|---|---|---|---|---|---|
| 2 | 9-14-67 | [illegible] | [illegible] | | |
| 1 | 7-7-67 | COMPLETE [illegible] | [illegible] | | |

QE-159 17/64

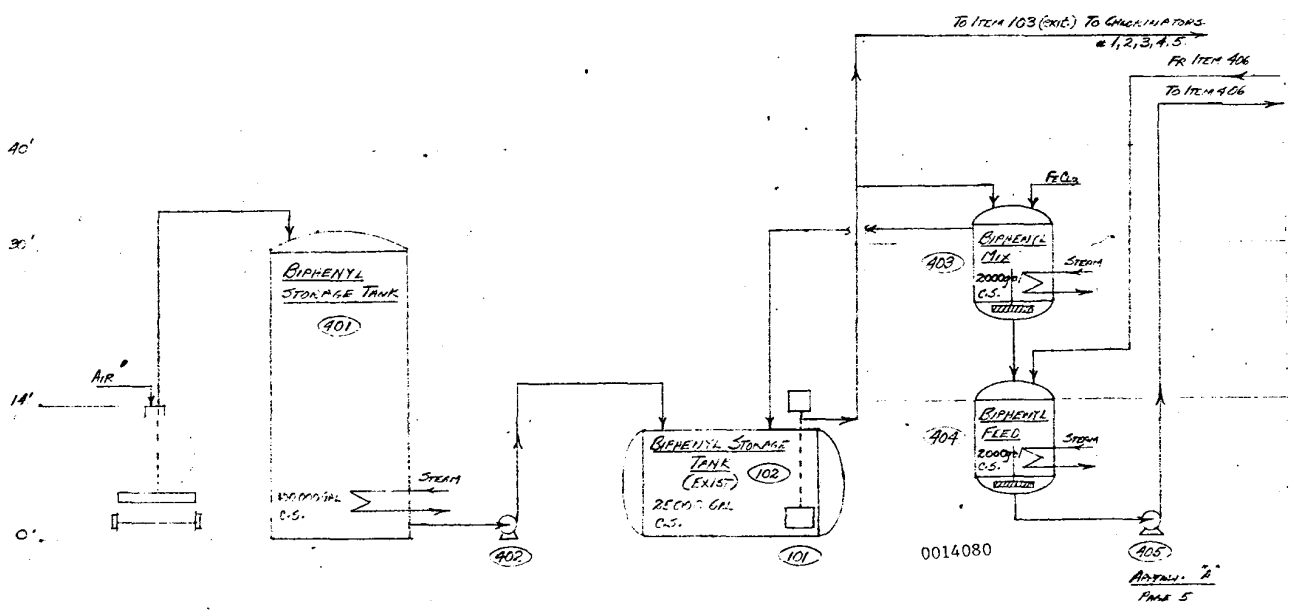
TOWOLDMON0043870

MONSANTO COMPANY
~~[illegible]~~
ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

EXPAND AROCLOR CAPACITY
BIPHENYL STGE & FEED
PLANT W.G. KRIMMRICH
LOCATION SAUGET, ILL.

EQUIPMENT FLOW SHEET

DESIGN MANUAL SECTION NO. ____ ITEM NO. ____
ESTIMATE NO. 1800 E.A. NO. ____
PREPARED BY K.S. YATES DATE 4-11-67
SHEET 1 OF 5




0014080

Appendix "A"
Page 5

| REV. NO. | DATE | REVISION | BY | APPROVED BY | DATE |
|---|---|---|---|---|---|
| 1 | 6-15-67 | [illegible] | KSY | | |

OS-188 (7/66)

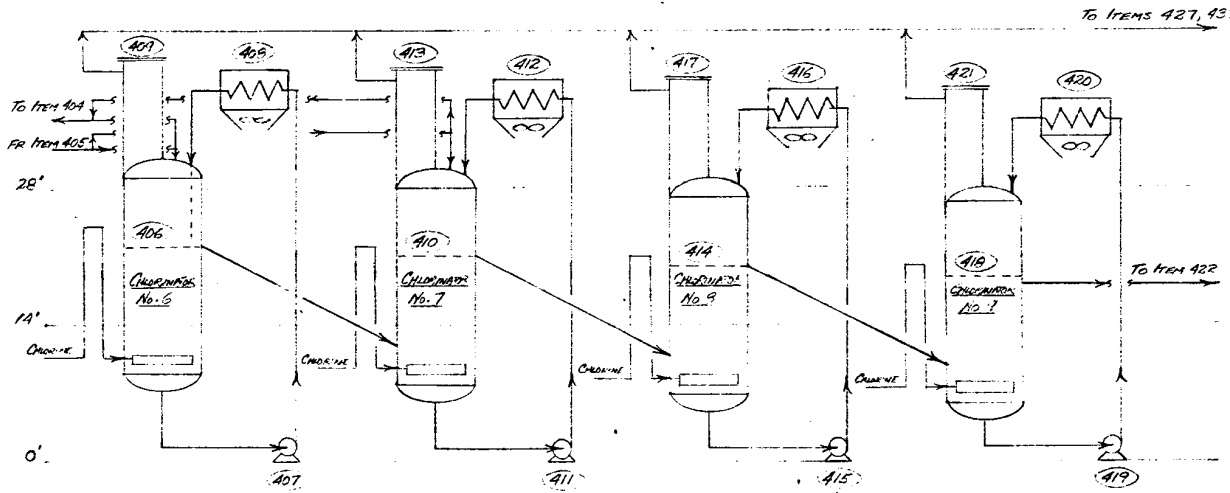
TOWOLDMON0043871

MONSANTO COMPANY
ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

EXPAND AROCLOR CAPACITY (HYDRINATION)
PLANT W. G. KRUMMRICH
LOCATION SAUGET, ILL.

EQUIPMENT FLOW SHEET

DESIGN MANUAL SECTION NO.
ITEM NO.
ESTIMATE NO. 1800
E.A. NO.
PREPARED BY R.S. VALES
DATE 4-11-67
SHEET 2 OF 3




0014081

Appendix 2
Page 6

| REV. NO. | DATE | REVISION | BY | APPROVED BY | DATE |
|---|---|---|---|---|---|
| | | | | | |

OG-129 (7/58)

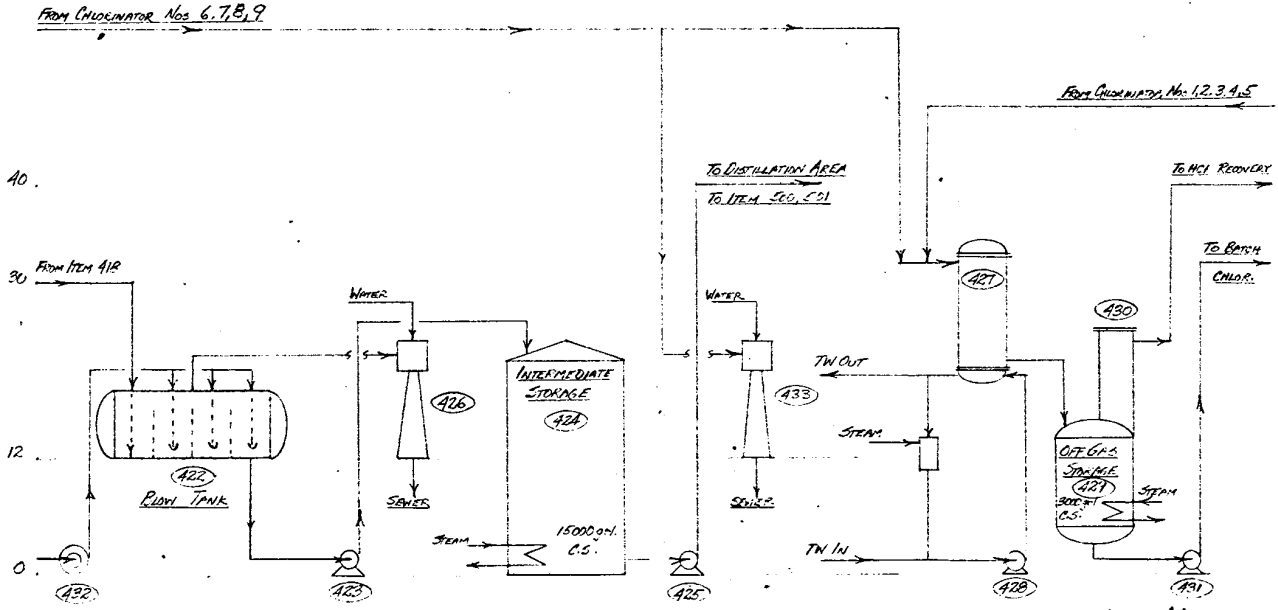
TOWOLDMON0043872

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

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

EQUIPMENT FLOW SHEET

DESIGN MANUAL SECTION NO.
ITEM NO.
ESTIMATE NO. 7800
E.A. NO.
PREPARED BY R S YATES
DATE 4-11-67
SHEET 3 OF 5




0014082

| REV. NO. | DATE | REVISION | BY | APPROVED BY | DATE |
|---|---|---|---|---|---|
| 1 | [illegible] | ADDED ITEM 423 | [illegible] | | |

OE-189 (7/64)

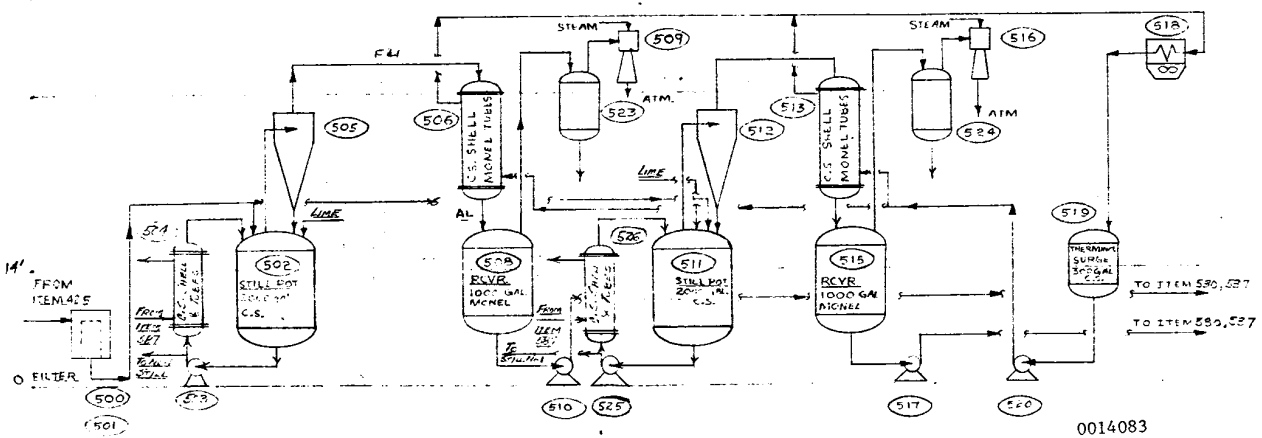
TOWOLDMON0043873

MONSANTO COMPANY
ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

EXPAND AROCLOR CAPACITY DISTILLATION
PLANT WG KRUMMRICH
LOCATION SAUGET, ILLINOIS

# EQUIPMENT FLOW SHEET

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




0014083

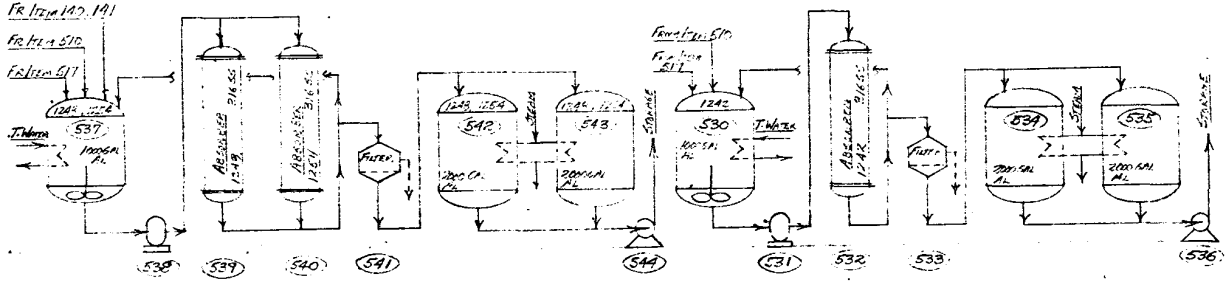
APPENDIX "A"
PAGE 8

| REV. NO. | DATE | REVISION | BY | APPROVED BY | DATE |
|---|---|---|---|---|---|
| 1 | [illegible] | [illegible] | [illegible] | | |

OE-100 (7/64)

TOWOLDMON0043874

| | | | |
|---|---|---|---|
| ...NSANTO COMPANY<br>...NGINEERING DEPARTMENT<br>... LOUIS, MISSOURI | EXPANS ABSOLUTE CAPACITY<br>EARTH TREATMENT<br>PLANT W G KRUMMRICH<br>LOCATION SAUGET ILLINOIS | EQUIPMENT FLOW DIAGRAM | DESIGN MANUAL SECTION NO. ITEM NO.<br>ESTIMATE NO. 1800 E.A. NO.<br>PREPARED BY KSYATES DATE 8-23-67<br>SHEET 5 OF 5 |



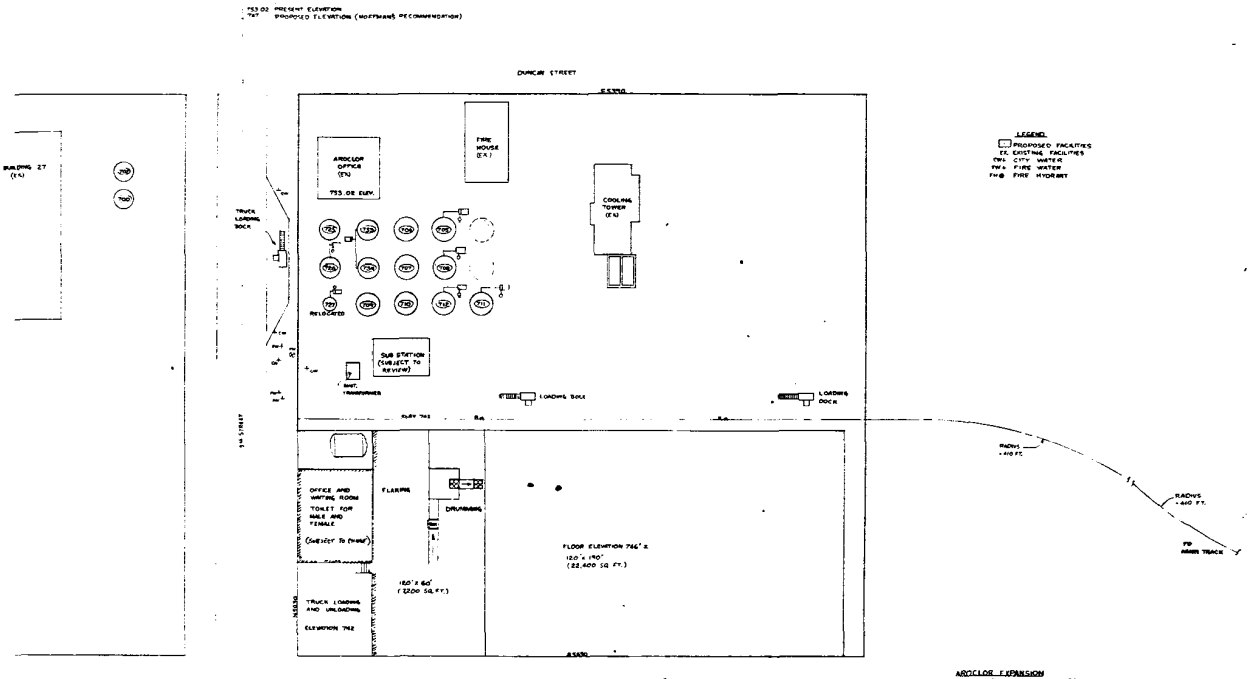

0014084

APPENDIX "A"
PAGE 9

| REV. NO. | DATE | REVISION | BY | APPROVED BY / DATE | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

OS-188 (7/64)

TOWOLDMON0043875



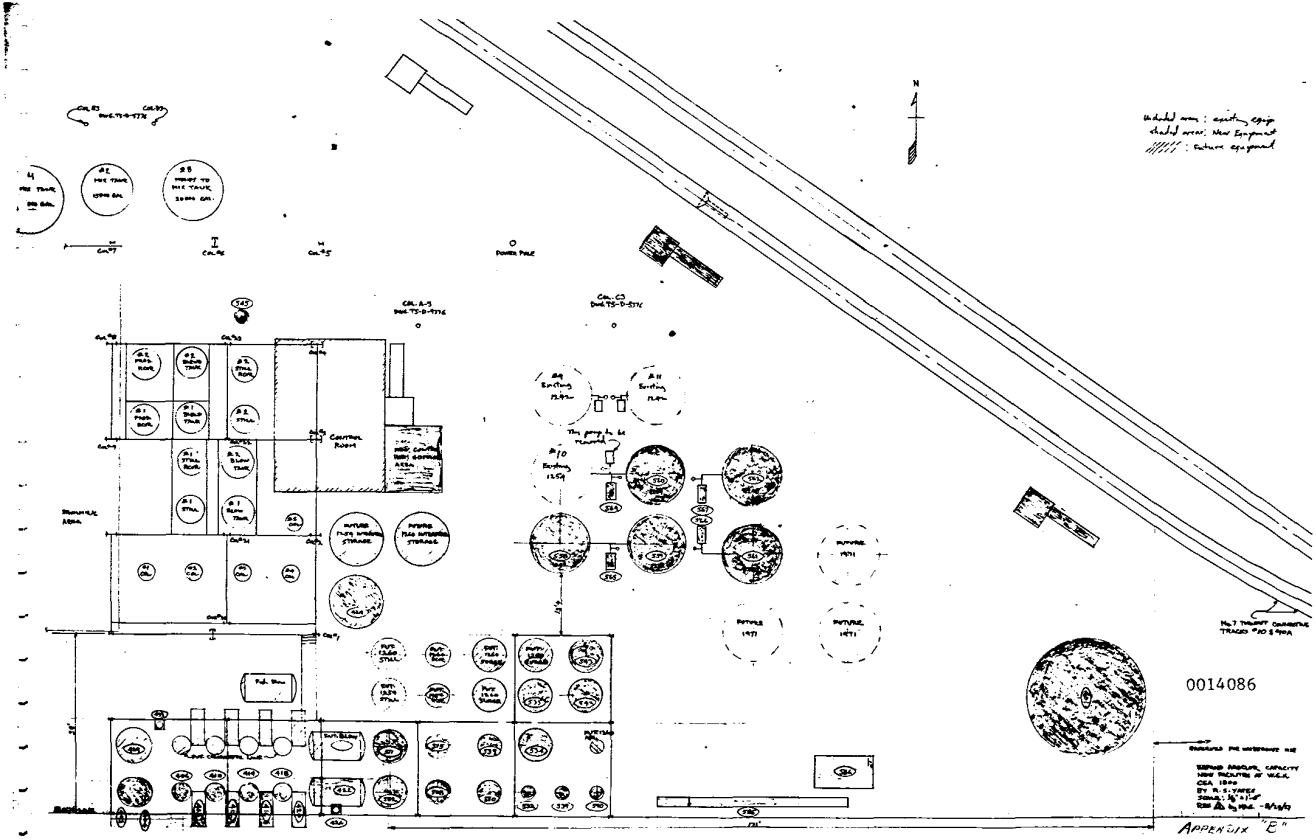

0014085

AROCLOR EXPANSION
DRUMMING, FLAKING, TANK FARM
PLANT: ANNISTON
LOCATION: ANNISTON, ALABAMA
C&A 1830
BY: K.D. CARELLANO
DATE: 6-29-67
SCALE: 1"=20'-0"

APPENDIX E
PAGE 1

DCB 8-23-67

TOWOLDMON0043876




TOWOLDMON0043877

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

MONSANTO COMPANY
CENTRAL ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

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

DESIGN MANUAL SECTION NO.
PROJ. NO. C.E.A. NO. 1435
PREPARED BY R.S. YATES
DATE 6-19-67 SHEET 1 OF 6

AREA 01

## EQUIPMENT LIST AND SUMMARY

| REV. NO. | REMARKS | OPERATING TEMP. & PRESS. | MATERIALS OF CONSTRUCTION | APPROX. DIM. | NOMINAL RATING | NEW OR ON HAND | ITEM NO. | NAME |
|---|---|---|---|---|---|---|---|---|
| | PLANT ITEM 210 | | ALUMINUM | | 11,500 GALS | OH | 700 | DAY TANK 1254 |
| | PL ITEM 213, DURCO A30, SIZE 3x2-13/11 | | | SEAL - #7 CRANE OUTSIDE QP 191 | 150 GPM 120' TDH | OH | 701 | TRANSFER PUMP |
| | | | | | | OH | 701-001 | MOTOR |
| | PL ITEM 211 | | ALUMINUM | | 11,500 GALS | OH | 702 | DAY TANK 1242 |
| | PL ITEM 212, DURCO A30, SIZE 3x2-12/11 | | | SEAL - #7 CRANE OUTSIDE QP 191 | 150 GPM 120' TDH | OH | 703 | TRANSFER PUMP |
| | | | | | | OH | 703-001 | MOTOR |
| | WITH A & P 70 SINGLE PASS PLATE COILS 10" x 119", AREA 62 FT² 7500# | 100°C ¼ PSI | ALUMINUM | 13'6" DIA x 20'6" | 2700 GALS | N | 704 | FINISHED GOODS 1243 |
| | SAME AS IT 704 | 100°C ¼ PSI | ALUMINUM | 13'6" DIA x 20'6" | 2700 GALS | N | 705 | FINISHED GOODS 1259 |
| | | | | | | | 706 | CANCELLED |
| | SAME AS IT 704 | 100°C ¼ PSI | ALUMINUM | 13'6" DIA x 20'6" | 2700 GALS | N | 707 | FINISHED GOODS 1259 |
| | SAME AS IT 704 | 100°C ¼ PSI | ALUMINUM | 12'6" DIA x 20'6" | 2700 GALS | N | 708 | FINISHED GOODS 1254 |
| | WITH A & P 70 SINGLE PASS PLATE COILS 10" x 117", AREA 56 FT² 5500 # | 100°C ¼ PSI | ALUMINUM | 12' DIA x 22'6" | 1800 GALS | N | 709 | FINISHED GOODS 1243 |
| | SAME AS IT 709 | 100°C ¼ PSI | ALUMINUM | 12' DIA x 22'6" | 1800 GALS | N | 710 | FINISHED GOODS 1241, 1253 |
| | SAME AS IT 709 | 100°C ¼ PSI | ALUMINUM | 12' DIA x 22'6" | 1800 GALS | N | 711 | FINISHED GOODS 1265 |
| | SAME AS IT 709 | 100°C ¼ PSI | ALUMINUM | 12' DIA x 22'6" | 1800 GALS | N | 712 | FINISHED GOODS 1262 |
| | AVC A30, SIZE 3x2-13 | 100°C | 316 SS | WITH MECH SEAL | 200 GPM 150' TDH | N | 713 | TRANSFER PUMP |
| | | TEFC | | | 15 HP 1800 RPM | N | 713-001 | MOTOR |
| | AVC A30, SIZE 3x2-13 | 100°C | 316 SS | WITH MECH SEAL | 200 GPM 150' TDH | N | 714 | TRANSFER PUMP |
| | | TEFC | | | 15 HP 1800 RPM | N | 714-001 | MOTOR |
| | AVC A30, SIZE 3x2-13 | 100°C | 316 SS | WITH MECH SEAL | 200 GPM 150' TDH | N | 715 | TRANSFER PUMP |
| | | TEFC | | | 15 HP 1800 RPM | N | 715-001 | MOTOR |
| | | | | | | | 716 | CANCELLED |
| | AVC A30, SIZE 3x2-13 | 100°C | 316 SS | WITH MECH SEAL | 200 GPM 150' TDH | N | 717 | TRANSFER PUMP |
| | | TEFC | | | 15 HP 1800 RPM | N | 717-001 | MOTOR |

APPENDIX "C" PAGE 1

TOWOLDMON0043878

0014088

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

MONSANTO COMPANY
CENTRAL ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

PROJECT: AMOCO EXPANSION
SUBJECT: FINISHED GOOD STORAGE
PLANT: ANNISTON
LOCATION: ANNISTON, ALA

DESIGN MANUAL SECTION NO.
PROJ. NO. C.E.A. NO. 1430-
PREPARED BY: R.C. YATES
DATE: 6-14-67 SHEET 2 OF 6

AREA 01

## EQUIPMENT LIST AND SUMMARY

| REV. NO. | REMARKS | OPERATING TEMP. & PRESS. | MATERIALS OF CONSTRUCTION | APPROX. DIM. | NOMINAL RATING | NEW OR ON HAND | ITEM NO. | NAME |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | 718 | CANCELLED |
| | ALSEP PAK - #12 S-6 WITH #90 MEDIA MOUNT IN PARALLEL | 100°C 50PSI | 316 SS | 18" DIA x 5' LONG | | N | 719 | PRODUCT FILTER |
| | SEE IT 719 | 100°C 50PSI | 316 SS | 18" DIA x 5' LONG | | N | 720 | PRODUCT FILTER |
| | SEE IT 719 | 100°C 50PSI | 316 SS | 18" DIA x 5' LONG | | N | 721 | PRODUCT FILTER |
| | | | | | | | 722 | CANCELLED |
| | SEE IT 719 | 100°C 50PSI | 316 SS | 18" DIA x 5' LONG | | N | 723 | PRODUCT FILTER |
| | | | | | | | 724 | CANCELLED |
| | WITH 4 #70 SINGLE EMB PLATECOILS 18" x 107" - AREA 56 FT² 4500# | 100°C 1/4 PSI | ALUMINUM | 11' DIA x 13'0" | 12000 GAL | N | 725 | MIX TANK |
| | | | | | | N | 725-001 | DRIVE |
| | LIGHTNING MODEL 10P-RCLS-5.2 WITH MECH SEAL | | | | 280 RPM | N | 725-002 | AGITATOR |
| | | TEFC | | | 7½ HP 1800 RPM | N | 725-003 | MOTOR |
| | WITH 4 #70 SINGLE EMB PLATECOILS 18" x 107" - AREA 56 FT² 5500# | 100°C 1/4 PSI | ALUMINUM | 12' DIA x 22'0" | 18000 [illegible] | N | 726 | FINISHED BLEND [illegible] |
| | PLANT ITEM 206 - JETD TANK | 100°C 1/4 PSI | C.S. [illegible] | 6'6" DIA x 8'2" | 2100 GAL | OH | 727 | MIX TANK |
| | | | | | | OH | 727-001 | DRIVE |
| | | | | | | OH | 727-002 | AGITATOR |
| | | | | | | OH | 727-003 | MOTOR |
| | AVS A20 - SIZE 3x1½-13 | | 316 SS | | 150 GPM 100' TDH | N | 728 | TRANSFER PUMP |
| | | TEFC | | | 10 HP 1800 RPM | N | 728-001 | MOTOR |
| | | | | | | | 729 | CANCELLED |
| | AVS A20 - SIZE 3x1½-13 | | 316 SS | | 150 GPM 100' TDH | N | 730 | TRANSFER PUMP |
| | | TEFC | | | 10 HP 1800 RPM | N | 730-001 | MOTOR |
| | SPANKLE # 88-12-65 FT² AREA | 100°C 50PSI | 304 SS | 3'0" x 5'6" | [illegible] | N | 731 | FILTER |
| | PLANT ITEM 642 - SPANKLE #15 S-23 - 37.26 FT² AREA | 100°C 50PSI | 304 SS | | 300 GAL | OH | 732 | FILTER |
| | WITH 4 #70 SINGLE EMB PLATECOILS 18" x 107" - AREA 56 FT² 10000# | 30°C 1/4 PSI | CARBON STEEL | 11' DIA x 19'0" | 1200 GAL | N | 733 | TOE [illegible] TANK |

APPENDIX [illegible]

TOWOLDMON0043879

| REV. NO. | DATE | DESCRIPTION |
|---|---|---|
| 1 | 7-27-67 | GENERAL |
| 2 | 8-23-67 | ADDED IT 737, 74?, 74? |

PROJECT Nuclear Electric
SUBJECT Fuel Oil Systems
PLANT Arnold
LOCATION Palo Alto

DESIGN MANUAL SECTION NO
DRWG NO S.E.A. NO 1465
PREPARED BY E. Jaffe
DATE 6-14-67 SHEET 3 OF 6

Area 01

## EQUIPMENT LIST AND SUMMARY

| REV. NO. | REMARKS | OPERATING TEMP. & PRESS. | MATERIALS OF CONSTRUCTION | APPROX. DIM. | NOMINAL RATING | NEW OR ON HAND | ITEM NO. | NAME |
|---|---|---|---|---|---|---|---|---|
| | See Item 738 | 80°C Vo PSI | CARBON SEAL | 11'0" DIA x 18'0" | 12000 GAL | N | 734 | TTCE STORAGE TANK |
| | AVS A20, SIZE 3x1½-13 | | DUCTILE IRON | | 150 GPM 100' TDH | N | 737 | TTCE STG. PUMP |
| | | TEFC | | | 10 HP 1800 RPM | N | 737-001 | MOTOR |
| | | | | | | | 738 | CANCELLED |
| | WORTH 36R NEW SEAL PUMP WITH DEEP STUFFING BOX | | CAST IRON | | 1500 GPM 100' TDH | N | 737 | UNLOAD PUMP |
| | | TEFC | | | 15 HP | N | 737-001 | MOTOR |
| | | | | | | | 739 | CANCELLED |
| 2 | AVS A30, SIZE 3x2-13, REPL IT 605 | 100°C | BRONZE | WITH ALLEN SEAL | 1500 GPM 120' TDH | N | 737 | NO. 1 FL TANK PUMP |
| 2 | | TEFC | | | 15 HP 1800 RPM | N | 737-001 | MOTOR |
| 2 | AVS A30, SIZE 3x2-13, REPL IT 603 | 100°C | BRONZE | WITH ALLEN SEAL | 1500 GPM 120' TDH | N | 740 | NO. 2 FL TANK PUMP |
| 2 | | TEFC | | | 15 HP 1800 RPM | N | 740-001 | MOTOR |
| 2 | AVS A30, SIZE 3x2-13, REPL IT 601 | 100°C | BRONZE | WITH ALLEN SEAL | 1500 GPM 120' TDH | N | 741 | NO. 3 FL TANK PUMP |
| 2 | | TEFC | | | 15 HP 1800 RPM | N | 741-001 | MOTOR |

0014089

TOWOLDMON0043880

| REV. NO. | DATE | DESCRIPTION |
|---|---|---|
| 1 | 6-14-67 | GENERAL |
| 2 | 8-23-67 | RMVD 1T 80K |

MONSANTO COMPANY
CENTRAL ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

PROJECT: APOLLO EXPANSION
SUBJECT: DRUMMING
PLANT: ANNISTON
LOCATION: ANNISTON, ALA

DESIGN MANUAL SECTION NO.
PROJ. NO. C.E.A. NO. 1430
PREPARED BY: RS/[illegible]
DATE: 5-8-67 SHEET 4 OF 6

AREA 01

# EQUIPMENT LIST AND SUMMARY

| REV. NO. | REMARKS | OPERATING TEMP. & PRESS. | MATERIALS OF CONSTRUCTION | APPROX. DIM. | NOMINAL RATING | NEW OR ON HAND | ITEM NO. | NAME |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | 800 | CANCELLED |
| | TOLEDO MODEL 9116-A SUB SURFACE HI SPEED LIQUID SCALE FILLER | 100°C | STEEL, SILICANE | 24"x30" PLATFORM | 1 TO 2 DRUM/MIN | N | 801 | DRUM FILLER |
| | | | | | | | 802 | CANCELLED |
| | CHAIN OPERATED | | C.S. | 48" WIDE x 90' LONG | STORAGE FOR 20 PALETTES | N | 803 | DRUM CONVEYOR |
| | | TEFC | | | 15HP 1800RPM | N | 803-001 | MOTOR |
| | JOY MODEL, INCL AIR RCVR AND COOLER | | | | 50 SCFM 100 PSIG | N | 804 | COMPRESSOR |
| | | TEFC | | | 25HP 1800RPM | N | 804-001 | MOTOR |
| | WORTHINGTON 2½ NPA WITH NO 15 STAGE | | NOZZLE MONEL BODY CI | | 50 LB AIR AT 25" HG VAC | N | 805 | EJECTOR |
| | TRINITY MODEL # 50 HAC | | C.S. | | 45 SCFM 100 PSIG | N | 806 | INSTR AIR DRYER |
| | INCL TANK, CONTR, COMPR, MAN HOLE | | | | 30 GPM | N | 807 | SEWERAGE EJECTOR |
| | | TEFC | | | 1½ HP | N | 807-001 | MOTOR |
| | | TEFC | | | 1½ HP | N | 807-002 | MOTOR |
| | GRAVITY TYPE | | | 26" WIDE x 30' LONG | | N | 808 | CONVEYOR FOR EMPTIES |

0014090

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TOWOLDMON0043881

| REV. NO. | DATE | DESCRIPTION |
|---|---|---|
| 1 | 9-19-67 | ADDED IT 326, REV IT 610 |

MONSANTO TOWN AND COUNTRY ENGINEERING DEPARTMENT ST. LOUIS, MISSOURI

PROJECT ARCHEON EXPANSION
SUBJECT FLAKING & LAMINATING
PLANT ANNISTON
LOCATION ANNISTON, ALA.

DESIGN MANUAL SECTION NO.
EDP NO. C.E.A. NO. 1930
PROGRAMED BY RW/AEG
DATE 6-15-67 SHEET 3 OF 6

AREA - 01

## EQUIPMENT LIST AND SUMMARY

| REV. NO. | REMARKS | OPERATING TEMP. & PRESS. | MATERIALS OF CONSTRUCTION | APPROX. DIM. | NOMINAL RATING | NEW OR ON HAND | ITEM NO. | NAME |
|---|---|---|---|---|---|---|---|---|
| 1 | WITH 10 # TO SINGLE END PLATES TOTAL 36"x12" | 260°C ATM | CARBON STEEL | 15'DIA x 10' LONG | 6000 GAL | N | 610 | ARCHEON HORIZ. TANK |
| | WITH JACKET 7000# TANK JCT | 260°C 7000# | CARBON STEEL | 6'6"DIA x 7'7" | 2000 GAL | N | 611 | 595 - 1165 GAL TANK |
| | | 316°C 50PSI | | | | | | |
| | AREA 12SFT² (4'8 x 2'6") | 316°C ATM | PAN DRUM: CR PLATED 316SS | 5'WIDE x 16' LONG | 6900 #/HR | N | 612 | ARCHEON FLAKER |
| | | TEFC | | | 10 HP | N | 612-01 | 10 HP |
| | | | 316SS | | | N | 612-02 | ARCHEON TANK & CRADLE |
| | | TEFC | | | 2 HP | N | 612-03 | MOTOR |
| | | 70°C ATM | 304 SS | 3'x6'x6' HIGH | | N | 613 | STORAGE HOPPER |
| | STOKES FLAKE FILLING HOPPER | | 304 SS | 6'x6'x7' HIGH | 2 BAGS/MIN | N | 614 | ARCHEON BAG FILLER |
| | WITH 85FT 1½" I.P. SAN 80 COIL 1550# | 100°C ATM | CARBON STEEL | 5'DIA x 6'7" | 1000 GAL | N | 615 | DIPHENYL SURGE TANK |
| | AREA 72FT² (4'8 x 6') | 100°C ATM | PAN DRUM: CR PLATED 304 SS | 5'WIDE x 16' LONG | 3350 #/HR | N | 616 | ARCHEON FLAKER |
| | | TEFC | | | 5 HP | N | 616-01 | MOTOR |
| | | 70°C ATM | 304 SS | 3'x6'x6' HIGH | | N | 617 | STORAGE HOPPER |
| | STOKES FLAKE FILLING HOPPER | | 304 SS | 6'x6'x9' HIGH | 2 BAGS/MIN | N | 618 | DIPHENYL BAG FILLER |
| | | | | 26"x26"x6' LONG | 4 BAGS/MIN | N | 619 | BAG FLATTENER |
| | | TEFC | | | 3 HP | N | 619-01 | MOTOR |
| | GRANITE TYPE | | | 26"WIDE x 30"LONG | 4 BAGS/MIN | N | 620 | BAG CONVEYOR |
| | | | CARBON STEEL | 1'9" x 1'8" | | N | 621 | SCALE ATTACHMENT |
| | TOLEDO MODEL 2091 | | | 1'3" x 1'3" | 200 LB MAX | N | 622 | CHECK SCALE |
| | ROOTS - CONN #42 AT | | | | 15 CFM 10 PSI | N | 623 | FLUIDIZING AIR BLOWER |
| | | TEFC | | | 5 HP 1800 RPM | N | 623-001 | MOTOR |
| | R-C #42 AT | | | | 45 CFM 10 PSI | N | 624 | FEED SCREW AIR BLOWER |
| | | TEFC | | | 5 HP 1800 RPM | N | 624-01 | MOTOR |
| | PELTRON 629 TYPE MODEL 5801 | | | | | ON | 625 | FLUIDIZING SCREW FEEDER |

0014092

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

MONSANTO COMPANY
CENTRAL ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

PROJECT: ANDCLOR EXPANSION
SUBJECT: FLAKING - FLAKING
PLANT: ANNISTON
LOCATION: ANNISTON, ALA

DESIGN MANUAL SECTION NO.
PROJ. NO. C.E.A. NO. 1437
PREPARED BY: R. YATES
DATE: 6-15-67 SHEET 6 OF 6

AREA - 01

## EQUIPMENT LIST AND SUMMARY

| REV. NO. | REMARKS | OPERATING TEMP. & PRESS. | MATERIALS OF CONSTRUCTION | APPROX. DIM. | NOMINAL RATING | NEW OR ON HAND | ITEM NO. | NAME |
|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | N | 826 | 1268 MILL |
| 1 | | | | | 15HP | N | 826-001 | MOTOR |
| | | | | | | | 827 | CANCELLED |
| | | | CARBON STEEL | | 3000CFM | N | 828 | SUCTION BLOWER |
| | | | | | 5HP | N | 828-001 | MOTOR |
| | | | | | | | 827 | CANCELLED |
| | | | 304 SS | 6'WIDE x 6' LONG | | N | 830 | FUME REMOVAL HOOD |
| | WITH JCTD EP AND ST BOX | | | | 50GPM 50' TDH | N | 831 | 1268 TRANSFER PUMP |
| | | TEFC | | | 3HP 1800 RPM | N | 831-001 | MOTOR |
| | WITH JCTD EP AND ST BOX | | | | 50GPM 50' TDH | N | 832 | BIPH TRANSFER PUMP |
| | | TEFC | | | 3HP 1800 RPM | N | 832-001 | MOTOR |
| | ONE DP COOLER - 10FT LONG | | | 12" x 15' LONG | | N | 833 | BIPH COOLER |
| | | | 304 SS | 12" x 20' LONG | 6900 LB/HR | N | 834 | ANDCLOR CONVEYOR |
| | | TEFC | | | 3HP | N | 834-001 | MOTOR |
| | | | 304 SS | 12" x 20' LONG | | N | 835 | 1268 CONVEYOR |
| | | TEFC | | | 3HP | N | 835-001 | MOTOR |
| | | | 304 SS | 12" x 15' LONG | | N | 836 | BIPH CONVEYOR |
| | | TEFC | | | 3HP | N | 836-001 | MOTOR |
| 1 | WITH JCTD EP AND ST BOX | | | | 50GPM 50' TDH | N | 837 | TRANSFER PUMP |
| 1 | | TEFC | | | 3HP 1800 RPM | N | 837-001 | MOTOR |
| 1 | | | CARBON STEEL | | 750 CFM | N | 838 | DUST COLLECTOR |
| 1 | | TEFC | | | 3/4 HP | N | 838-001 | SHAKER MOTOR |
| 1 | | | | | 1000 CFM | N | 839 | SUCTION BLOWER |
| 1 | | TEFC | | | 5HP | N | 839-001 | MOTOR |

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| REV. NO. | DATE | DESCRIPTION |
|---|---|---|
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PROJECT: Alcohol Expansion
SUBJECT: 450T Lb Plant
PLANT: Iwaki
LOCATION: Sprague, Illinois

DESIGN MANUAL SECTION NO.
PROJ. NO. C.E.A. NO. 1600
PREPARED BY: R.J. Yates
DATE: 4-1-67 SHEET 1 OF 7

Area 01

## EQUIPMENT LIST AND SUMMARY

| REV. NO. | REMARKS | OPERATING TEMP. & PRESS. | MATERIALS OF CONSTRUCTION | APPROX. DIM. | NOMINAL RATING | NEW OR ON HAND | ITEM NO. | NAME |
|---|---|---|---|---|---|---|---|---|
| | Shell E = 3/8" Bottom E = 7/16" Head E = 3/16" With 250 Ft of 2" Sch 80 Pipe | 85°C Atm | Carbon Steel | 25'Dia x 30' | 100,000 Gal | N | 401 | Effluent Storage |
| | Avs A60, Size 3x2-10, Jetd EP | 85°C | Cast Steel | With Mech Seal | 1000 GPM 80'TDH | N | 402 | Transfer Pump |
| | | TEFC | | | 7½ HP 1800 RPM | N | 402-001 | Motor |
| | | 200°F Atm | Carbon Steel | 15'6" Dia - 40'6" | 25000 Gal | OH | 102 | Fermenter Storage |
| | Shell E = 3/16" With Bottom of Head E = 1/4" 2" Sch 80 Pipe C.I. 2600 # | 85°C Atm | Carbon Steel | 6'6" Dia x 7'7" | 2000 Gal | N | 403 | Fermenter Mix Tank |
| | Falk Model 4ELH2 Reducer | | | | 125 RPM | N | 403-001 | Drive |
| | | | Carbon Steel | 26" Dia Pinion 3½" Dia Shaft | 125 RPM | N | 403-002 | Adaptor |
| | | TEFC | | | 10 HP, 1800 RPM | N | 403-003 | Motor |
| | Shell E = 3/16" With Bottom of Head E = 1/4" 2" Sch 80 Pipe C.I. 2600 # | 85°C Atm | Carbon Steel | 6'6" Dia x 7'7" | 2000 Gal | N | 404 | Fermenter Feed Tank |
| | Falk Model 4ELH2 Reducer | | | | 125 RPM | N | 404-001 | Drive |
| | | | Carbon Steel | 26" Dia Pinion 3½" Dia Shaft | 125 RPM | N | 404-002 | Adaptor |
| | | TEFC | | | 10 HP, 1800 RPM | N | 404-003 | Motor |
| | Avs A50, Size 3x1½-10, Jetd EP | 85°C | Cast Steel | With Mech Seal | 750 GPM 60'TDH | N | 405 | Pipe Feed Tank Pump |
| | | TEFC | | | 5 HP, 1800 RPM | N | 405-001 | Motor |
| | With SS Sparger | 150°C 5PSI | Carbon Steel | 4'Dia x 20' | 1200 Gal | N | 406 | Cooler No 6 |
| | Avs A30, Size 3x2-13 | 150°C | Ductile Iron | With Mech Seal | 250 GPM 100'TDH | N | 407 | No 6 Cooler Pump |
| | | TEFC | | | 15HP 1800 RPM | N | 407-001 | Motor |
| | Diller Model 1-34 S-2 | 150°C 50PSI | Steel Tube - Alum Fins | 8'x8'x6' | 1,100,000 BTU/HR | N | 408 | No 6 Cooler Chiller |
| | | TEFC | | | 2 HP 1200 RPM | N | 408-001 | Motor |
| | Brink's Type | 150°C 5PSI | Carbon Steel | | | N | 409 | No 6 Cooler Recirculating |
| | With Sightglass | 150°C 5 PSI | Carbon Steel | 4'Dia x 20' | 1200 Gal | N | 410 | Cooler No 7 |
| | Avs A35, Size 3x2-13 | 150°C | Ductile Iron | With Mech Seal | 250 GPM 100'TDH | N | 411 | No 7 Cooler Pump |
| | | TEFC | | | 15HP 1800 RPM | N | 411-001 | Motor |
| | Taken Subenergy # C-9 2½" Inlet 2" Outlet | | Model Shaft Brunke Fittings | | | OH | 101 | Recirculating Transfer Pump |
| | | TEFC | | | 3HP 1800 RPM | OH | 101-001 | Motor |

Appendix C Page 7

TOWOLDMON0043884

| REV. NO. | DATE | DESCRIPTION |
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MONSANTO CHEMICAL
CENTRAL ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

PROJECT AR-1 (AM) EXPANSION
SUBJECT 40 MILE PLANT
PLANT W-14
LOCATION SAUGET, ILLINOIS

DESIGN MANUAL SECTION NO.
PROJ. NO. C.E.A. NO. 1801
PREPARED BY E.S. YATES
DATE 4-10-67 SHEET 2 OF 7

## EQUIPMENT LIST AND SUMMARY

| REV. NO. | REMARKS | OPERATING TEMP. & PRESS. | MATERIALS OF CONSTRUCTION | APPROX. DIM. | NOMINAL RATING | NEW OR ON HAND | ITEM NO. | NAME |
|---|---|---|---|---|---|---|---|---|
| | DILLER # 1-39 S32 | 150°C 5 PSI | STEEL TUBE ALUM. FINS | 8'x8'x6' | 1,100,000 BTU/HR | N | 412 | NO. 7 CHLOR HEATER |
| | | TEFC | | | 2HP 1200 RPM | N | 412-001 | MOTOR |
| | BRINKS TYPE | 150°C 5PSI | CARBON STEEL | | | N | 413 | NO. 7 CHLOR MIST ELIMINATOR |
| | WITH S.S. SPARGER | 150°C 5PSI | CARBON STEEL | 4'DIA x 20' | 1200 GAL | N | 414 | CHLOR NO. 7 |
| | ANS A30, SIZE 3x4-13 | 150°C | DUCTILE IRON | WITH MECH SEAL | 250 GPM 100' TDH | N | 415 | NO. 7 CHLOR PUMP |
| | | TEFC | | | 15HP 1800 RPM | N | 415-001 | MOTOR |
| | DILLER # 1-39 S32 | 150°C 5PSI | STEEL TUBES ALUM. FINS | 8'x8'x6' | 1,100,000 BTU/HR | N | 416 | NO. 8 CHLOR COOLER |
| | | TEFC | | | 2HP 1200 RPM | N | 416-001 | MOTOR |
| | BRINKS TYPE | 150°C 5PSI | | | | N | 417 | NO. 8 CHLOR MIST ELIMINATOR |
| | WITH S.S. SPARGER | 150°C 5PSI | CARBON STEEL | 4'DIA x 20' | 1200 GAL | N | 418 | CHLOR NO. 7 |
| | ANS A30, SIZE 3x2-12 | 150°C | DUCTILE IRON | WITH MECH SEAL | 250 GPM 100' TDH | N | 419 | NO. 7 CHLOR PUMP |
| | | TEFC | | | 15HP 1800 RPM | N | 419-001 | MOTOR |
| | DILLER # 1-38 S32 | 150°C 50PSI | STEEL TUBE ALUM. FINS | 9'x8'x6' | 1,100,000 BTU/HR | N | 420 | NO. 7 CHLOR COOLER |
| | | TEFC | | | 2HP 1200 RPM | N | 420-001 | MOTOR |
| | BRINKS TYPE | 150°C 5PSI | CARBON STEEL | | | N | 421 | NO. 7 CHLOR MIST ELIMINATOR |
| | SHELL + HEAD t = 1/4" WITH 3-1/4" t. BAFFLES, 4, 1½" ϕ SPACERS, R.F. | 150°C ATM | CARBON STEEL | 6'DIA x 12' | | N | 422 | RUBY TANK |
| | ANS A50, SIZE 3x1½-10 | 100°C | DUCTILE IRON | WITH MECH SEAL | 256 GPM 60' TDH | N | 423 | TRANSFER PUMP |
| | | TEFC | | | 3HP 1800 RPM | N | 423-001 | MOTOR |
| | SHELL + HEAD t = 1/4" 11,500 # | 65°C ATM | CARBON STEEL | 11'DIA x 23' | 15000 GAL | N | 424 | INTER. STORAGE TANK |
| | ANS A50, SIZE 3x1½-10 | 100°C | DUCTILE IRON | WITH MECH SEAL | 400 GPM 60' TDH | N | 425 | TRANSFER PUMP |
| | | TEFC | | | 5HP 1800 RPM | N | 425-001 | MOTOR |
| | STRUTHERS # 4014 | | HAVES, FINNED TUBE | 8'6" LONG x 5' DIGM | 425 SCFM 1" Δ PRESS | N | 426 | SCRUBBER |
| | 426-3/4 x 14 BWG x 8' LONG TUBES AREA - 695 FT² (4 PASS UNIT) | 150°C 75PSI | CARBON STEEL | 2'DIA x 12' LONG | | N | 427 | OFF GAS CONDENSER |



TOWOLDMON0043885

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

MONSANTO COMPANY
CENTRAL ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

PROJECT: ARCOLOR EXPANSION
SUBJECT: 40 M LB PLANT
PLANT: W&K
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

| REV. NO. | REMARKS | OPERATING TEMP. & PRESS. | MATERIALS OF CONSTRUCTION | APPROX. DIM. | NOMINAL RATING | NEW OR ON HAND | ITEM NO. | NAME |
|---|---|---|---|---|---|---|---|---|
| | AVS A30, SIZE 3x2-13 | 80°C | DUCTILE IRON | WITH MECH SEAL | 350 GPM 80' TDH | N | 428 | CIRCULATING PUMP |
| | | TEFC | | | 15 HP 1800 RPM | N | 428-001 | MOTOR |
| | HEAD 2-1/4" WITH 125 FT SHELL - 3/16" OF 2" SCH 80 PIPE PD. 1 3400 # | 60°C 5PSI | CARBON STEEL | 7'6" DIA x 8'9" | 3000 GAL | N | 429 | OFF GAS STSE TANK |
| | BRINKS TYPE | 40°C 5PSI | CARBON STEEL | | | N | 430 | MIST ELIMINATOR |
| | AVS A60, SIZE 3x2-10 | 80°C | DUCTILE IRON | | 1500 GPM 70' TDH | N | 431 | TRANSFER PUMP |
| | | TEFC | | | 7½ HP 1800 RPM | N | 431-001 | MOTOR |
| | | | CARBON STEEL | | 2000 CFM 10 PSIG | N | 432 | AIR BLOWER |
| | | TEFC | | | 15 HP 1800 RPM | N | 432-001 | MOTOR |
| 1 | SCH SCRUBBER # 4014 | | HAVEG POLYESTER | 12" SUCT x 12" DISCH | 840 CFM | N | 433 | SCRUBBER |
| 1 | AVS A30, SIZE 3x 2-13 | | DUCTILE IRON | WITH MECH SEAL | 200 GPM 80' TDH | N | 434 | WATER PUMP |
| 1 | | TEFC | | | 10 HP 1800 RPM | N | 434-001 | MOTOR |

0014095

CE-179-12-66

APPENDIX "C" PAGE 7

TOWOLDMON0043886

| REV. NO. | DATE | DESCRIPTION |
|---|---|---|
| 1 | 8-23-67 | Chgd 18"ø cr 14ø on 304, 505, 506, 508, 515 |

MONSANTO COMPANY
CENTRAL ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

PROJECT: ARCTIC EXPANSION
SUBJECT: 40 MLB. PLANT
PLANT: WGK
LOCATION: SAUGET, ILLINOIS

DESIGN MANUAL SECTION NO.
PROJ NO. C.E.A. NO. 1655
PREPARED BY R. JAEGER
DATE 4-26-67 SHEET 4 OF 7

## EQUIPMENT LIST AND SUMMARY

| REV. NO. | REMARKS | OPERATING TEMP. & PRESS. | MATERIALS OF CONSTRUCTION | APPROX. DIM. | NOMINAL RATING | NEW OR ON HAND | ITEM NO. | NAME |
|---|---|---|---|---|---|---|---|---|
| | FLITE-RITE #6CM S1-2 AIPH 6 TUBES | 65°C 15PSI | CARBON STEEL | 8"DIA x 1'7" | 30 GPM | N | 500 | CLEANUP FILTER |
| | SAME AS IT 500 | 65°C 15PSI | CARBON STEEL | 8"DIA x 1'7" | 30 GPM | N | 501 | CLEANUP FILTER |
| | SERIES "B" STD TNK 4100# | 250°F FV | CARBON STEEL | 6'6"DIA x 5'9" | 2000 GALS | N | 502 | STILL POT #1 |
| | ANS A40, SIZE 4x3-13 | 250°C | DUTILE IRON | | 340GPM 100'TDH | N | 503 | STILL #1 CIRC PUMP |
| | | TEFC | | | 20 HP 1800 RPM | N | 503-001 | MOTOR |
| | 140-3/4"ID x 16 GA x 8' LONG TUBES AREA=220FT² WITH F&F EXP JOINT | 250°C 50PSI | STEEL TUBES & SHELL | 1'2"DIA x 12' | 650000 BTU/HR | AI | 504 | STILL EXT HEAT EXCH. |
| 1 | 14" INLET & 16" OUTLET NOZZLE | 250°C FV | CARBON STEEL | 3'6"DIA x 10'OAH | 3500 #/HR | N | 505 | CYCLONE SEPARATOR |
| 1 | 32-1¼"ID x 16 GA x 8' LONG TUBES AREA=80FT² WITH F&F EXP JOINT | 250°C FV | STEEL SHELL MONEL OR AL TUBES, MDS | 1'4"DIA x 12' | 400,000 BTU/HR | AI | 506 | STILL CONDENSER |
| | | | | | | | 507 | CANCELLED |
| 1 | SERIES "B" TYPE MONEL WT WITH 40FT OF 1½" IPS PIPE COIL 2500# | 150°C FV | MONEL OR AL | 5'0"DIA x 6'9" | 1000 GAL | N | 508 | RECEIVER #1 |
| | WORTHINGTON 2½ CPA 2½ WITH NO 5+6 STAGES | | MONEL NOZZLE CI BODY | | 20 LB/HR AT 40 mm | N | 509 | STILL #1 EJECTOR |
| | ANS A50, SIZE 3x1½-10 | 100°C | 316 SS | | 100GPM 60'TDH | N | 510 | TRANSFER PUMP |
| | | TEFC | | | 5HP 1800 RPM | N | 510-001 | MOTOR |
| | SERIES "B" STD TNK 4100# | 250°C FV | CARBON STEEL | 6'6"DIA x 7'9" | 2000 GALS | N | 511 | STILL POT #2 |
| | WITH M" INLET & 16" OUTLET NOZZLE | 250°C FV | CARBON STEEL | 3'6"DIA x 10'OAH | 3500 #/HR | N | 512 | CYCLONE SEPARATOR |
| | 32-1¼"ID x 16 GA x 8' LONG TUBES AREA 160 FT² WITH F&F EXP JOINT | 250°C FV | STEEL SHELL MONEL OR AL TUBES, MDS | 1'4"DIA x 12' | 400000 BTU/HR | N | 513 | STILL CONDENSER |
| | | | | | | | 514 | CANCELLED |
| 1 | SERIES "B" TYPE WITH MONEL WT 40FT OF 1½" IPS PIPE COIL 2200# | | MONEL OR AL | 5'0"DIA x 6'9" | 1000 GAL | N | 515 | STILL RECEIVER #2 |
| | WORTHINGTON 2½ CPA 2½ WITH NO 5+6 STAGES | | MONEL NOZZLE CI BODY | | 20LB/HR AT 40 mm | N | 516 | STILL #2 EJECTOR |
| | ANS A50, SIZE 3x1½-10 | 100°C | 316 SS | | 100GPM 60'TDH | N | 517 | TRANSFER PUMP |
| | | TEFC | | | 5HP 1800 RPM | N | 517-001 | MOTOR |
| | DELER MODEL #24H | 100°C 50PSI | STEEL TUBES AL FINS | 3'x3'6" x 5'9" | 700,000 BTU/HR | AI | 518 | THERMINOL COOLER |
| | | TEFC | | | 2HP | N | 518-001 | MOTOR |
| | 925# | | CARBON STEEL | 3'6"DIA x 4'3" | 300 GAL | N | 519 | THERMINOL SURGE TANK |

CE-1F-12-66

APPENDIX C PAGE 10

TOWOLDMON0043887

| REV. NO. | DATE | DESCRIPTION |
|---|---|---|
| 1 | 6-23-67 | Revised Pl. 1, 2, 3, 5, 522, Chgd. MHS-11 523, 524, Added MHS-1A 525, 526 |
| 2 | 6-26-67 | Revised Pl. 1 522-545 |

PROJECT: Anderson Extension
SUBJECT: Acetate Plant
PLANT: Wise
LOCATION: Seuget, Illinois

DESIGN MANUAL SECTION NO.
PROJ. NO. 1-2-67E
PREPARED BY: E.S.A. NO. 1823
DATE: 4-10-67 SHEET 5 OF 7

## EQUIPMENT LIST AND SUMMARY

| REV. NO. | REMARKS | OPERATING TEMP. & PRESS. | MATERIALS OF CONSTRUCTION | APPROX. DIM. | NOMINAL RATING | NEW OR ON HAND | ITEM NO. | NAME |
|---|---|---|---|---|---|---|---|---|
| | AVS A50, Size 3x1½-10 | 100°C | Ductile Iron | With mech. seal | 100 GPM 60' TDH | N | 520 | Thermal Circ. Pump |
| | | TEFC | | | 5 HP 1800 RPM | N | 520-M1 | Motor |
| 1 | | | | | | | 521 | Cancelled |
| 1 | | | | | | | 522 | Cancelled |
| 1 | 925# | 100°C FV | Carbon Steel | 36" Dia x 4'3" | 800 Gal | N | 523 | Caustic Tk. |
| 1 | 925# | 100°C FV | Carbon Steel | 36" Dia x 4'3" | 800 Gal | N | 524 | Catch Tk. |
| 1 | AVS A40, Size 4x3-12 | 250°C | Ductile Iron | | 300 GPM 110' TDH | N | 525 | Still #2 Circ. Pump |
| 1 | | TEFC | | | 20 HP 1800 RPM | N | 525-M1 | Motor |
| 1 | 147-¾" OD x 16 GA x 6'-1" long tubes Area = 220 ft² with Fx F exp. joint | 250°C 50 PSI | Steel tubes & shell | 12" Dia x 12' | 650 000 BTU/Hr | N | 526 | Still #2 Ext. Htg. Ex. |
| | | | | | | | 527-529 | Htr. U-Bolts |
| 2 | With 50 ft of 2" IPS Fire Rol-Series "A" tank AL WT 1000# | 100°C Atm | Aluminum | 5'6" Dia x 6'9" | 1000 Gal | N | 530 | Surge Tank for 1242 |
| 2 | Falk Model 4E1H E Reducer | | | | 100 RPM | N | 530-M1 | Drive |
| 2 | | | 316 SS Shaft & Aluminum | 26" Dia Turbine 3" Dia Shaft | 100 RPM | N | 530-M2 | Agitator |
| 2 | | TEFC | | | 10 HP 1800 RPM | N | 530-M3 | Motor |
| | Viking # K4268, 12" Size 4 inch with A-147 Impeller, -425 KPA1 | 100°C 100 PSI | 316 SS | | 376 GPM 100 PSI | N | 531 | Transfer Pump |
| | | TEFC | | | 10 HP 1800 RPM | N | 531-M1 | Motor |
| 2 | With 18" Dia x 10" Orifice Nozzle - Support Plate | 65°C 100 PSI | 316 SS | 36" Dia x 15' | Flow - 376 GPM | N | 532 | Heat Exch. for 1242 |
| | Sprinkler # 18 D12 | 65°C 6 PSI | 304 SS | 2'9" Dia x 5'11" | Flow - 156 GPM | N | 533 | Recirc. Filter |
| 2 | With 50 ft of 2" IPS Fire Rol Series "A" tank 1500# | | Aluminum | 6'4" Dia x 7'7" | 1000 Gal | N | 534 | Surge Tank for 1242 |
| 2 | With 50 ft of 2" IPS Fire Rol Series "A" tank 1500# | | Aluminum | 6'4" Dia x 7'7" | 2000 Gal | N | 535 | Surge Tank for 1242 |
| | AVS A50, Size 3x1½-10 | | 316 SS | With Mech. Seal | 100 GPM 6' TDH | N | 536 | Transfer Pump |
| | | TEFC | | | 2 HP 1800 RPM | N | 536-M1 | Motor |
| 2 | With 50 ft of 2" IPS Fire Rol-Series "A" tank AL WT 1000# | 100°C Atm | Aluminum | 5'6" Dia x 6'9" | 1000 Gal | N | 537 | Surge Tank for 1254 |
| | Falk Model 4E1H Reducer | | 316 SS Shaft, Aluminum Turbine | 26" Dia Turbine 3" Dia Shaft | 100 RPM | N | 537-M1 | Drive |



TOWOLDMON0043888

0014098

| REV. NO. | DATE | DESCRIPTION |
|---|---|---|
| 2 | 8-25-67 | General revision to 532-545 |
| 3 | 8-22-67 | Added Seals to Nos 544, 545, 546 & 547 |

MONSANTO COMPANY
CENTRAL ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

PROJECT: Aroclor Expansion
SUBJECT: 40 AT LB Plant
PLANT: Inca
LOCATION: Sauget, Illinois

DESIGN MANUAL SECTION NO.
PROJ. NO. C.E.A. NO. 1964
PREPARED BY: R.W.Pate
DATE: 4-26-67 SHEET 6 OF 7

## EQUIPMENT LIST AND SUMMARY

| REV. NO. | REMARKS | OPERATING TEMP. & PRESS. | MATERIALS OF CONSTRUCTION | APPROX. DIM. | NOMINAL RATING | NEW OR ON HAND | ITEM NO. | NAME |
|---|---|---|---|---|---|---|---|---|
| 2 | | | Aluminum Turbine 316 SS Plate | 26" Dia Turbine 3 Dia Stack | 100 RPM | N | 531 | Agitator |
| 2 | | TEFC | | | 1 HP 1800 RPM | N | 531-A | Motor |
| 2 | Viking # K 4128, 2" Suction Flow with 4-19/16 Elevation, RPM: 420 | 100# 100PSI | 316 SS | | 375 GPM 100 PSI | N | 532 | Transfer Pump |
| 2 | | TEFC | | | 10 HP 1800 RPM | N | 532-A | Motor |
| 2 | See Item 532 | 65°C 100PSI | 316 SS | 36" Dia x 15' | Flow-Jet #1 | N | 537 | Accumulator Tank 1249 |
| 2 | See Item 532 | 65°C 100PSI | 316 SS | 30" Dia x 15' | Flow-Jet #1 | N | 540 | Accumulator Tank 1254 |
| 2 | Sprinkler # 18212 | 65°C 100PSI | 304 SS | 27" Dia x 5'1" | Sharples 15413 | N | 541 | Polishing Filter |
| 2 | See Item 534 | 65°C Atm | Aluminum | 42" Dia x 4'3" | 1200 Gal | N | 542 | Surge Tank for 1254 |
| 2 | See Item 535 | 65°C Atm | Aluminum | 66" Dia x 11'8" | 2000 Gal | N | 543 | Surge Tank for 1254 |
| 2 | ANC A50, Size 3x1½-10 | 65°C | 316 SS | With Mech Seal | 100 GPM 80' TDH | N | 544 | Transfer Pump |
| 2 | | TEFC | | | 5 HP 1800 RPM | N | 544-A | Motor |
| 2 | See Item 532 | 65°C 100PSI | 316 SS | 36" Dia x 15' | Flow-Jet #1 | N | 545 | Accumulator Tank 1256 |
| | | | | | | | 546-547 | Not Used |
| | With 4 # 10 Platforms, 22'-9" x 11'-9", SE | 65°C Atm | Aluminum | 12'6" Dia x 24' | 3200 Gal | N | 556 | Finished Storage 1242 |
| | Same As Item 556 | 65°C Atm | Aluminum | 12'6" Dia x 24' | 3200 Gal | N | 557 | Finished Storage 1242 |
| | " " " 556 | 65°C Atm | Aluminum | 12'6" Dia x 24' | 3200 Gal | N | 560 | Finished Storage 1254 |
| | " " " 556 | 65°C Atm | Aluminum | 12'6" Dia x 24' | 3200 Gal | N | 561 | Finished Storage 1262 |
| | " " " 556 | 65°C Atm | Aluminum | 12'6" Dia x 24' | 3200 Gal | N | 562 | Finished Storage 1248 |
| | | | | | | | 563 | Cartridge |
| 3 | ANC A30, Size 3x2-14 | 100°C 50PSI | 316 SS | With Mech Seal | 300 GPM 100' TDH | N | 564 | Transfer Pump |
| | | TEFC | | | 15 HP 1800 RPM | N | 564-A | Motor |
| 3 | ANC A30, Size 3x2-13 | 100°C 50PSI | 316 SS | With Mech Seal | 300 GPM 100' TDH | N | 565 | Transfer Pump |
| | | TEFC | | | 15 HP 1800 RPM | N | 565-A | Motor |

Attach. 8 Item 12

TOWOLDMON0043889

| REV. NO. | DATE | DESCRIPTION |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |

MONSANTO COMPANY
CENTRAL ENGINEERING DEPARTMENT
ST. LOUIS, MISSOURI

PROJECT: Arcadia Expansion
SUBJECT: 40 M LB Plant
PLANT: WSK
LOCATION: Sauget, Illinois

DESIGN MANUAL SECTION NO.
PROJ. NO. C.E.A. NO. 1800
PREPARED BY: T. Stayer
DATE: 4-10-67 SHEET 7 OF 7

## EQUIPMENT LIST AND SUMMARY

| REV. NO. | REMARKS | OPERATING TEMP. & PRESS. | MATERIALS OF CONSTRUCTION | APPROX. DIM. | NOMINAL RATING | NEW OR ON HAND | ITEM NO. | NAME |
|---|---|---|---|---|---|---|---|---|
| 3 | AVS A30, Size 3x2-13 | 100°C 50PSI | 316 SS | | 200GPM 100'TDH | N | 566 | Transfer Pump |
| | | TEFC | | | 15HP 1800RPM | N | 566-001 | Motor |
| 3 | AVS A30, Size 3x2-13 | 100°C 50PSI | 316 SS | | 200GPM 100'TDH | N | 567 | Transfer Pump |
| | | TEFC | | | 15HP 1800RPM | N | 567-001 | Motor |
| | | | | | | | 568 | Cancelled |
| | 2 No 12S-6 Also Pak Filters MTD in Parallel - With # 70 Media | 100°C 50PSI | 316 SS | 18" x 5' long | | N | 569 | Product Filter |
| | See Item 569 | 100°C 50PSI | 316 SS | 18" x 5' long | | N | 570 | Product Filter |
| | " " 569 | 100°C 50PSI | 316 SS | 18" x 5' long | | N | 571 | Product Filter |
| | " " 569 | 100°C 50PSI | 316 SS | 18" x 5' long | | N | 572 | Product Filter |
| | | | | | | | 573-584 | Not Used |
| | Brown Finings No 102 Heater | 575°F 75PSI | Carbon Steel | 10" Dia x 30' long | 1,200,000 BTU/HR | N | 585 | Thermoil Heater |
| | With 30 FT of 3" IPS Pipe Coil | 575°F Atm | Carbon Steel | 5'0" Dia x 10' long | 1500 GAL | N | 586 | Thermoil Surge Tank |
| | Taber Vert Surm #346CCG | | Cast Steel | | 3500GPM 165'TDH | N | 587 | Thermoil Circ Pump |
| | | TEFC | | | 50HP 1800RPM | N | 587-001 | Motor |
| | | | | | | | 588-589 | Not Used |
| | Brinks Unit - Same as Existing Unit With # 1542 Element | 100°C 18PSI | | 1'8" Dia x 6'3" | 4500 LB/HR Cl2 | N | 590 | Chlorine Mist Eliminator |

0014099

Appendix "C" Page 1

TOWOLDMON0043890

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

# SCOPE OF WORK

## Aroclor Expansion at Anniston

## Storage Tank Farm and Mixing Station

0014100

Appendix "D"

TOWOLDMON0043891

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.

0014101

TOWOLDMON0043892

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.



TOWOLDMON0043893

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.



TOWOLDMON0043894

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 $ft^2$ |

0014104

TOWOLDMON0043895

| | | |
|---|---|---|
| 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



TOWOLDMON0043896

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.

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



TOWOLDMON0043897

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 $yd^3$



TOWOLDMON0043898

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)



TOWOLDMON0043899

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.



TOWOLDMON0043900

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

# SCOPE OF WORK

## Aroclor Expansion at Anniston

## Drumming and Flaking

Appendix "E"

0014110

TOWOLDMON0043901

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 $yd^3$ |

0014111

TOWOLDMON0043902

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 | $ft^2$ |

0014112

TOWOLDMON0043903

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 Bi$\phi$ = 500'

3" steel insulated line for Therminol = 900'

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

2" steel insulated steam for Bi$\phi$ surge tank = 200'

2" steel insulated steam for Miscellaneous piping = 200'

12 - Ductwork

Flaking

12" $\phi$ - 304 SS 18 gauge = 100 ft.



TOWOLDMON0043904

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.

0014114

TOWOLDMON0043905

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 |



TOWOLDMON0043906

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.



TOWOLDMON0043907

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"

0014117

TOWOLDMON0043908

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.



TOWOLDMON0043909

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. Size 24" dia. X 25' long — 42 cu.yds.

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

0014119

TOWOLDMON0043910

| | |
|---|---|
| For Blow Tank | 1.75 cu.yds. |
| 1 - 1' X 3' high X 7' long support<br>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



TOWOLDMON0043911

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.



TOWOLDMON0043912

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.



TOWOLDMON0043913

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

0014123

TOWOLDMON0043914

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 |

0014124
TOWOLDMON0043915

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.

0014125

TOWOLDMON0043916

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" |



TOWOLDMON0043917

| 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 $ft^2$.



TOWOLDMON0043918

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 |



TOWOLDMON0043919

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

# SCOPE OF WORK

## Aroclor Expansion at W. G. Krummrich

## Storage Tank Farm

Appendix "G"

0014129

TOWOLDMON0043920

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:



TOWOLDMON0043921

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.

06 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 |



TOWOLDMON0043922

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

10 Sprinklers and Fire Protection

None required.



TOWOLDMON0043923

11 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.

200 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)



TOWOLDMON0043924

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



TOWOLDMON0043925

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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TOWOLDMON0043926

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:

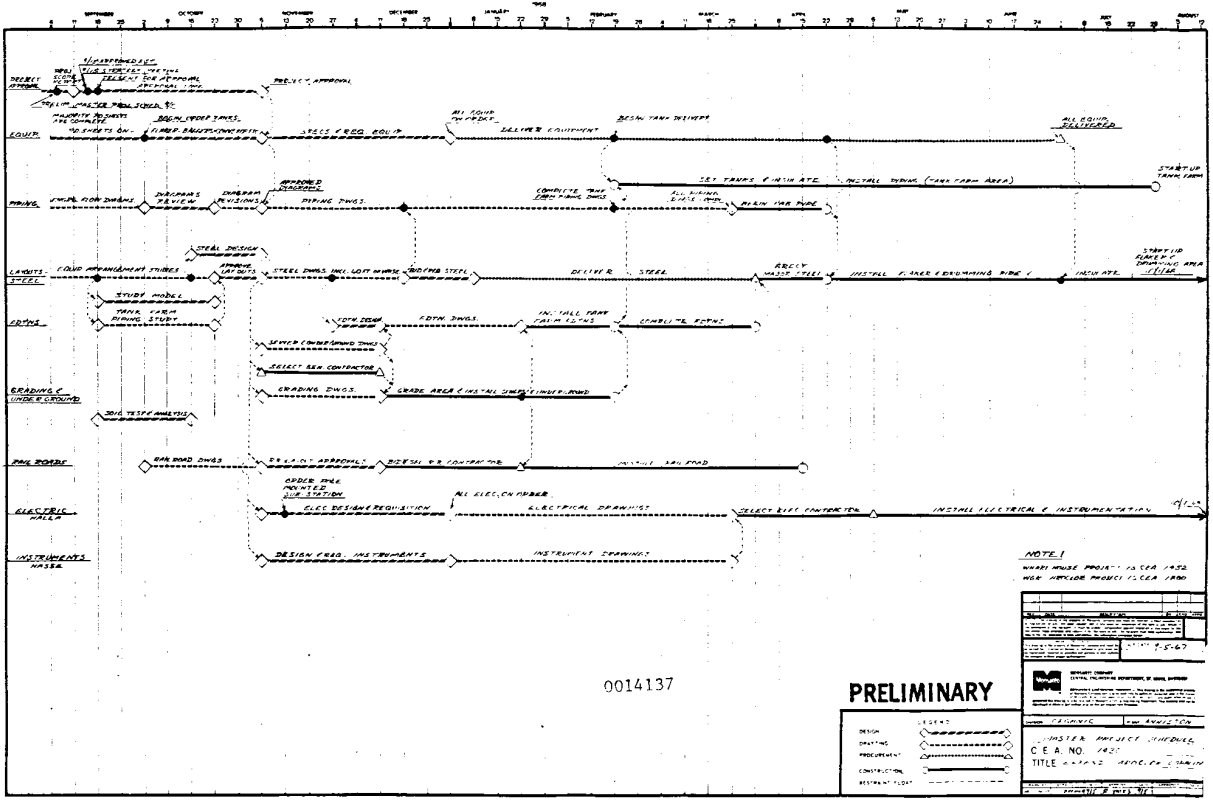
| Item No. | Equipment No. | Description |
|---|---|---|
| 148 | 21-0768 | 10' Dia. X 26' long U.G. Hor. Tank |
| 149 | 19-0585, 66-0853 | Pump and Motor |
| 150 | 21-0769 | 10' Dia. X 26' long U.G. Hor. Tank |
| 151 | 19-0584, 66-1501 | Pump and Motor |
| 152 | 21-1310 | 10' Dia. X 26' long U.G. Hor.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

93 Relocation

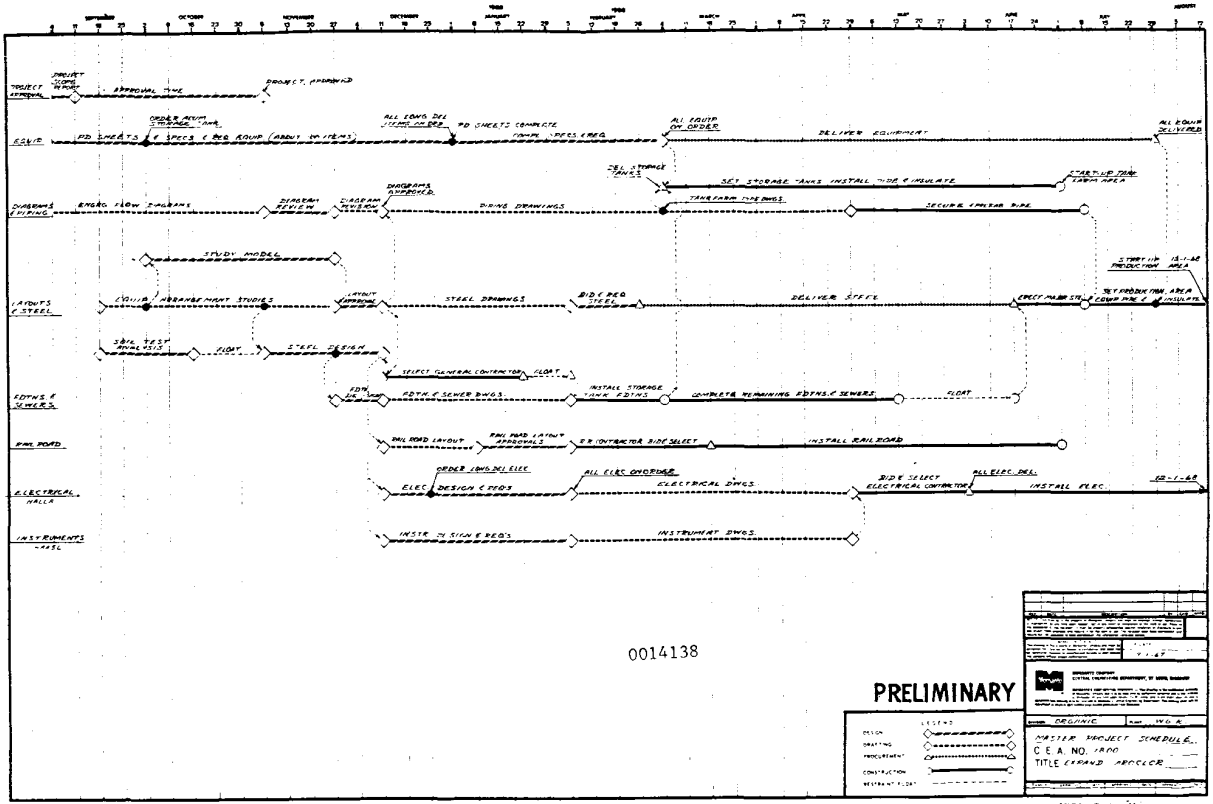
Replace two existing pipe supports going out to present tank car loading dock.



TOWOLDMON0043927




TOWOLDMON0043928




0014138

TOWOLDMON0043929

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.

APPENDIX "I" (1)

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TOWOLDMON0043930

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.



TOWOLDMON0043931

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

APPENDIX "I" (3)



TOWOLDMON0043932

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.

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APPENDIX I (4)

TOWOLDMON0043933

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

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APPENDIX "I" (5)

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TOWOLDMON0043934