Do they drain water into trench or bypass with somehow

PROJECT SCOPE REPORT

PROJECT CEA-2417

Have come we are adding scrubber?

Have is pump hooked to 1242 absorber

Bill

Wayne,

Please review thoroughly and lets discuss comments with Bob.

Bill

MCS-1016

B.O feed to #1 Illuminator from where.

#2 plan tails & tie into very [illegible]

Has [illegible] looked at materials

W. G. KRUMMRICH PLANT - SAUGET, ILLINOIS

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Prepared by: A. J. Heinze
August 4, 1970
Revision 1: December 30, 1970

Approved by: N. B. Wolk Approved by: R M McCutchan

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MONS 057652

PROJECT SCOPE REPORT

CEA-2417

MCS-1016 DISTILLATION

W. G. KRUMMRICH PLANT
SAUGET, ILLINOIS

Prepared by: A. J. Heinze
August 4, 1970

Revision 1: December 30, 1970

MONS 057653

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- D. Plot Plan and Preliminary Equipment Layout
- E. Process Flow Diagrams and Material Balance
- F. Instrument List
- G. Scope of Work

MONS 057654

1.1 Project Scope Summary

A. Title:

Project title:	MCS-1016 Distillation
Product name:	MCS-1016
Division:	Organic Chemicals
Plant:	W.G. Krummrich, Sauget, Ill.
CEA number:	2417
Expected cost:	$820,000 Capital
Expected completion date:	June 15, 1971

B. Objectives

Recent pollution problems associated with polychlorinated biphenyls (PCB's) have created an urgent need for improved, biodegradable PCB's for Aroclor. The primary objective of this project is to provide the necessary manufacturing facilities to produce an improved, biodegradable PCB product (MCS-1016) at a volume consistent with current and foreseeable sales requirements. A secondary objective is to provide new facilities and to make certain modifications to existing equipment to manufacture Aroclor 1221 now produced at Anniston.

On the completion of this project, all liquid Aroclors will be produced at the W. G. Krummrich plant and the production of liquid Aroclors will be discontinued at Anniston.

C. Tone

Due to the ecological nature of this project, time is of the essence in completing the work and starting operation as soon as reasonably possible. Although no overtime engineering or construction work is planned, the overall design and construction schedules will be tight and will be carefully followed and expedited as required to meet the expected completion date.

D. Design Capacity

The nominal design capacity of the new facility is 50 M pounds of MCS-1016 product per year at approximately 90% O.S.T. In addition to the new MCS-1016 facilities, modifications will be made to existing equipment for the production of sufficient crude Aroclor 1142 (MCS-1016 feed stock) to attain the product design capacity.

E. Project Status

Detailed process and engineering design are proceeding on the $100 M advanced authorization obtained from Organic Division Management on 8/18/70. However, due to the recent MCS-1016 process change from semi-continuous to batch distillation, complete research data are not yet available and certain process variables need to be explored.

Process risks appear to be minimal based on the research work done to date. Also, the same manufacturing process currently used at W.G. Krummrich will be employed to produce Aroclor 1142.

Development samples of MCS-1016 have been sent to and are being evaluated by our major customers. Preliminary results from these evaluations pointed out a needed composition change of the original product for fire-resistance improvement which recently resulted in an MCS-1016 process change from semi-continuous to batch distillation. Accordingly, no major scope changes are anticipated in the future.

F. Description of Facilities

The project provides for the installation of facilities to produce MCS-1016 which includes a 30-tray distillation column and auxiliaries, fuel oil and MCS-1016 product storage tanks. Three existing batch chlorinators will be converted into a new continuous line which will operate in conjunction with the existing continuous chlorinator system to produce the required volume of Aroclor 1142.

F. Description of Facilities (continued)

A new Porocel absorber plus two additional storage tanks will be installed to provide the capability of producing the new MCS-1016 product plus Aroclor 1221 or 1242 concurrently.

Aroclor 1254 and 1260 are currently produced batch-wise at W.G. Krummrich by the chlorination of bi-phenyl followed by a take-over distillation step and porocel treating. These two products will continue to be produced in existing equipment but the starting material to be chlorinated will be the bottoms from the MCS-1016 distillation process.

No building or control room extensions are needed.

A. J. Heinze

MONS 057657

1.2 Process Technology

1.21 Process Description

For MCS-1016 production, Aroclor 1142 (column feed) will be produced via the existing manufacturing process in the existing continuous chlorination unit and in a new continuous line which will consist of three of the existing batch chlorinators piped together and equipped with a new Densitrol density controller. The combined 1142 streams will be air-blown in existing blow tank (Item 422) and then pumped to the existing 15,000 gallon intermediate surge tank (Item 424), and a 20,000 gallon intermediate surge tank (Item 329) to be installed on this project.

capacity? minimum? Will our demister pad be large enough for the increased air flow?

The new column system, which will be operated batchwise, will be fed from Items 424 and 329 surge tanks. An initial 1142 charge, including lime will be pumped into the column still pot. Vapors are then generated by pumping the still pot liquid through the fired reboiler and the column is put on total reflux. After temperatures have lined out, a forecut of light ends is taken, then distillate product is cut forward, cooled and pumped through absorption columns to storage. A column run will consist of approximately 17,000 gallons of distillate. The still pot contents are boiled down to an end point temperature of approximately 290°C and the pot "residue" is transferred to the residue surge tank.

What pressure? 40 at top of column?

Residue from the surge tank is pumped to the existing #2 still system where "High Boilers" are taken overhead and Montar is removed. The "High Boiler" stream is then batch chlorinated to Aroclor 1154 or 1160 in an existing chlorinator. Aroclor 1154 or 1160 is then refined in the existing #3 still system and pumped through an existing absorber to storage. Residue from the #3 still is recycled back to the #2 still system for "boil down".

Aroclor 1221 will be produced batchwise as currently done in Anniston. Aroclor 1121 will be manufactured batchwise on a blocked-out basis in two of the three chlorinators piped up to form the new continuous chlorinator line. The 1121 is then processed through the existing #4 still system and product 1221 is then pumped to storage. Aroclor 1242 will be produced using the same manufacturing process currently used at W.G.K.

What about Aroclor 1232?

I see nothing about additional demister capacity for increasing Cl_2. What will be increase in Cl_2 usage over present at max. rate?

1.21 Process Description (cont'd)

Organic Research has made several lab scale runs to determine the degree of fractionation required for the new MCS-1016 product. Research has also demonstrated at Anniston the feasibility of chlorinating high boilers (fractionator bottoms) to salable Aroclor 1254 and 1260 products.

1.22 Raw Materials and Usages

Raw material requirements for MCS-1016 and Aroclor 1221 production are as follows:

Materials	Spec. Code No.	Issue Date	Usage Lbs/100 Lbs.
a) MCS-1016:			
Aroclor 1142	-	10/21/68	135
Hydrated Lime	38800	4/ 7/70	0.14
b) Aroclor 1221:			
Biphenyl	82601	10/23/70	82.1
Chlorine	81059	8/28/69	45.2
Hydrated Lime	38800	4/ 7/70	1.3

The raw material specification sheets as indicated above are attached as Appendix A.

1.23 Products and By-Products

The MCS-1016 product specification sheet is being developed by Organic Research. A "Typical Properties" sheet for MCS-1016, along with Finished Product Specification sheets for Aroclor 1221 and 1242, are attached in Appendix A.

MCS-1016 product will be stored in 6 aluminum storage tanks making a total of 126M gallons. Each individual column batch will be pumped to a separate storage tank equipped for complete blending of the tank contents prior to loading. Tankage identity for 1016 storage is as follows:

Dept. Item No.	M Gal	Present Usage
117	20	Aroclor 1242 Storage
118	20	Aroclor 1248*Storage
119	20	Aroclor 1242 Storage
558	22	Aroclor 1242 Storage
559	22	Aroclor 1242 Storage
(1-314)	22	New Tank
Total	126	

MONS 057659

*Aroclor 1248 production to be discontinued.

1.23 Products and By-Products (cont'd)

Aroclor 1254 will be stored in 2 aluminum storage tanks as follows:

Dept. Item No.	M Gal	Present Usage
560	22	Aroclor 1254
562	22	Aroclor 1254
	Total 44	

Aroclor 1260 will be stored in one 22M gallon aluminum tank, existing Item 561, presently used for 1260.

Aroclor 1221 will be stored in one new 22M gallon aluminum storage tank.

Aroclor 1242 will be stored in one new 22M gallon aluminum storage tank.

1.24 Waste Streams

One potential waste stream which will require disposal is excess high boilers from the fractionator. One of the economic premises of this project is that all future Aroclor 1254 and 1260 will be made at W.G.K. by chlorinating (and further refining) the fractionator high boiler stream, assuming the availability of this material from MCS-1016 sales requirements. At the project design capacity of 50M lbs/year of MCS-1016, the present Aroclor 1254 and 1260 sales forecasts are such that all the high boilers are consumed for these requirements, leaving no excess. However, a product requirement imbalance could occur such that excess high boilers (not needed for Aroclor 1254 or 1260) would have to be disposed of. Should this situation materialize, the excess high boilers would be burned in the proposed Aroclor incinerator at W.G.K.

What is this ratio - MCS-1016 to high boilers? 20% bottoms 80% 1016 & forecast

Some additional Montar will be generated from the production of Aroclors 1221 and 1242. This will be disposed of by incineration. The column ejector will emit a calculated 0.6 lb/batch of Aroclor to the atmosphere. Since this could be considerably in error due to the lack of good vapor pressure data and since there are not any definitive standards on air pollution at this time, we will sample the stream after startup. Additional measures will be taken at that time if required.

Will need to monitor this continuously! Loss will depend upon air leaks etc in system.

$\frac{.6}{28.5} \times 24 = .5\#/\text{day}$

3.5# 14#

1.25 Personnel, Property and Public Hazards

This project will not create any new hazards in Dept. 246 compared to the present manufacturing process. In the present operation, Aroclors are handled at elevated temperatures in a safe manner which is the only potential hazard for this project.

1.3 Manufacturing Facilities

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

Equipment Summary Sheets - Appendix B

Plot Plan and Equipment Layout - Appendix D

Process Flow Diagrams - Appendix E

Instrument List - Appendix F

Scope of Work - Appendix G

1.31 Description

The major equipment items to be installed for the production of the MCS-1016 product are as follows:

a) Fractionating Column - a 30 plate, stainless steel, insulated, self-supported column.

b) Column Condenser - a 2400 sq.ft. stainless steel (tubes) shell and tube unit supported above the top of the column.

c) Column Reboiler Furnace - a vertical, gas (or oil)-fired tubular heater rated at 10M BTU/hr.

d) Column Still Pot - a 26,000 gallon, horizontal, steel vessel equipped with a 600 GPM submerged circulating pump.

e) Residue Surge Tank - a 12,000 gallon, horizontal, steel vessel equipped with a transfer pump.

f) Storage Tank - a 22,000 gallon, vertical, flat-bottom aluminum tank.

g) Intermediate surge tank 20,000 gal.
h) Fuel oil storage 20,000 gal

1.31 Description (cont'd)

The major equipment items to be installed for the production of Aroclor 1221 and 1242 are as follows:

a) Storage Tanks - one 22,000 gallon, vertical, flat-bottom aluminum tank with transfer pump for each product.

b) Absorber - a vertical, stainless steel Porocel absorber for Aroclor 1242 production.

1.32 Design Capacity

The nominal design capacity of the MCS-1016 fractionation facility is 50M lbs/year. The anticipated fractionator operating cycle time is 28.5 hours/batch, broken down as follows:

		Hours
a)	Start charging Aroclor 1142 and lime to Still Pot	0.5
b)	Complete charge, attain total reflux and line out column temperature	2.0
c)	Distill off light ends head cut	2.0
d)	Product 1016 draw-off	23.5
e)	Pump out residue	0.5
	Total	28.5

Operating on-stream is approximately 8,000 hours/year.

1.33 Storage and Shipping Requirements

Product storage facilities are noted in detail in Section 1.23 of this report. The loading facilities for the existing Aroclor products will be used. A new line filter will be installed in the Pyranol tank car loading line - dock 3, track 11. No extensions are anticipated to be made to the existing loading/unloading docks.

1.34 Flexibility and Future Expansion

Due to the expected limited sales life of the MCS-1016 product, no specific provisions for future expansions are included in the project.

1.34 Flexibility and Future Expansion (cont'd)

One possible future replacement for MCS-1016 is Aroclor 1230 with the 4-4' dichlorobiphenyl removed. The 4-4' cut can be separated using a batch distillation process. With the addition of a fraction receiver and some piping modifications, the MCS-1016 fractionator system could be converted over to produce the distilled Aroclor 1230 substitute product. The ultimate capacity of this product depends on the results of current research work on this distillation process.

1.4 Utilities

The utility requirements along with the various utility sources are discussed under Utilities Facilities below.

1.41 Utilities Summary

The utilities summary and requirements sheets are attached in Appendix C.

1.42 Utilities Facilities

a) 80 psig Saturated Steam - The design requirement for 80# steam is 520 lbs/hr. Tie-in will be made to the existing department 80# system. The existing steam meter is adequate for this additional usage.

b) 200 psig Saturated Steam - The design requirement for 200# steam is 700 lbs/hr. Connection will be made to the existing 2" 200# steam header. The existing steam meter is adequate for this additional usage.

c) City Water - City water will be used in the column condenser. The design requirement is 100 GPM. Connection will be made to the existing department city water break tank system. (Existing water pump, Item 434.)

d) Natural Gas - The column reboiler furnace will be fired with either "interruptable" natural gas or with fuel oil (see e) below). The design requirement for gas is 1900 Therms per day. The 3" gas supply line will be extended from the SW corner of Dept. 254 to the meter in Dept. 246. A new in-line type gas meter is included.

1.42 Utilities Facilities (cont'd)

e) Fuel Oil - A No. 2 heating oil back-up system will be provided for the column reboiler service. This system will consist of a 20,000 gallon oil storage tank and feed pump. Fuel oil will be received from an oil shuttle truck about once per week (when operating on oil) delivered into the storage tank using the truck pump. The design fuel oil usage rate is 60 GPH.

f) Instrument Air - Design requirements are 15 CFM. This air will be supplied from the plant centralized instrument air system and connection will be made to the existing department air header.

g) Electrical - Electrical power for the required 207 connected HP load will be supplied via the No. 3 circuit at No. 8 substation. A new 500 MCM cable will be installed.

h) Nitrogen - Nitrogen will be used as an inert blanketing gas for the new MCS-1016 storage tank and the new Aroclor 1221 and 1242 storage tanks. Connection will be made to the existing N_2 blanketing piping system in the tank farm. Nitrogen will also be used to fill the column system when letting down from vacuum for maintenance or inspection.

1.5 Reference Reports

a) "Revised Tentative Process on MCS-1016", Job No. 2-02-760.01-1348305. Report No. P-1592, dated February, 1971 by J. E. Silver. (Future Report)

b) G. L. Arnett (Anniston) memo to R. H. Munch, dated July 17, 1970 regarding "high boiler" chlorination to Aroclor 1254 and Aroclor 1260.

Monsanto
ORGANIC CHEMICALS DIVISION
W. G. Krummrich Plant
RAW MATERIAL
SPECIFICATION

MATERIAL CODE	MATERIAL
38800	Lime, Hydrated
PLANT: WGK	USING DEPTS.: 287, 750, 246
DATE EFFECTIVE: 4/7/70	SUPPLIER: Mississippi Lime Co.

APPROVALS

PRODUCTION: T. W. Dalton	RESEARCH: M. E. Gibbs
PROCUREMENT: J. Leverle ~~R. Conlow~~	QUALITY CONTROL (Chief Chemist): R. Blowers

GENERAL DESCRIPTION

CHEMICAL FORMULA: $Ca(OH)_2$

SUPERSEDES SPECS OF	SAMPLE FOR ANALYSIS	ISSUED BY
8/13/69	1 x 16 oz. W.M. Bottle	Higgerson/Stites

CHARACTERISTIC	LIMITS	METHOD
Appearance	Fine white or slightly gray powder, free from lumps or gritty material	10,188
Assay ($Ca(OH)_2$)	92.00%, min.	10,191
Carbonates as ($CaCO_3$)	3.00%, max.	10,193
Magnesium	0.50%, max.	10,192
Sulfates (as SO_3)	0.30%, max.	10,189

Supplier's certificate of analysis to be sent on day of shipment to:

Chief Chemist, Monsanto Co., Sauget, Illinois

MONS 057665

(1) Routine Analysis. All others Analyzed by request only.

Appendix A-2

Monsanto
ORGANIC CHEMICALS DIVISION

FINISHED PRODUCT SPECIFICATION

PRODUCT		DEPT.
CHLORINE, Liquid		830
PLANT: WGK	PRODUCT CODE: 81059	USE: Sales and Internal
DATE EFFECTIVE: 8/28/69	SALES CODE: 3060-000-06-03	

APPROVALS

PRODUCTION	RESEARCH
T. W. Dalton	M. A. Terpstra
SALES	QUALITY CONTROL (Chief Chemist)
W. E. Ault	R. Blowers

GENERAL DESCRIPTION

CHEMICAL FORMULA

MOL WT. 70.914

SUPERSEDES SPECS. OF	SAMPLE FOR ANALYSIS	ISSUED BY
6/29/66	1 x 40 ml. Beaker 3/4 full	Higgerson/Stites

CHARACTERISTIC	LIMITS	METHOD
UNRESTRICTED INFORMATION		
(R) Appearance	Clear heavy liquid	10,748
(R) Color	Amber to greenish yellow	10,748
(R) Moisture	.015%, max.	12,793
(R) NVM	.01%, max.	12,793
Iron as:		10,688
Fe.	*Report %	
$FeCl_3.6H_2O$	Report %	

*When used in manufacture of ACl products, the specification on Iron as Fe is 20 ppm max. (H. V. Moss)

For use in Depts. 264, 258, 238, 243, 244 and 251.

J Higgerson 10/69

~~For Dept.~~ B. Bammann 12/23/69

MONS 057666

Monsanto
ORGANIC CHEMICALS DIVISION

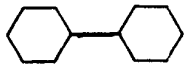
RAW MATERIAL SPECIFICATION

MATERIAL CODE	MATERIAL
82601	DIPHENYL (BIPHENYL)
PLANT	**USING DEPTS.**
WGK	246
DATE EFFECTIVE	**SUPPLIER**
10/23/70	Anniston Plant

APPROVALS

PRODUCTION	RESEARCH
B. W. Corlew	M. A. Terpstra G. W. Miller
PROCUREMENT	**QUALITY CONTROL** *(Chief Chemist)*
J. Leyerle	R. Blowers

GENERAL DESCRIPTION



mol wt. 154.20

CHEMICAL FORMULA

SUPERSEDES SPECS OF	SAMPLE FOR ANALYSIS	ISSUED BY
2/6/69	2 x 16 oz. W.M. Bottles	S. Shaulter/G. Stites

CHARACTERISTIC		LIMITS	METHOD
UNRESTRICTED INFORMATION			
(R)	Appearance and Color	Light Yellow Cryst. Solid	10,252
(R)	Crystallizing Point	68.7°C., min.	10,298
(R)	H_2O	250 ppm max.	13,155
GENERAL INFORMATION			
	Distillation Range:		
	First Drop to	2.5°C., max.	10,299
	Dry Point	Must include 255°C. within range	

This specification is the property of Monsanto Company and is for internal use only.

MONS 057667

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

Monsanto
ORGANIC CHEMICALS DIVISION

FINISHED PRODUCT SPECIFICATION

PRODUCT		DEPT.
Aroclor 1142 Crude Commercial		27-Ann, 246
PLANT	PRODUCT CODE	USE
Anniston-WGK		Sales WGK
DATE EFFECTIVE	SALES CODE	
10/21/68	1040-130-04/11/03/09	

APPROVALS

PRODUCTION	RESEARCH
J. W. Molloy	M. E. Gibbs
SALES	QUALITY CONTROL (Chief Chemist)
W. E. Ault	W. J. Gresham — G. W. Miller, Ann.

GENERAL DESCRIPTION

CHEMICAL FORMULA

MOL WT.

SUPERSEDES SPECS. OF	SAMPLE FOR ANALYSIS Ann. 1 Qt. Bottle	ISSUED BY
2/26/65	WGK 2.16 oz. W.M. Bottle	E. McEntire/G. Stites

CHARACTERISTIC		LIMITS	Anniston	WGK METHOD
UNRESTRICTED INFORMATION				
(R)	Appearance and Color	Brown to black Oily liquid		10084
(R)	Sp. Gr. @25°/15.5°C.	1.384 - 1.394	14-49-54	10114
(R)	Acid Number (mg. KOH/g.)	0.7, max.	14-46-54	11532
RESTRICTED INFORMATION				
(R)	Acid Number (mg. KOH/g.)	0.2, max. *	14-46-54	11532

* When stored in non-lacquered metal containers.

Monsanto
ORGANIC CHEMICALS DIVISION

FINISHED PRODUCT SPECIFICATION

PRODUCT	AROCLOR 1221		DEPT. App. 608
PLANT	PRODUCT CODE	USE	
Anniston	826.10	Sales	
DATE EFFECTIVE	SALES CODE		
3-1-69	1040-225-04/11-009		

APPROVALS

PRODUCTION	RESEARCH
H. Williams 2/19/69	M. E. Gibbs 3/12/69
SALES	QUALITY CONTROL (Chief Chemist)
W. Ault 3/10/69	R. Blowers 3/26/69 G. W. Miller 2/15/69

GENERAL DESCRIPTION

MIXTURE

CHEMICAL FORMULA

MOL WT.

SUPERSEDES SPECS. OF	SAMPLE FOR ANALYSIS	ISSUED BY
4/25/61	2 x 1/2 gal. Amber Bottles	G. Miller

CHARACTERISTIC	LIMITS	METHOD
(R) Condition	Clear	G-1
(R) Color, APHA	100 Max.	046
(R) Specific Gravity (25/15.5°C)	1.182-1.192	052
(R) Acidity, (Mg KOH/g)	0.014 Max.	050
(R) Viscosity @ 100°F	38-41 SUS 4.0-5.5 Cp	049

MONS 057669

(R) Routine Analysis All others Analyzed by request Only

MCS-1016

TYPICAL PROPERTIES

COLOR (APHA)	10
CONDITION	CLEAR
SP. GR. @ 25/15.5°C	1.363
ACIDITY (Mg. KOH/g.)	0.001
MOISTURE (PPM)	40
REFRACTIVE INDEX @ 25°C	1.6210
INORGANIC (FREE) CHLORIDES (PPM)	0.02
POUR POINT (°C)	-18
DIELECTRIC CONSTANT (1000 CYCLES @ 100°C)	4.96
RESISTIVITY (500 VDC @ 100°C, D.1"GAP) AS OHM-CM X 10^9	353×10^3
HYDROLYSIS STABILITY (PPM AS CHLORIDES)	0.10
MONSANTO STABILITY (PPM AS CHLORIDES)	0.06
DISTILLATION RANGE (ASTM D-20, CORRECTED)	
10% DISTILLED (BY WT.) °C	324
90% DISTILLED (BY WT.) °C	342
DIELECTRIC STRENGTH @ 25°C (KV)	50
FLASH POINT (°F)	354
FIRE POINT (UP TO B.P.)	NONE
VISCOSITY @ 100°F (SUS)	70.6
FIXED CHLORIDE (%)	41.3
(G-E) THERMAL CHEM. CHLORIDES (PPM)	0.16
(WESTINGHOUSE) HYDROLIZABLE CHLORINE (PPM)	0.26

MONSANTO
ORGANIC CHEMICALS DIVISION
KRUMMRICH AND ANNISTON

FINISHED PRODUCT SPECIFICATION

Aroclor 1242, Electrical Grade — WGK 246

WGK	81101 - 82612	SALES
10/22/69	1040-240-04/11/16-03/09	

APPROVALS

J. Molloy	M. E. Gibbs
W. E. Ault	R. M. Blowers
	G. W. Miller

8/1/69	3 x 5 pt. Amber Bottles	Higgerson/Stites

UNRESTRICTED INFORMATION

			WGK	ANNISTON
(R)	Color (APHA)	40, max.	10084	14-44-54
(R)	Condition	Clear	10084	G-1
(R)	Sp.Gr. @ 25/15.5°C.	1.381 - 1.392	10114	14-49-54
(R)	Acidity (mg. KOH/g.)	0.010, max.	10087	14-42-54
(R)	Moisture (H_2O)	35 ppm., max.	10620	14-53-54
(R)	Refractive Index @ 25°C.	1.6240 - 1.6260	10125	14-34-54
(R)	Inorganic (Free) Chlorides	0.05 ppm., max.	12741	014
(R)	Pour Point	-14°C. or Lower	10115	14-47-54
(R)	Dielectric Constant (1000 cycles @ 100°C.)	4.70 - 4.90	11608	14-36-54
(R)	Resistivity (500 VDC @ 100°C. 0.1" Gap) As OHM-CM x 10^9	500, min.	11607	14-35-57
(R)	Hydrolysis Stability Test (As Chlorides)	0.5 ppm, max.	12672	010
(R)	Monsanto Stability Test (As Chlorides)	0.4 ppm., max.	11503	14-61-57
(R)	Distillation Range (ASTM D-20, Corrected)		10117	14-31-54
	10% Distilled by wt.	325°C., min.		
	90% Distilled by wt.	360°C., max.		
	Sulfates	None	12169	-----
	Dielectric Strength @ 25°C.	35 KV, min.	11605	043
	Flash Point (°F)	338 - 392	10123	14-28-54
	Fire Point	None	10123	14-28-54
	Corrosion Test (6 hrs. @ 210°C. with bright aluminum foil)		10126	14-55-57
	Change in wt. of AL %	0.0		
	A.C. Color (APHA)	60, max.	10084	14-44-54
	A.C. Condition	Clear	10084	G-1
	A.C. Acidity (mg. KOH/g.)	0.010, max.	10087	14-42-54
	A.C. Inorganic (Free) Chlorides	0.05 ppm., max.	12741	014
	Visc. @ 100°F. (SUS)	82 - 92	10086	14- 4-52

OVER

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

GENERAL INFORMATION

Specific Heat @ 25°C.	0.30
Coefficient of Expansion (25 - 65°C)	0.00068 cc/°C.
Fixed Chlorine	42.5 - 43.5%
Power Factor @ 100°C.	(Typical Values)
60 cycles	5
1000 cycles	0.30

SPECIAL CUSTOMER REQUIREMENTS

General Electric

Thermal Chemical Chlorides	0.65 ppm., max.	12722

Westinghouse

Hydrolisable Chlorine (Westinghouse Stability Test)	1.0 ppm., max.	T-2219

MONS 057673

PHASE 1

APPENDIX B-1

CENTRAL ENGINEERING DEPARTMENT — EQUIPMENT INFORMATION SUMMARY

PREPARED BY	CEA NO	AREA	PAGE
A.J. HEINZE	2417	1	1 OF 6

PROJECT NAME	APPROVED BY	INITIAL ISSUE	REV NO	REV ISSUED
MCS-1016 FRACTIONATION - WGK		8-29-70	1	12/4/70

CED EQUIPMENT IDENTIFICATION NUMBER	DESCRIPTION OF EQUIPMENT ITEM	QTY.	SIZE, RATING, MODEL, ETC	MATERIAL OF CONSTRUCTION	OPERATING WEIGHT (POUNDS)	REMARKS	SOURCE*	ESTIMATED PRICE
1-301-000	COLUMN	1	8'-6" ϕ x 43'-6"	316 L S.S.	115,000	18' SKIRT 550°F & F.V. CODE STAMPED	R	CEA 4077 ITEM AS-201
1-301-001	COLUMN TRAYS	23	SIEVE	316 L S.S.	—	EXIST. TRAYS	R	—
		7	SIEVE	304 S.S.	—	TO BE INSTALLED	N	
1-302-000	COLUMN CONDENSER	1	2400 SQ. FT. 37" SHELL 10' LONG	AL. TUBES STEEL SHELL	12,000	3/4" x 14 Ga. TUBES 400°F & F.V. OIL COOLED	R	ITEM TT-202
~~1-303-000~~	~~REFLUX SPLITTER~~	1	~~1081 MAN. R.R.~~	~~ALUMINUM~~	—	CANCELLED	N	
~~1-304-000~~	~~PROD. COOLER~~	1	~~92 SQ. FT. U-TUBE UNIT~~	~~MONEL TUBES STEEL SHELL~~	—	CANCELLED	N	—
1-305-000	STILL POT	1	~~25,000~~ GAL 18'-6" ϕ x 28'-0"	STEEL	~~200,000~~	HORIZ. STILL 650°F & F.V. SADDLE SUPPORT	N	—
1-306-000	STILL CIRC. PUMP	1	650 GPM 45' TDH	STAINLESS STEEL	—	SUBMERGED UNIT - MOUNTED IN STILL POT.	R	ITEM PP-203
1-306-001	PUMP MOTOR	1	30 HP	—	—	1200 RPM	N	"
1-307-000	COLUMN REBOILER	1	4 M BTU/HR GAS FIRED	STEEL TUBES	25,000	CYLIND.-VERT. 100 PSIG & 700°F DESIGN	R	—
1-308-000	COLUMN EJECTOR SYSTEM	1	~~30~~ LBS/HR AIR ~~25~~ MM SUCTION	MONEL/C.I.	—	TWO STAGE 150# MOTIVE STM.	N	—
~~1-309-000~~	~~THERMINOL SURGE TANK~~	1	~~300 GAL 3'-6" ϕ x 8'-3"~~	~~STEEL~~	~~31,000~~	CANCELLED		—

CE-224

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

** ESTIMATED WEIGHT FILL

MONS 057674

PHASE 1

APPENDIX B-2

CENTRAL ENGINEERING DEPARTMENT — EQUIPMENT INFORMATION SUMMARY

PREPARED BY	CEA NO	AREA	PAGE
A.J. HEINZE	2417	1	2 OF 6

PROJECT NAME	APPROVED BY	INITIAL ISSUE	REV. NO	REV. ISSUED
MCS-1016 FRACTIONATION - WGK		7-23-70	1	12/4/70

CED EQUIPMENT IDENTIFICATION NUMBER	DESCRIPTION OF EQUIPMENT ITEM	QTY.	SIZE, RATING, MODEL, ETC	MATERIAL OF CONSTRUCTION	OPERATING WEIGHT (POUNDS) **	REMARKS	SOURCE	~~ESTIMATED PRICE (¢)~~
~~1-310-000~~	~~THERMINOL CIRC. PUMP~~	1	~~500 GPM 75' TDH~~	~~D.I.~~	—	CANCELLED	R	CEA 4877 ITEM PP206-A
~~1-310-001~~	~~PUMP MOTOR~~	1	~~40 HP TEFC~~	—	—	CANCELLED	N	—
~~1-311-000~~	~~THERMINOL COOLER~~	1	~~4M BTU/HR 160 SQ FT. FXTS~~	~~STEEL~~	—	CANCELLED	N	—
1-312-000	RESIDUE SURGE TANK (WARP IN COIL)	1	12,500 GAL 11'-6"φ x 16'-0"	STEEL	100,000	HORIZONTAL 650°F 30 PSIG SADDLE SUPPORT	N	—
1-313-000	RESIDUE TANK PUMP	1	100 GPM 50' TDH	D.I.	—	J. CRANE MECH SEAL DURCO	N	—
1-313-001	PUMP MOTOR	1	7½ HP TEFC	—	—	1750 RPM	N	—
1-314-000	1016 STORAGE TANK	1	22,000 GAL. 12'-6" x 24'-0"	ALUMINUM 5052	—	INSULATED STM. HEAT. PANELS	N	—
1-315-000	1016 STORAGE PUMP	1	150 GPM @ 40' TDH	316 S.S.	—	J.CRANE MECH. SEAL DURCO 3X2-13	N	—
1-315-001	PUMP MOTOR	1	25 HP 1750 RPM	—	—	ENCAPSULATED	N	—
1-316-000	FUEL OIL STORAGE TANK	1	20,000 GAL 18'-0"φ x 20'	STEEL	—	VERT. FLAT BTM. ATM. 500°F DES.	R	—
1-317-000	FUEL OIL SUPPLY PUMP	1	100 GPH 50 PSIG	D.I.	—	WORTHINGTON GEAR PUMP W/MECH SEAL	N	—
1-317-001	PUMP MOTOR	1	1½ HP TEFC	—	—	1750 RPM	N	—

CE-224

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

** ESTIMATED WEIGHT [illegible]

PHASE 1

APPENDIX B-3

CENTRAL ENGINEERING DEPARTMENT — EQUIPMENT INFORMATION SUMMARY

PREPARED BY	CEA NO	AREA	PAGE
A.J. HEINEE	2417	1	3 of 6

PROJECT NAME	APPROVED BY	INITIAL ISSUE	REV NO	REV ISSUED
MCS-1016 FRACTIONATION - WGK		7-27-70	1	12/4/70

CED EQUIPMENT IDENTIFICATION NUMBER	DESCRIPTION OF EQUIPMENT ITEM	QTY.	SIZE, RATING, MODEL, ETC	MATERIAL OF CONSTRUCTION	OPERATING WEIGHT (POUNDS) **	REMARKS	SOURCE *	ESTIMATED PRICE ($)
~~1-318-000~~	~~COLUMN JETS SUMP TANK~~	1	~~300 GAL. 3'6"Ø x 4'3"~~	~~STEEL~~	—	CANCELLED	N	
~~1-319-000~~	~~OIL RETURN PUMP~~	1	~~10 GPM @ 30' TDH~~	~~CI.~~	—	CANCELLED	N	
~~1-319-001~~	~~PUMP MOTOR~~	1	~~2 HP 1750 RPM~~	—	—	CANCELLED	N	
1-320-000	LIME SLURRY TANK	1	500 GAL. 4'-0" x 5'-3"	STEEL	—	LEG SUPPORTED INSULATED 30 PSIG 300°F DES.	N	
1-320-001	TANK AGITATOR	1	6-BLADE (FLAT) TURBINE	STEEL	—	100 RPM	N	
1-320-002	AGITATOR MOTOR	1	5 HP 1760 RPM	—	—	ENCAPSULATED	N	
~~1-321-000~~	~~LIME SLURRY TRANSFER PUMP~~	1	~~30 GPM @ 40' TDH~~	~~CI.~~	—	CANCELLED	N	
~~1-321-001~~	~~PUMP MOTOR~~	1	~~5 HP 1750 RPM~~	—	—	CANCELLED	N	
1-322-000	PRODUCT POLISH FILTER	2	ALSOP MODEL PAK 125-6	316 S.S.	—	ASBESTOS/CELLULOSE FILTER MEDIA 1200 GPM FLOW	N	
1-323-000	FUME SCRUBBER	1	S&K MODEL 7010 W/SEPARATOR MODEL 7040	FURAN FIBERGLASS	—	12" SIZE; 1" BOTT LARGE NOZZLE	N	
1-324-000	VENT CONDENSER	1	100 SQ. FT.	SHELL - STEEL TUBES - MONEL			N	

MONS 057675

CE-224

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

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

PHASE 1 — APPENDIX B-4

CENTRAL ENGINEERING DEPARTMENT — EQUIPMENT INFORMATION SUMMARY

PREPARED BY	CEA NO	AREA	PAGE
N. B. WOLK	2417	1	4 OF 6

PROJECT NAME	APPROVED BY	INITIAL ISSUE	REV NO	REV ISSUED
MCS-1016 FRACTIONATION - WGK		12/4/70		

CED EQUIPMENT IDENTIFICATION NUMBER	DESCRIPTION OF EQUIPMENT ITEM	QTY.	SIZE, RATING, MODEL, ETC	MATERIAL OF CONSTRUCTION	OPERATING WEIGHT (POUNDS)	REMARKS	SOURCE*	ESTIMATED PRICE ($)
1-325-000	TEMP. WATER PUMP	1	450 GPM @ 75' TDH	D.I.	—	CENTRIFUGAL EXIST. IT 132 (ORNL)	R	
1-325-001	PUMP MOTOR	1	40 HP 1950 RPM	—	—	DITTO	R	
1-326-000	MOTOR CONTROL CENTER	1	3 SECTIONS	—	—		N	
1-327-000	PRODUCT POLISH FILTER	1	ALSOP MODEL PAK 125-4	316 S.S.	—	ASBESTOS/CELLULOSE FILTER MEDIA 160 GAM FLOW	N	
1-328-000	LIGHT ENDS RECEIVER	1	5000 GALLON 8'-6 X 11'-3"	C.S.	60,000	LEG SUPPORTED SERIES B UTILITY VESSEL	N	
1-329-000	INTERMEDIATE SURGE TANK	1	20,000 GALLON 10'-6" X 30'-0"	C.S.	220,000	EXISTING IT-516 (PHENOL REFINING)	R	
1-330-000	INTERMEDIATE SURGE PUMP	1	300 GPM 45' TDH	D.I	—	DURCO 4 X 3-10 IT. 127 (Phenol Dept)	R	
1-330-001	PUMP MOTOR	1	20HP 1750 RPM	—	—		R	
1-331-000	LIGHT ENDS PUMP	1	108 GPM 88' TDH	D.I.	—	DURCO A[illegible] 3X1½-10 ITEM 4C5	R	
1-331-001	PUMP MOTOR	1	20 HP 1750 RPM	—	—		R	

MONS 057676

CE-324

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

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

APPENDIX B-5

PHASE 2

CENTRAL ENGINEERING DEPARTMENT — EQUIPMENT INFORMATION SUMMARY

PREPARED BY	CEA NO	AREA	PAGE
A.J. HEINZE	2417	1	5 OF 6

PROJECT NAME	APPROVED BY	INITIAL ISSUE	REV NO	REV ISSUED
MCS-1016 FRACTIONATION - WGK		12/21/70		

CED EQUIPMENT IDENTIFICATION NUMBER	DESCRIPTION OF EQUIPMENT ITEM	QTY	SIZE, RATING, MODEL, ETC	MATERIAL OF CONSTRUCTION	OPERATING WEIGHT (POUNDS) **	REMARKS	SOURCE	ESTIMATED PRICE ($)
1-340-000	AROCLOR 1221 STORAGE TANK	1	22,000 GAL. 12'-6" X 24'-0"	ALUMINUM 5052	—	INSULATED STM. PANELS ATMOS.	N	
1-341-000	AROCLOR 1221 POLISH FILTER	2	ALSOP MODEL PAK 125-4	316 S.S.	—	ASBESTOS/CELL. MEDIA 120 GPM RATING	N	
1-342-000	AROCLOR 1221 STORAGE PUMP	1	150 GPM @ 40' TDH	316 S.S.	—	JOHN CRANE MECH. SEAL DURCO 3X2-13	N	
1-342-001	PUMP MOTOR	1	25 HP 1750 RPM	—	—	ENCAPSULATED	N	
1-343-000	AROCLOR 1242 STORAGE TANK	1	—	—	—	SAME AS IT. 1-340-000	N	
1-344-000	AROCLOR 1242 POLISH FILTER	2	—	—	—	SAME AS IT. 1-341-000	N	
1-345-000	AROCLOR 1242 STORAGE PUMP	1	—	—	—	SAME AS IT. 1-342-000	N	
1-345-001	PUMP MOTOR	1	—	—	—	SAME AS IT. 1-342-001	N	
1-346-000	NO 2 BLOW TANK	1	1000 GAL. 4'-0" X 10'-0"	STEEL	—	HORIZONTAL - FOUR BAFFLES INSULATED	N	
1-347-000	BLOW TANK PUMP	1	15 GPM @ 55 TDH	D.I.	—	JACKETED - MECH. SEAL DURCO 3X1½-10	N	
1-347-001	PUMP MOTOR	1	5HP 1750 RPM	—	—	ENCAPSULATED	N	

MONS 057677

CE 224

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

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

APPENDIX B-6

CENTRAL ENGINEERING DEPARTMENT — PHASE 2 EQUIPMENT INFORMATION SUMMARY

PREPARED BY	CEA NO	AREA	PAGE
A. J. HEINZE	2417	1	6 of 6

PROJECT NAME	APPROVED BY	INITIAL ISSUE	REV NO	REV ISSUED
MCS-1016 FRACTIONATION - WGK		12/21/70		

CED EQUIPMENT IDENTIFICATION NUMBER	DESCRIPTION OF EQUIPMENT ITEM	QTY.	SIZE, RATING, MODEL, ETC	MATERIAL OF CONSTRUCTION	** OPERATING WEIGHT (POUNDS)	REMARKS	SOURCE *	ESTIMATE PRICE ($)
1-348-000	AROCLOR 1242 ABSORBER	1	105 FT^3 VOL. 3'-0" x 15'-0" VERTICAL	316 S.S.	—	POROCEL-5200 LBS DISHED HEADS INSULATED	N	
1-349-000	1242 ABSORBER POLISH FILTER	1	ALSOP MODEL 125-4	316 S.S.	—	CUNO 12P4 CARTRIDGE	N	
1-350-000	AROCLOR 1242 ABSORBER PUMP	1	25 GPM @ 135 'TDH	316 S.S.	—	MECH. SEAL DURCO A-20	N	
1-350-001	PUMP MOTOR	1	15 HP 1750 RPM	—	—	ENCAPSULATED	N	

MONS 057678

CE 224

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

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

UTILITIES SUMMARY

CENTRAL ENGINEERING DEPARTMENT

APPENDIX C-1

PROJECT NAME	PREPARED BY	APPROVED BY	CEA NO	AREA	PAGE
MCS-1016 FRACTIONATION-WGK	A.J. HEINZE		2417	1	1 OF 2

UTILITY SERVICE	UNITS	INITIAL ISSUE DATE 7-29-70		REV 1 DATE 12/30/70		REV. 2 DATE		REV. 3 DATE	
		AVERAGE	DESIGN	AVERAGE	DESIGN	AVERAGE	DESIGN	AVERAGE	DESIGN
NATURAL GAS	THERMS/DAY	1580	1900	1580	1900				
(FUEL OIL)	GPH	49	60	49	60				
ELECTRICAL	CONN. HP	—	~~149~~	—	207				
STEAM-80 PSIG	LBS/HR	360	~~450~~	380	520				
STEAM-200 PSIG	LBS/HR	~~400~~	~~500~~	600	700				
~~COOLING TOWER WATER~~	~~GPM~~	~~445~~	~~500~~						
CITY WATER	GPM	~~185~~	230	85	100				
INSTRUMENT AIR	CFM	10	~~15~~						
NITROGEN	SCFD	940	1000	2820	3000				

MONS 057929

Blank Space Indicates This Utility Requirement Has Not Been Checked Since Last Revision.
Repeated Number Indicates This Utility Requirement Has Been Checked Since The Last Revision, and Remains The Same.

CE-321

MONS 057680

APPENDIX C-2

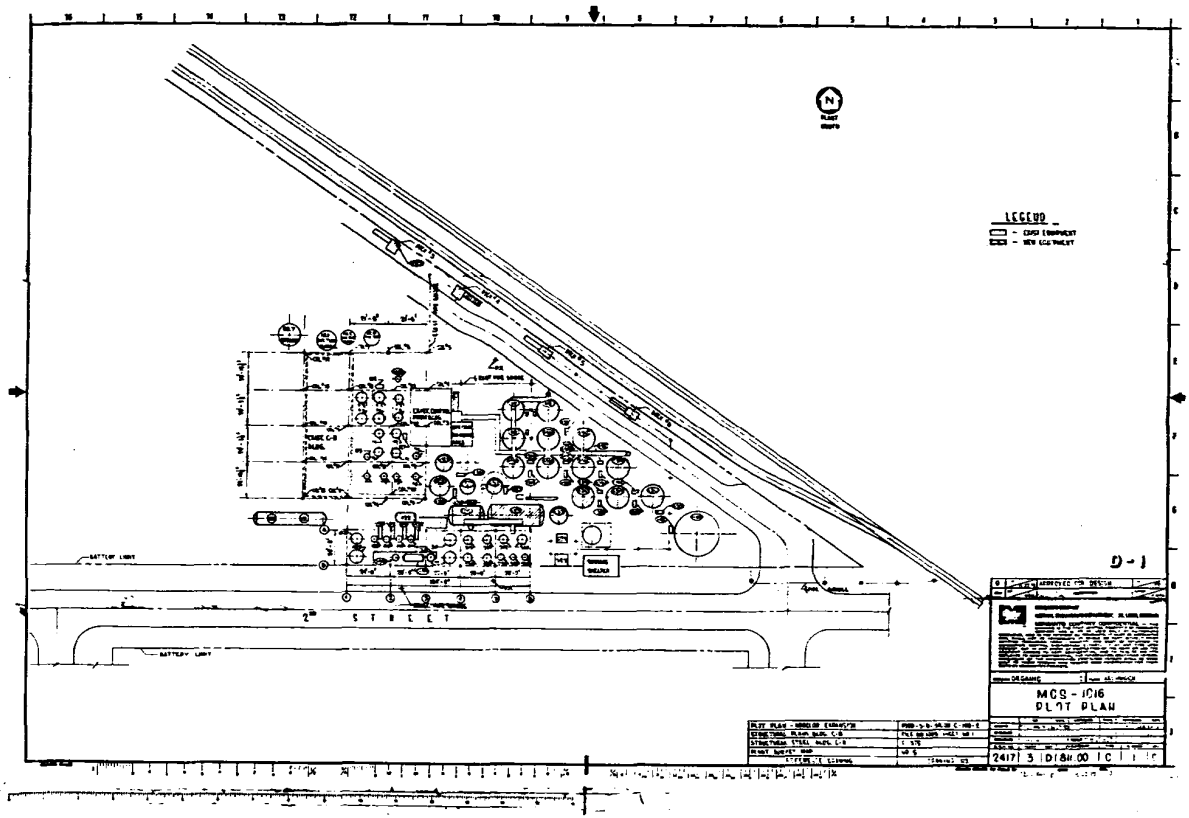
UTILITIES REQUIREMENTS

CENTRAL ENGINEERING DEPARTMENT

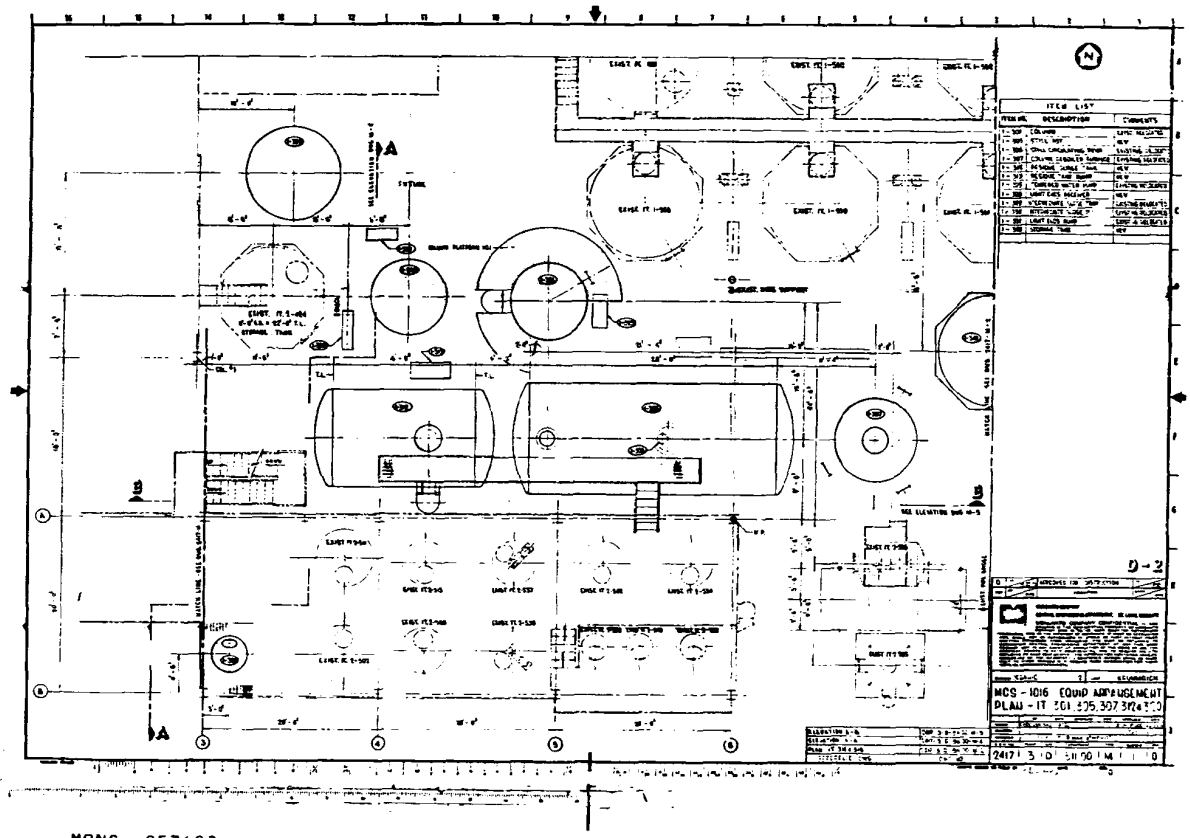
PREPARED BY	CEN NO.	AREA	PAGE
A.J. HENNEE	2417	1	2 of 2
APPROVED BY	INITIAL ISSUE	REV. NO.	REV. ISSUED
	7-29-70	1	12-30-70

PROJECT NAME: MCS-1016 DISTILLATION - WGK

CEN EQUIPMENT IDENTIFICATION NUMBER	DESCRIPTION OF EQUIPMENT ITEM	NATURAL GAS THERMS/DAY		(FUEL OIL) GPH		ELECTRICAL CONNECTED HP		80 PSIG STEAM LBS/HR		200 PSIG STEAM LBS/HR		CITY WATER GPM		NITROGEN SCF/DAY			
		AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
1-302	COLUMN CONDENSER	—	—	—	—	—	—	—	—	—	—	85	100	—	—		
1-306	STILL CIRC. PUMP	—	—	—	—	—	30	—	—	—	—	—	—	—	—		
1-307	COLUMN REBOILER	1580	1900	49	60	—	—	—	—	—	—	—	—	—	—		
1-308	COLUMN EJECTOR	—	—	—	—	—	—	—	—	500	550	—	—	—	—		
1-312	RESIDUE SURGE TANK	—	—	—	—	—	—	DOWN TIME HEATING ONLY		—	—	—	—	—	—		
1-313	RESIDUE TANK PUMP	—	—	—	—	—	15	—	—	—	—	—	—	—	—		
1-314	MCS-1016 STORAGE TANK	—	—	—	—	—	—	75	100	—	—	—	—	940	1000		
1-315	1016 STORAGE PUMP	—	—	—	—	—	25	—	—	—	—	—	—	—	—		
1-316	FUEL OIL STORAGE TANK	—	—	—	—	—	—	75	100	—	—	—	—	—	—		
1-317	FUEL OIL PUMP	—	—	—	—	—	2	—	—	—	—	—	—	—	—		
1-320	LIME SLURRY TANK AGITATOR	—	—	—	—	—	5	—	—	—	—	—	—	—	—		
1-323	FUME SCRUBBER	—	—	—	—	—	—	—	—	—	—	(HOLD)		—	—		
1-325	TEMP. WATER PUMP	—	—	—	—	—	20	—	—	—	—	—	—	—	—		
1-328	LIGHT ENDS RECEIVER	—	—	—	—	—	—	40	60	—	—	—	—	—	—		
1-329	#2 INTERMEDIATE SURGE TANK	—	—	—	—	—	—	—	—	40	60	—	—	—	—		
1-330	SURGE TANK PUMP	—	—	—	—	—	20	—	—	—	—	—	—	—	—		
1-331	LIGHT ENDS PUMP	—	—	—	—	—	20	—	—	—	—	—	—	—	—		
1-340	AROCLOR 1221 STORAGE TANK	—	—	—	—	—	—	75	100	—	—	—	—	940	1000		
1-342	1221 STORAGE PUMP	—	—	—	—	—	25	—	—	—	—	—	—	—	—		
1-343	AROCLOR 1242 STORAGE TANK	—	—	—	—	—	—	75	100	—	—	—	—	940	1000		
1-345	1242 STORAGE PUMP	—	—	—	—	—	25	—	—	—	—	—	—	—	—		
1-346	BLOW TANK PUMP	—	—	—	—	—	5	—	—	—	—	—	—	—	—		
1-350	ABSORBER PUMP	—	—	—	—	—	15	—	—	—	—	—	—	—	—		
—	TRACING & MISC.	—	—	—	—	—	—	40	60	60	90	—	—	—	—		
	TOTALS	1580	[illegible]	49	[illegible]		[illegible]	[illegible]	[illegible]								



MONS 057681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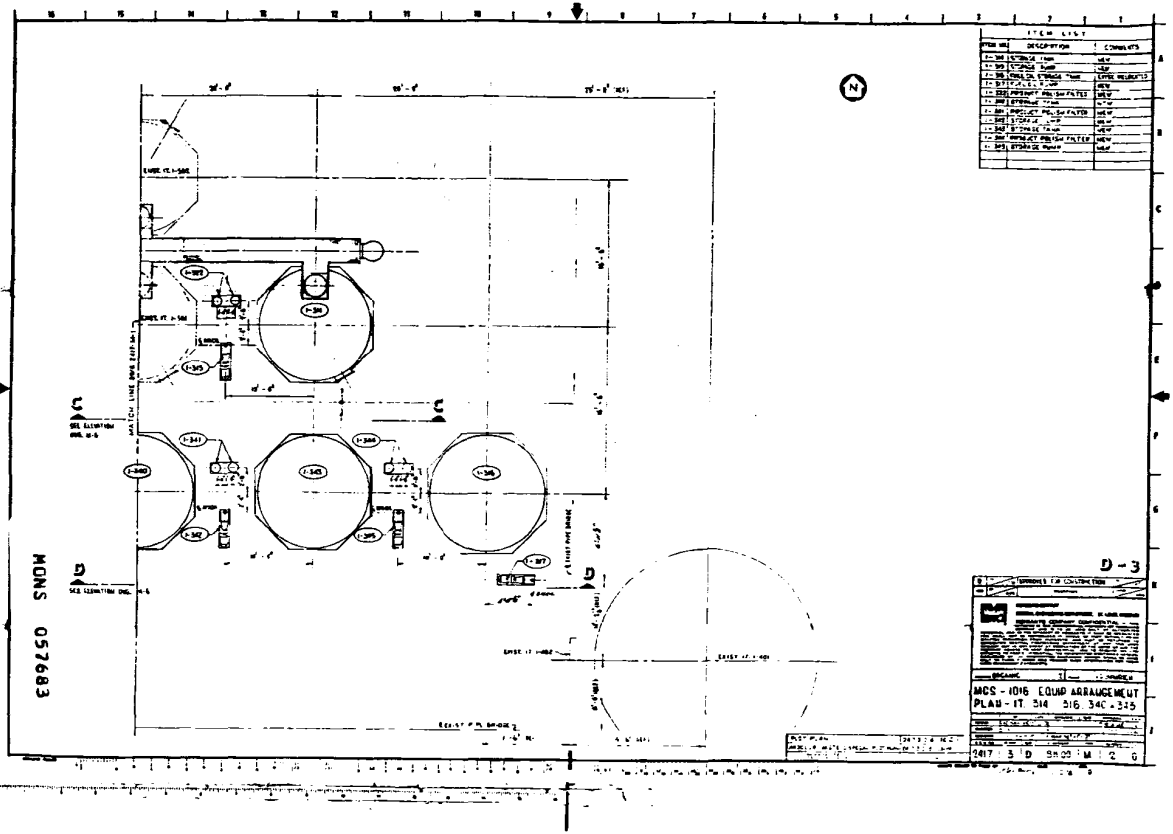
PLAN - IT 301,305,307,3124,300
D-2

MONS 057682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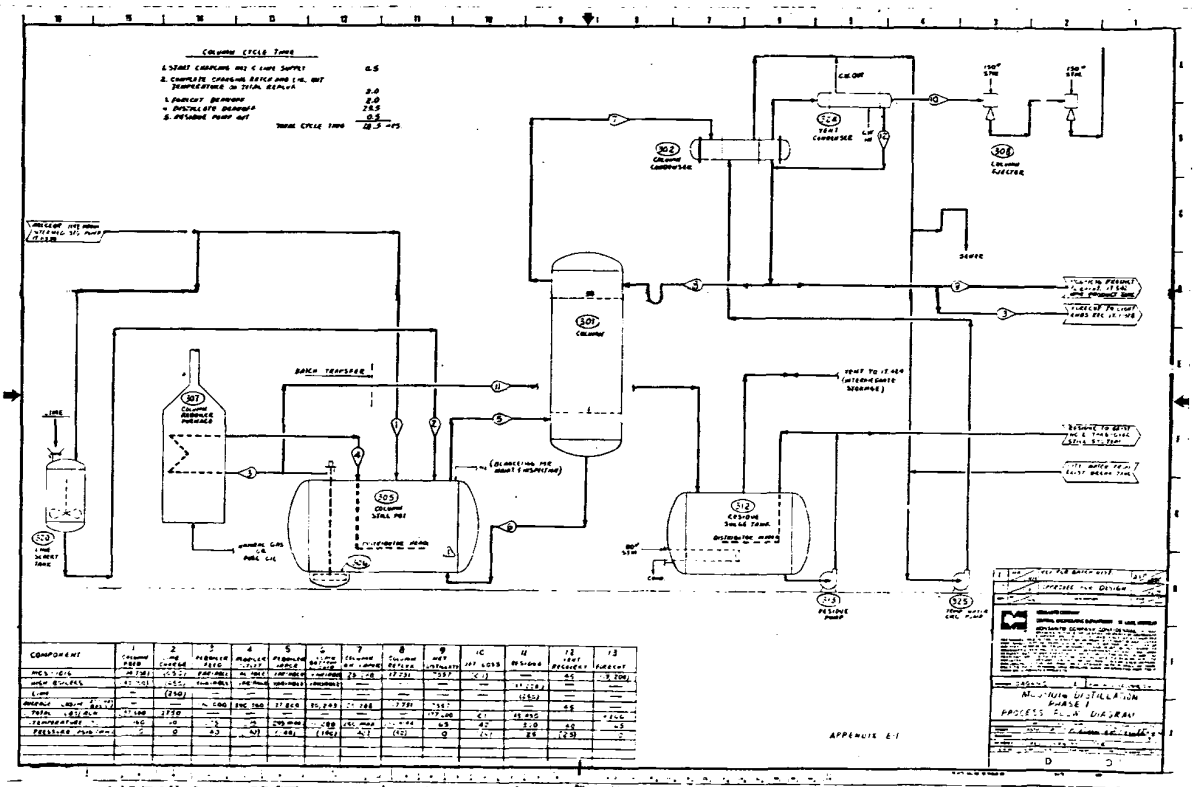
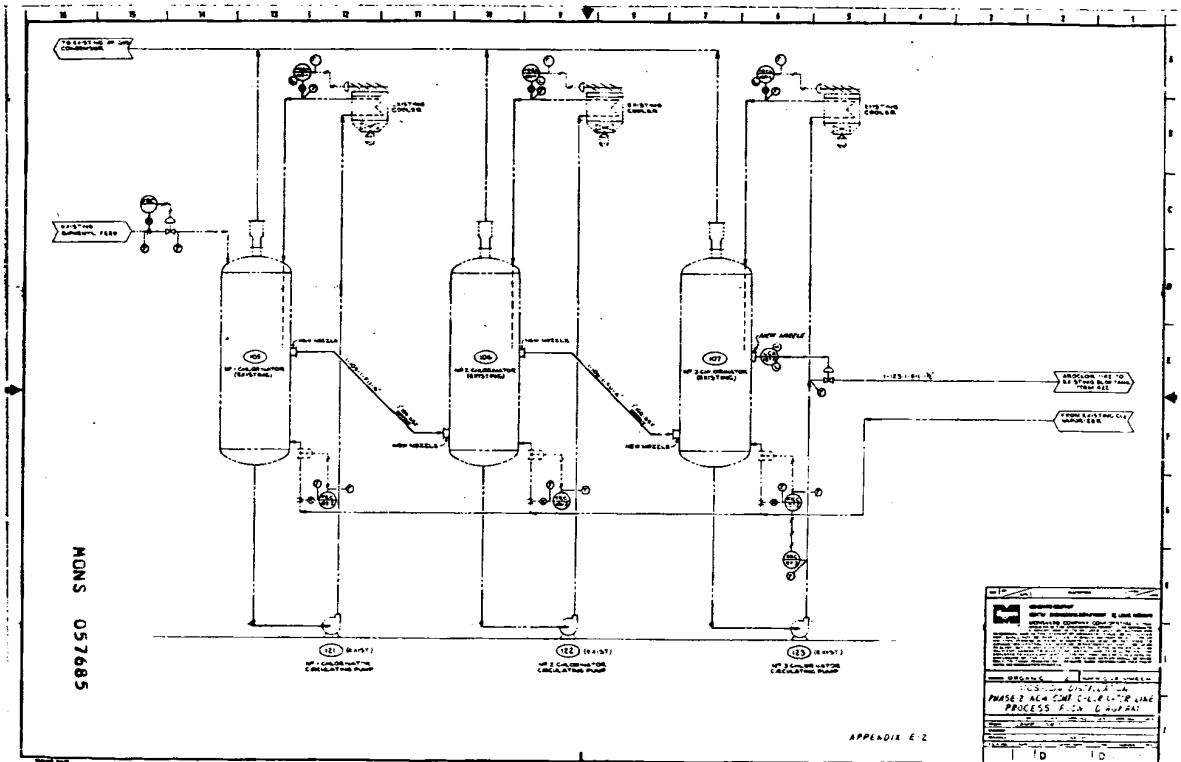
MATCH LINE
D-3
MCS - 1016 EQUIP ARRANGEMENT
PLAN - IT. 314 316 340 + 345
2417 3 D 9800 M 2 0

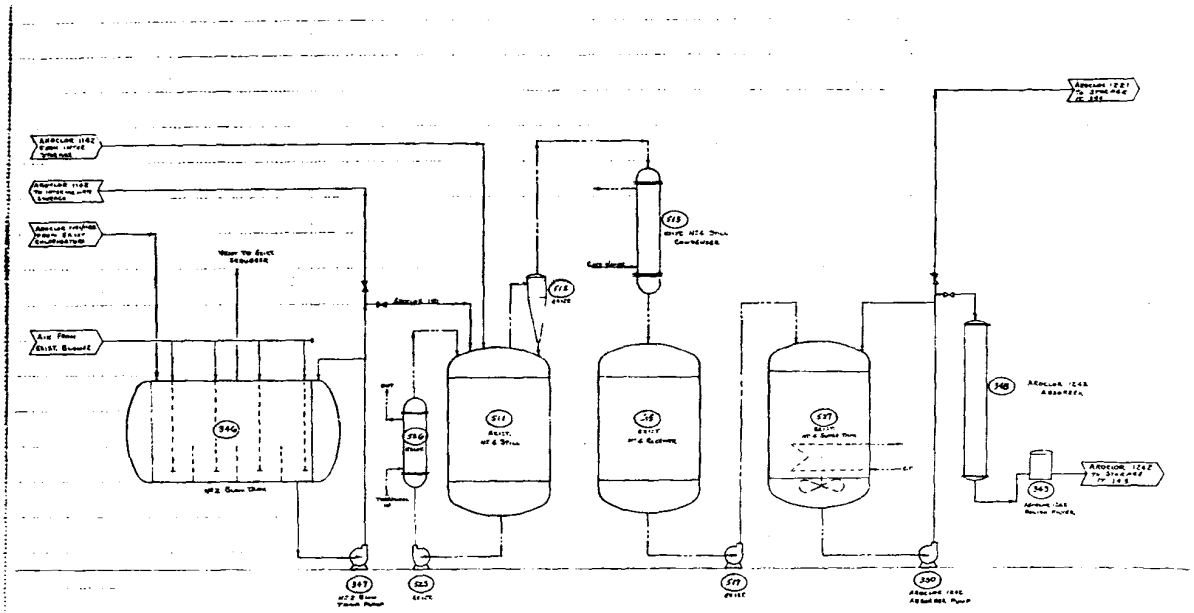
MONS 057683

MONS 057684



COMPONENT	1 COLUMN FEED	2 MIX CHARGE	3 PRESSURE FEED	4 AZEOTROPE VAPOR	5 AZEOTROPE VAPOR	6 MIX CHARGE	7 COLUMN BOTTOMS	8 COLUMN BOTTOMS	9 WET SOLIDS	10	11 RECYCLE	12 VENT RECYCLE	13
MCS - 10%	17.581	4.531	0.00/0.001	0.001	0.00/0.001	0.00/0.001	2.5	17.231	0.257	0.1	—	0.1	0.206
WET SOLIDS	11.701	4.531	0.00/0.001	0.00/0.001	0.00/0.001	0.00/0.001	—	—	—	—	11.228	—	—
LIME	—	2.510	—	—	—	—	—	—	—	—	0.450	—	—
AMMONIA (GAS)	—	—	0.006	0.00	17.820	0.203	0.00	0.191	0.01	—	—	0.1	—
TOTAL (LB)	29.282	27.572	—	—	—	0.203	2.5	17.422	0.267	0.1	11.678	—	0.206
TEMPERATURE °C	40	40	0	0	209.444	0.00	150.444	40	40	40	5.0	40	40
PRESSURE mm Hg	0	0	4.0	4.0	760	(10%)	4.0	(0.0)	0	0.0	25	(2.0)	0


MONS 057685
APPENDIX E-2



Note: Existing N2 & Wheeler Still system operates in blanked out position on either Aroclor 1181 or 1142

Appendix E-3

ACT-1016 Distillation

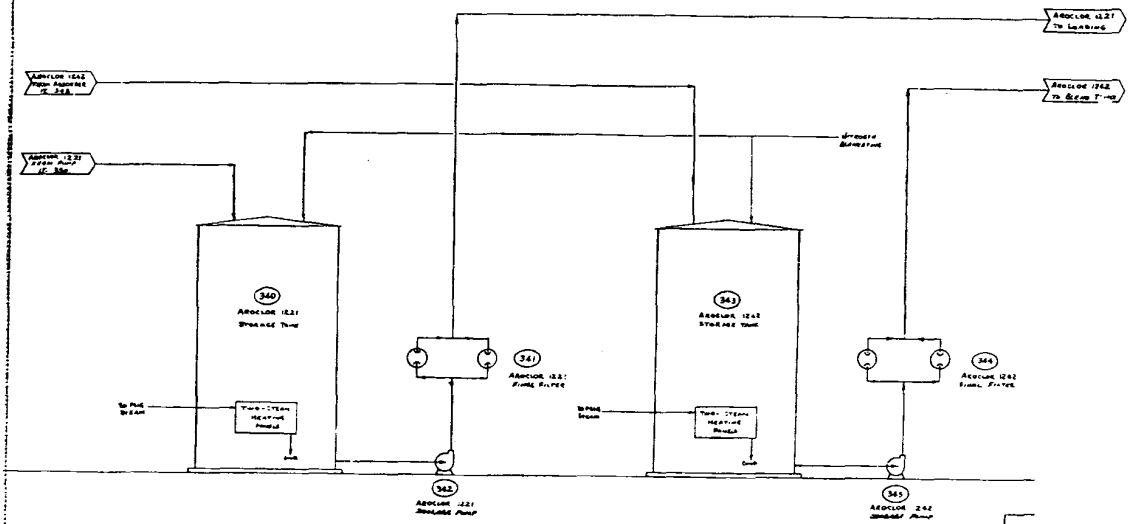
Process Flow Diagram

Phase 2

Aroclor 1221 and 1242 Distillation

By A. Gehrke Date 1/28/70

MONS 057686



APPENDIX E-6

MCS-1016 DISTILLATION

PROCESS FLOW DIAGRAM

PHASE 2

AROCLOR 1221/1242

FINISHED GOODS STORAGE

BY: A.J. HOUSE DATE: 12/23/76

MONS 057687

APPENDIX F-1

Monsanto

PHASE I
INSTRUMENT INDEX

LOCATION WGK PROJECT MCS-1016 DISTILLATION

PROJECT NO.	SYSTEM	UNIT	AREA	CONTROL	APPROVED
2417	0	1118170	8-A		

DIVISION 002 PLANT WGK
JOBB NO. 2417 SHEET OF SHEETS 246 SHEET 1 REV 0

MANUFACTURER	MODEL	P.O. NUMBER	RANGE CALIB. OR VALVE ACTION	LOCATION FIELD, PANEL, LINE NO. OR EQUIP. NO.	INSTALL. DETAIL NO.	INSTR. SCHEM. NO.	SPEC NO.	SERVICE & REMARKS	SPD	INSTRUMENT NUMBER
Weksler	15°03826-7-1-01-1-000-000-10-22.001	0010	0-350°C	MAIN			-11 -1	MULTIPOINT TEMPERATURE RECORDER THERMOCOUPLES & WELLS	MWK	TR-300
Tex Tex	P3-0-WTR14J24-5ER24		Type J	301			-95 24-1	301 BOTTOM TEMPERATURE	3	TE-301-1
" "	same		"	301			"	301 MIDDLE TEMPERATURE	3	TE-301-2
" "	same		"	301			"	301 TOP TEMPERATURE	3	TE-301-3
" "	same		"	305			"	305 STILL POT TEMPERATURE	4	TE-305-1
" "	P1-U3-WTR14J22-11TR12		"	1-307-1-F8811-B			"	ABOVE/OR FROM FURNACE 1-307	5	TE-307-1
" "	same as TE-301-1		"	312			"	312 RESIDUAL SURGE TANK	4	TE-312-1
" "	same as TE-305-1		"	1-324-1-F11-4"			"	301 NON-CONDENSIBLES TO STEAM JET	4	TE-320-1
" "	" " "		"	1-305-3-F252-4"			"	TEMPERATURE TO 302	4	TE-302-1
" "	" " "		"	1-305-2-A11-2"			"	MCS 1016 PRODUCT	4	TE-320-1
Fisher Contact in TJR-300				Panel			-11 24-1	HI TEMP ALARM ABOVE/OR FROM FURNACE 1-307	5	TA-307-1
Fisher Contact in TJE-320				Panel			-11 24-1	HI TEMP ALARM 301 NON-CONDENSIBLES TO STEAM JET	4	TA-320-1
Fisher	67 FRTC	Electric	10 PIC	Field Cabinet			-92 24-1	PRESSURE REGULATOR FOR CABINET PURGE	WK	PR-300
Fisher Potter	12A2132-M	0012	2.5 SCFH	same			24 -1	FLOW INDICATION FOR CABINET PURGE	WK	FI-300-1
Fisher Potter	12A2132-M	0012	2.5 SCFH	same			-96 24-1	same	WK	FI-300-2
Tagliabue	Series 50	0009	3 Point 1 Alarm	Panel			-70 24-3 -70 24-1	Annunciator Cabinet	WK	AR-300
Nameplate	for MR-300	0009	Nameplate	Panel			Nameplate	Nameplate	WK	AR-300

MONS 057688

APPENDIX F-2

Monsanto

PHASE I
INSTRUMENT INDEX

JOB NO.	REVISED	DATE	BY	CHECKED	APPROVED
2417	12	11/13/78	RKL		

DIVISION: 002 — PLANT: WGK — SHEET NO.: 2 — REV:

LOCATION: WGK — PROJECT: MCS - 101A DISTILLATION — DEPT NO.: 2417 — 246

MANUFACTURER	MODEL	P.O. NUMBER 2417-3	INSTR. CALIB. OR VALVE ACTION	LOCATION FIELD, PANEL, LINE NO. OR EQUIP. NO.	INSTAL. STATUS NO. 6	INSTR. SCHEM. NO. 1	SPEC NO. M-2417	SERVICE & REMARKS	QTY	INSTRUMENT NUMBER
FOXBORO	IIAM-M32	[illegible]	0-42 INCHES	FIELD -301-			5A-1	ABSOLUTE PRESSURE TRANSMITTER	3	FT-301-5
FISCHER-PORTER	1351ARPC	0012	0-100 LIN SCALE	PANEL			-12 / 5A-1	PANEL INDICATOR	3	PIC-301-5
FISHER	667A	[illegible]	[illegible]	?			-30 5A-1	CONTROL VALVE	4	FV-301-5
FOXBORO	BAI-M3G		0-150"	FIELD -301-			-32 5A-1	DIFFERENTIAL PRESSURE TRANSMITTER	3	PDT-301-4
FISCHER-PORTER	1352APAC	0012	0-150 LIN SCALE	PANEL			-12 5A-1	DIFFERENTIAL PRESSURE INDIC.	3	PDI-301-4
FISCHER-PORTER	10A1135M	0012	2.5 SCFM	?			-44 5A-1	PURGE FLOWMETER	3	FI-301-9
FISCHER-PORTER	10A1135M	0012	2.5 SCFM	?			-44 5A-1	PURGE FLOWMETER	3	FI-301-10
FISHER	67FRTC	[illegible]	10 PSIG	?			-02 5A-1	PRESSURE REGULATOR	3	PCV-301-11
SUPPLIED WITH PCV-301-11		-		?			-32 5A-1		3	PG-301-11
				?				PRESSURE REGULATOR	3	PCV-301-12
				?				PRESSURE GAUGE	3	PG-301-12
				?				VACUUM INDICATOR	3	PI-301-7
FISHER	9150	[illegible]	[illegible]				5A-1	MCS-101A PRODUCT FLOW		FV-301-1
FISCHER-PORTER	10A1152A-OK-1401KA41	0012	0-150 LIN SCALE	1-303-1-A11-4"			-30 5A-2	ROTAMETER INDICATING TRANSMITTER	4	FT-303-1
FOXBORO	556-11-30	[illegible]	[illegible]	FIELD CABINET			-32 5A-1	SQUARE ROOT ANALOG COMPUTER	4	FY-303-1
FOXBORO	14A	[illegible]	60-90% 0-100	PANEL			-05 5A-1	INTEGRATING TOTALIZER	4	FQI-303-1
FISCHER-PORTER	1351AEPC	0012	LIN SCALE	PANEL			-12 5A-1	INDICATING CONTROLLER	4	FIC-303-1
				FIELD				FLOW INDICATOR	4	FI-303-1
FISCHER-PORTER	10A1152A-OK-1401KA41	0012	[illegible]	1-303-2-A11-2"			-44 5A-2	ROTAMETER INDICATING TRANSMITTER	4	FT-302-3
								FIELD INDICATOR	4	FI-302-3
FOXBORO	GII LOW VOLT W/RETTS ON		6" 316 SS	1-302-1-FRB16-2"			-30 5A-1	MCS-101A PRODUCT FLOW	4	FV-302-1
FOXBORO	GII " " " "		2" CS	1-302-5-FRB16-2"			-30 5A-2	LIGHT ENDS TO 328	4	FV-302-2

MONS 057689

APPENDIX F-3

Monsanto — **PHASE I** INSTRUMENT INDEX

LOCATION UGK — PROJECT MCJ-1016 DISTILLATION

PROJECT NO.	REVISION	DATE	BY	CHECKED	APPROVED	DIVISION	PLANT	SHEET NO.
2417	0	11/21/80	RMH			002	UGK	
						AUTH NO.	DEPT OR AREA	SHEET / NO.
						2417	246	3 of 0

MANUFACTURER	MODEL	P.O. NUMBER 2417 -	RNTR CALIB. OR VALVE ACTION	LOCATION FIELD, PANEL, LINE NO. OR EQUIP. NO.	INSTR. VENDOR NO.	INSTR. SCHEDULE NO.	SPEC NO. M-2417	SERVICE & REMARKS	SPD	INSTRUMENT NUMBER
Invar Tub	520		4"-20 PSI	3-601-1-F2816 - B			-55 1		3	FO-305-4
Ashcroft	1020 AC		15"Hg, 30" Hg	1-307-1-F2816-FA			-49 1	Pump 305 Discharge Pressure	3	PG-305-5
Mansfield & Green	Type S-1			1-307-1-F2816-FA			-49 1	Diaphragm Seal	3	PG-305-5
Fisher	2500T-2506-249FP	Alcohol	120" (Span) H2O	Field - 305'			-54 1	305 Level Indicator Controller	3	LICA-305-3
Mercoid	AP-153-R26	0015"	4 PSIG	Field Cabinet			-54 1	305 High Level Alarm	3	LA-305-3
Mercoid	AP-153-R26	0013"	4 PSIG	Field Cabinet			-54 1	305 Low Level Alarm	3	LA-305-3
Fisher	667-A	Alcohol	10" H2O	1-305-1-FIIP-2"			-30 2 -54		3	LV-305-3
BS&B	Type DV	0013	150 PSIG	Vessel			-53 1	305 Rupture Disc	3	PSE-305-8
Ashcroft	1020A		0-30 PSIG	1-306-1-F2816 F-2			-49 1		3	PG-306-5
Mansfield & Green	Type S-1			1-306-1-F2816 F-B			-49 1		3	PG-306-5
Foxboro	AS IFO-S2-1-S	0-100"	0-100" WC 0-40" WC 0-40 PSIG	317-1-F27-1"			-35 1 -36 -31	Fuel Oil - Integral Flow Orifice	5	FE-317-1
Invar Tub	M-32RW, 520			F27-2"			-36 1 -31	Meter Run, Orifice Flg + Orifice Plt	5	FC-307-2
Foxboro	IAI-ME2	0-100"	0-40" WC	F27-2"			-31 1	Fuel Gas - Flow Transmitter	5	FT-317-2
Foxboro	IAI-ME2	0-100	0-30" WC	317-1-F27-1			-33 1	Fuel Air - Flow Transmitter	5	FT-317-1
									5	FCV-317-1
Fischer-Porter	1251 ABEC	0012	0-10 to 0-30 PT	Vessel			-18 2	Fuel Flow Indicator Controller	5	FIC-317-1
									5	HIC-8-1
									5	HIC-8-2
									5	HIC-8-1
									5	FCV-8-2
									5	FCV-8-2
									5	FCV-8-2
									5	FCV-317-1

MONS 057690

APPENDIX F-4

Monsanto

PHASE I
INSTRUMENT INDEX

PROJECT NO.	REVISION	DATE	BY	CHECKED	APPROVED
2417	0	11/5/70	EMJ		
	1	11/12/70			

DIVISION	PLANT	DWG NO.
002	WGK	
AUTH NO.	DEPT OR AREA	SHEET / REV
2417	246	4 of 0

LOCATION: WGK — PROJECT: MCS-1016 DISTILLATION

MANUFACTURER	MODEL	P.O. NUMBER 2417-9	INSTR CALIB. OR VALVE ACTION	LOCATION FIELD, PANEL, LINE NO. OR EQUIP. NO.	INSTALL. DETAIL NO.	INSTR. SCHEDULE NO.	SPEC NO. 2417	SERVICE & REMARKS	SPD	INSTRUMENT NUMBER
Barton	277	0017	0-50" WC	1-307-1-F2816-6"			-47 SH 1	Aroclor Flow from	5	FIA-307-5
Daniel Ind	30RS-520		600 GPM 0-50" WC	1-307-1-F2816-8"			-45 SH 2	Furnace -307	5	FE-307-5
Fisher	95L	[illegible]	5 PSIG				-42 SH 4	Steam Trace		[illegible]
Honeywell	R7161C1201	0010	0-600°C	Field Cabinet			-47 SH 2	Temperature Indicating Alarm	5	TIA-307-4
(Existing)			Type J	1-307 Stack				Thermocouple + Thermowell	5	TE-307-4
Honeywell	C7012A-1061	0016	None	1-307 Burner #1			-55 SH 1	Ultra-Violet Flame Scanner	5	[illegible]
Honeywell	C7012A-1061	0016	"	Burner #2			-55 SH 1	- Same -	5	[illegible]
Honeywell	C7012A-1061	0016	"	Burner #3			-55 SH 1	- Same -	5	TE-307-3
Honeywell	W78'C-100 +	0016	None	Field Cabinet			-56 SH 1	Flame Safeguard Burner #1	5	PA-307-1
~~Honeywell~~	~~R4128A~~			~~Field Cabinet~~			~~-56 SH 1~~	~~Same Burner #2~~	~~5~~	~~[illegible]~~
~~Honeywell~~	~~R4128A~~			~~Field Cabinet~~			~~-56 SH 1~~	~~Same Burner #3~~	~~5~~	~~[illegible]~~
								Steam to Steam Jet -308-	4	[illegible]
								Steam Pressure to Steam Jet -308-	4	FG-[illegible]
								Steam Jet -308- Vacuum	4	FI-[illegible]-1
Carborundum	Impervious Graphite	[illegible]	2 PSIG 8" Burst	1-312-3-F2816-4"			-53 SH 2	312 Rupture Disc	4	FSE-312-4
Carborundum	Impervious Graphite	[illegible]	2 PSIG 8" Burst	1-312-3-F2816-4"			-53 SH 2	312 Rupture Disc	4	FSE-312-5
Fisher	2-00T-249BP	[illegible]	0-120"	Field -312-			-54 SH 1	312 Level Indication	4	LIA-312-3
Mercoid	AP-153-R36	0015	14 PSIG	Field Cabinet			-54 SH 2	Hi Level Alarm 312	4	[illegible]
Mercoid	AP-153-R36	0015	4 PSIG	Field Cabinet			-54 SH 2	Lo Level Alarm 312	4	[illegible]
Fisher-Porter	1352EFAC	0012	0-120 GPM	Panel			-72 SH 1	Panel Level Indicator	4	[illegible]
[illegible]	10A3135M	0012	[illegible]	Field			-44 SH 4	Nitrogen Purge to -312-		[illegible]
[illegible] Porter	10A2235	0012	[illegible]	Field			-44 SH 5	High Flow Alarm Rupture Disc Failure		[illegible]
[illegible]	[illegible]-153	0012	1-30" WC	Field			-54 SH 2	High Pressure Alarm -312		PA-312-6
Fisher	FIG 50									PG-312-7

MONS 057691

APPENDIX F-5

Monsanto

PHASE I
INSTRUMENT INDEX

PROJECT NO.	REVISION	DATE	BY	CHECKED	APPROVED	DIVISION	PLANT	ENG NO.
2417	0	4/17/70	EHJ			002	WGK	
						ACTIV NO.	DEPT OR AREA	SHEET / REV
						2416	246	5 of / 0

LOCATION WGK

PROJECT MCS-1016 DISTILLATION

MANUFACTURER	MODEL	P.O. NUMBER 2417-9	INSTR CALIB. OR VALVE ACTION	LOCATION FIELD, PANEL, LINE NO. OR SCULP. NO.	INSTALL. DETAIL NO.	INSTR SCHEM. NO.	SPEC NO. 2417	SERVICE & REMARKS	SPD	INSTRUMENT NUMBER
FISHER	Y600-3	n/a/to	2" W.C.	FIELD			-42 SH 3	RUPTURE DISC FAILURE -312		PCV-312-7
FISHER	Y600-3	n/a/to	50 PSIG	FIELD			-42 SH 3	RUPTURE DISC FAILURE -312		PCV-312-8
ASHCROFT	1020 A		0-30 PSIG	FIELD 313			-49 SH 1	PRESSURE GAUGE		PG-313-1
MANSFIELD & GREEN	TYPE S1			FIELD 313			-49 SH 1	DIAPHRAGM SEAL		PG-313-1
FISHER	95H	n/a/to	40 PSIG	?			-42 SH 1	PRESSURE REGULATOR		PCV-314-2
ASHCROFT	1020 A		0-100 PSIG	?			-49 SH 3	PRESSURE GAUGE		PG-314-5
ASHCROFT	50-6060 EHT		10-150°C	FIELD -314-			-51 SH 1	TEMPERATURE GAUGE & WELL		TG-314-4
VAREC	2500	0011	0-24'	FIELD -314-			-50 SH 1	TANK GAUGE		LI-314-1
FISHER	730B-21	n/a/to	4" W.C.	N-2-ES-1½"			-42 SH 2	TANK PAD PRESSURE		PCV-314-7
FISHER	FIG. 50	n/a/to	0-35" WC	N-2-ES-1½"			-49 SH 2	PRESSURE GAUGE		PG-314-6
FISHER	66-R	n/a/to	7" WC	N-2-ES-1½"			-42 SH 2	TANK PAD PRESSURE		PCV-314-5
ASHCROFT	1020 S		0-100 PSIG	315-1-ANP-3"			-49 SH 3	315 PUMP PRESSURE		PG-315-1
FOXBORO	13EA1-MK315	n/a/to	0-205" WC	FIELD 316			-32 SH 2	316 LEVEL TRANSMITTER		LT-316-1.1
PRESSURE GAUGE SUPPLIED WITH LT-316-1			0-100 LIN				-32 SH 2	316 LEVEL INDICATOR		LI-316-1.2
MERCOID	AP-153-R36	0015	14 PSIG	FIELD CABINET			-54 SH 1	316 HIGH LEVEL ALARM		LA-316-1
MERCOID	AP-153-R36	0015	4 PSIG	FIELD CABINET			-54 SH 1	316 LOW LEVEL ALARM		LA-316-1
ASHCROFT	1020 A		0-160 PSIG				-49 SH 3	317 PUMP PRESSURE		PG-317-1
FISHER	93 H	n/a/to	135 PSIG				-42 SH 1	317 PUMP BACK PRESSURE CONTROL		PCV-317-2

MONS 057692

APPENDIX F-6

Monsanto

PHASE I
INSTRUMENT INDEX

PROJECT NO.	REVISED	DATE	BY	CHECKED	APPROVED	DIVISION	PLANT	DWG NO.
2417	0	11/5/70	[illegible]			002	WGK	
						AUTH NO.	DEPT OR AREA	SHEET / REV
						2417	246	6 / 0

LOCATION WGK SUBJECT LTCI-1016 DISTILLATION

MANUFACTURER	MODEL	P.O. NUMBER	INSTR CALIB. OR VALVE ACTION	LOCATION FIELD, PANEL, LINE NO. OR EQUIP. NO.	INSTALL. DETAIL NO.	INSTR SCHEM. NO.	SPEC NO.	SERVICE & REMARKS	SPD	INSTRUMENT NUMBER
FISHER	2500T - 249 BP	11/30/70	0 - 42"	FIELD - 320 -			-34 SH 2	-320- LEVEL TRANSMITTER	3	LT-320-1
PRESSURE GAUGE SUPPLIED WITH LT-320-1		—	0 - 100 LIN	FIELD - 320 -			-34 SH 2	-320- LEVEL INDICATOR	3	LI-320-1
FISCHER-PORTER	10A2235	0012	0.4 TO 30 GPM	?			-44 SH 2	-324- COOLING WATER FLOW	4	FI-324-2
FISHER	95L	11/2/70	5.0 PSIG				-42 SH 4	STEAM TRACE		PCV-325-3
FISCHER-PORTER	10B3535A	0012	0 - 100"	1-325-1-F2C2-6"			-45 SH 2	-302 TEMPERED WATER FLOW	4	FC-325-2
ROTAMETER SUPPLIED WITH FE-325-2		0012	45 TO 450 GPM	1-325-1-F2C2-6"			-44 SH 3	" " " "	4	FI-325-2
ASHCROFT	1020A		0-50 PSIG	1-325-1-F2C2-6"			-44 SH 3	-325- TEMPERED WATER PUMP PRESSURE	4	FI-325-1
TAYLOR	441RM1123B2-100	0009	0-100°C	FIELD			-43 SH 1	TEMPERED WATER TEMP. INDIC + CONT	4	TICA-325-2
ALARM CONTACT WITH TICA-325-3		—								TA-325-3
FISHER	657-A	11/30/70	AIR TO OPEN	?			-50 SH 2	CITY WATER FLOW TO TEMPERED WATER	4	TV-325-3
FISHER	2500T - 249 BP		120"	- 328 -			-14 SH 3	-328- LIGHT END LEVEL	4	LIA-328-1
MERCOID	AP-153 - R36		ALARM AT 14.5 PSIG	FIELD CABINET			-54 SH 3	-328- HIGH LEVEL ALARM	4	LA-328-1
FORSARD	13FA1 - HK 315		485" WC	- 329 -			-42 SH 3	-329- INTERMEDIATE SURGE TANK LEVEL	3	LIA-329-1
MERCOID	AP-153 - R36		ALARM AT 14.5 PSIG	FIELD CABINET			-54 SH 3	-329- HIGH LEVEL ALARM	3	LA-329-1

MONS 057693

CENTRAL ENGINEERING DEPARTMENT

INSTRUMENT SUMMARY

PROJ/DEPT. MCS-1016
PLANT WEK DIVISION ORGANIC

DWG. NO. APPENDIX F-7
CEA NO. 2417 AREA NO. 1
BY A.L. HEINRE
DATE 12/17/70 SHEET ___ OF ___

PHASE 2

INST. Nº	SERVICE	LOC.	VALVE SIZE	VALVE MAT'L	REMARKS
TRC 105-1	EXIST. Nº 1 CHLORINATOR TEMP. CONTROLLER	P	EXIST.	—	LO TEMP ALARM
FRC 105-2	EXIST. Nº 1 CHLORINATOR Cl_2 FLOW CONTROLLER	P	EXIST.	—	HI TEMP. ALARM / INTERLOCK
FRC 105-3	BIPHENYL FLOW CONTROLLER	P	1½"	STL.	ORIFICE RUN
TRC 106-1	EXIST. Nº 2 CHLORINATOR TEMP. CONTROLLER	P	EXIST.	—	LO TEMP. ALARM
FRC 106-2	EXIST. Nº 2 CHLORINATOR Cl_2 FLOW CONTROLLER	P	EXIST.	—	HI TEMP. ALARM / INTERLOCK
TRC 107-1	EXIST. Nº 3 CHLORINATOR TEMP. CONTROLLER	P	EXIST.	—	LO TEMP. ALARM
FRC 107-2	EXIST. Nº 3 CHLORINATOR Cl_2 FLOW CONTROLLER	P	EXIST.	—	HI TEMP ALARM / INTERLOCK
DRC 107-3	EXIST. Nº 3 CHLORINATOR DENSITY CONTROLLER	P	—	—	RESETS FRC 107-2
LCA 107-4	EXIST. Nº 3 CHLORINATOR LEVEL CONTROLLER	F	1½"	STL.	HI-LO ALARM

MONS 057694

CENTRAL ENGINEERING DEPARTMENT

INSTRUMENT SUMMARY

APPENDIX F-8

PROJ/DEPT MCS-1016 CEA NO. 2417 AREA NO. 1

PLANT WGR DIVISION ORGANIC BY A.J. HEINZE

DATE 12/17/70 SHEET ___ OF ___

PHASE 2

INST. NO	SERVICE	LOC.	VALVE SIZE	VALVE MAT'L	REMARKS
LI 340-1	1221 STORAGE TANK LEVEL INDICATOR	F	–	–	VAREC FIG. 2500
PCV 340-2	1221 STORAGE STEAM PRESSURE REDUCER	F	1"	C.I.	FISHER FIG. 95 H
PCV 340-3	1221 STORAGE N_2 INLET REGULATOR	F	1½"	IRON	FISHER 750 B-21
PCV 340-4	1221 STORAGE N_2 OUTLET REGULATOR	F	2"	C.I.	FISHER 66-R
TG 340-5	1221 STORAGE TANK TEMP. INDICATOR	F	–	–	THERMOMETER & WELL
PG 340-6	1221 STORAGE STEAM PRESS. GAGE	F	–	–	ASHCROFT 1020 A
PG 342-1	1221 STORAGE PUMP PRESS. GAGE	F	–	–	ASHCROFT 1020 R
LI 343-1	1242 STORAGE TANK LEVEL INDICATOR	F	–	–	SAME AS LI 340-1
PCV 343-2	1242 STORAGE STEAM PRESS. REDUCER	F	1"	C.I.	SAME AS PCV 340-2
PCV 343-3	1242 STORAGE N_2 INLET REGULATOR	F	1½"	IRON	SAME AS PCV 340-3
PCV 343-4	1242 STORAGE N_2 OUTLET REGULATOR	F	2"	C.I.	SAME AS PCV 340-4
TG 343-5	1242 STORAGE TANK TEMP. INDICATOR	F	–	–	SAME AS TG 340-5
PG 343-6	1242 STORAGE STEAM PRESS. GAGE	F	–	–	SAME AS PG 340-6
PG 345-1	1242 STORAGE PUMP PRESS. GAGE	F	–	–	SAME AS PG 342-1

CENTRAL ENGINEERING DEPARTMENT

INSTRUMENT SUMMARY

PROJ/DEPT MCS-1016 PLANT WGK DIVISION ORGANIC

APPENDIX F-9
CEA NO. 2417 AREA NO. 1
BY A.V. HEINZE
DATE 12/11/70 SHEET ___ OF ___

PHASE 2

INST. Nº	SERVICE	LOC	VALVE SIZE	VALVE MAT'L	REMARKS
LCA 346-1	Nº 2 BLOW TANK LEVEL CONTROLLER	F	1"	316 ss	Hi-Lo ALARM - TRANSMITTER
PG 346-2 † PG 346-6	Nº 2 BLOW TANK PRESS. GAGES ON VARIOUS AIR INLET LINES	F	-	-	ASHCROFT 1020 A
TG 346-7	Nº 2 BLOW TANK TEMP. GAGE	F	-	-	ASHCROFT 50-6360 1½. WELL
CO 346-8	Nº 2 BLOW TANK CIRC. LINE CONTROL ORIFICE	F	-	-	DANIEL # 520
PG 347-1	Nº 2 BLOW TANK PUMP PRESS. GAGE	F	-	-	ASHCROFT 1020 A w/ CHEM. SEAL
FRC 348-1	AROCLOR 1242 ABSORBER FLOW CONTROLLER	P	1"	316 ss	Lo FLOW ALARM - TRANSMITTER - ORIFICE RUN
TIC 348-2	1242 ABSORBER TEMP. CONTROLLER	F	1"	C.I.	SENSES ABSORBER OUTLET STREAM
PCV 348-3	1242 ABSORBER STEAM PRESS. REGULATOR	F	1"	C.I.	FISHER 95 H
RD 348-4	1242 ABSORBER RUPTURE DISC	F	-	-	2" BS & B 150# ASA
PG 348-5	1242 ABSORBER OUTLET PRESS. GAGE	F	-	-	ASHCROFT 1020 A
PG 349-1	1242 POLISH FILTER OUTLET PRESS. GAGE	F	-	-	ASHCROFT 1020 S
AE 349-2	AROCLOR 1242 POWER FACTOR ANALYZER	P	-	-	Hi P.F. ALARM - TRANSDUCER - P.F. RECORDER
PG 350-1	1242 ABSORBER PUMP PRESS. GAGE	F	-	-	ASHCROFT 1020 S
CO 350-2	1242 ABSORBER PUMP CONTROL ORIFICE	F	-	-	DANIEL # 520

MONS 057696

Appendix G

Scope of Work

01 - Equipment Items

Refer to the Equipment Information Summary Sheets, Appendix B. (3 sheets)

02 - Instrument Items

A new 2 foot control panel is required using pneumatic type instrumentation. As much of the existing reboiler heater burner control system as practical will be used. Refer to the Instrument Index, Appendix F.

Add new flame safety panels.

03 - Setting and Testing Equipment

No unusual difficulties are anticipated. It should be noted, however, that the new fractionator and auxiliary equipment will be erected inside Dept. 246 battery limits and that "tight" conditions will exist as far as the mobility of construction equipment (crane, pile driver, etc.) is concerned.

Refer to the Preliminary Equipment Layout, Appendix D.

04 - Setting and Testing Instruments

No unusual circumstances are anticipated.

05 - Piling

The following equipment will be supported by pre-formed, concrete piles.

Item No.	Description	No. Piles	Length, Ft.
1-301 1-305 1-312 1-328	MCS-1016 Fractionator Column Still Pot Residue Surge Tank Light Ends Receiver	58	26
1-329	Intermediate Surge Tank	6	26
1-307	Column Reboiler	8	26
1-314	MCS-1016 Storage Tank	7	26
1-340	Aroclor 1221 Storage Tank	7	26
1-343	Aroclor 1242 Storage Tank	7	26
	Total	93	

06 - Excavation

The following excavation and backfill volumes will be required:

Item No.	Description	Cu. Yds. Excavation	Cu. Yds. Backfill
1-301	MCS-1016 Fractionator	43.0	5.0
1-305	Column Still Pot	20.0	12.0
1-307	Column Reboiler	6.5	4.0
1-312	Residue Surge Tank	10.0	6.0
1-314	#6 MCS-1016 Storage Tk.	10.0	6.0
1-328	Light Ends Receiver	5.0	3.0
1-329	Intermediate Surge Tk.	10.0	6.0
1-340	Aroclor 1242 Storage Tk.	10.0	6.0
1-343	Aroclor 1221 Storage Tk.	10.0	6.0
1-346	#2 Blow Tank	2.5	0.5
Pipe Supports and Miscellaneous		7.5	3.5
	Totals	134.0	58.0

Allowance should be made for costs involved in removal of unforeseen underground obstructions.

07 - Founcations

The following volume of concrete will be required:

Item No.	Description	Concrete Cu. Yds.
1-301	Fractionator	42.7
1-305	Column Still Pot	15.0
1-307	Column Reboiler	6.0
1-312	Residue Surge Tank	6.8
1-314	#6 MCS-1016 Storage Tank	11.0
1-328	Light Ends Receiver	4.0
1-329	Intermediate Surge Tank	10.0
1-340	Aroclor 1242 Storage Tank	11.0
1-343	Aroclor 1221 Storage Tank	11.0
1-346	#2 Blow Tank	2.0
Miscellaneous Pipe Supports		2.5
Process Area Paving and Curbs		65.0
	Total	187.0

08 - Supports, Platforms and Structures

Steel requirements are as follows:

a)	Saddles for Items 1-305 and 1-312	10 tons
b)	Tank Platforms	7 tons
c)	Ladders and Stairways	40 feet
d)	Handrail and Tooplate	250 feet
e)	Pipe Supports and Brackets	2 tons

All steel to be hot-dipped galvanized.

09 - Other Building Items

None required.

10 - Sprinklers and Fire Protection

No automatic sprinkler protection is required for the new equipment. The existing fire hydrant protection in Dept. 246 is considered adequate for the expanded department.

11 - Piping

Piping requirements for this project include piping and valves for new process and utility requirements, plus piping revision work around existing equipment.

a) Carbon Steel piping and valves required for new process and utility services follows. (List does not include small steam trap piping or valves.)

Size Inches	Total Length, Ft.	Pipe Spec.	No. Valves
24	60	F41	None
8	140	F41	5-Gate
6	400	F41	3-Gate; 2-Butterfly
4	110	F11	5-Plug
3	475	F11	2-Gate; 8-Plug
2	760	F11	26-Plug
1½	350	F11	4-Plug; 11-Gate

b) Aluminum piping and valves required for new process services follows:

Size Inches	Total Length, Ft.	Pipe Spec.	No. Valves
4	120	A11	3-Plug
3	520	A11	16-Plug
2	830	A11	9-Plug

c) New fume scrubber piping includes 30 feet each of 8" and 12" Furan piping, plus 40feet of 12" Saran lined steel pipe.

(The following piping revisions and additions are needed to attain the intermediate product capacity in Dept. 246 required for this project.)

d) Revise piping around existing blow tank and intermediate storage tank: 50 feet of 2" F11 pipe, traced and insulate.

e) Revise piping around absorbers 532 (Aroclor 1242) and 540 (Aroclor 1254): 25 feet of 1½" A-11 pipe, trace and insulate. Also requires new Flow controller and automatic control valve.

11 - Piping (cont'd)

f) Revise piping around 534 and 542 Product Tanks: 30 feet of 1½" A11 pipe, trace and insulate.

g) Install "high boiler" line to biphenyl head tank for batch chlorinators: 100 feet of 2" F11 pipe, trace and insulate.

h) Modify 3 batch chlorinators to make a new continuous line: the following are needed:

1) 130 feet of 1½" F11 pipe + 3 plug valves.
2) 40 feet of 2" G11 pipe + 2 plug valves.
3) 20 feet of 4" F11 pipe; trace and insulate all pipe.

In addition to the above piping, also required is a new Densitrol density controller, a new level controller and automatic control valve.

i) Install new "condensate" line from 429 storage to #7 chlorinator: 20 feet of 1½" F11 pipe + 2 plug valves; trace and insulate pipe.

j) Install line from #2 Blend Tank to #2 Receiving Pump: 30 feet of 3" F11 pipe + 1 Plug Valve; trace and insulate.

k) Install new overflow line from 103 head tank to 143 Bland Tank: 250 feet of 3" F11 pipe; trace and insulate.

Liberal allowance should be made for tubing for steam tracing; the majority of the above process piping will be steam traced. A liberal number of steam trap assemblies should also be included.

One steam-water-air hose station is included.

Allowance should be made for the installation of approximately 10 automatic control valves.

l) Install 2 - 316 S.S. mixing eductors per tank (S&K type 258 or equivalent) - total of 12 - in each MCS-1016 storage tank to assure adequate mixing of product for each column.

12 - Ductwork

None required.

13 - Electrical

The electrical classification to which the electrical systems apply is water-tight.

The lighting requirements for the new process area are 20 - 175 watt mercury vapor fixtures. The lighting requirements for the new storage tank are 2 - 400 watt mercury vapor fixtures.

Electrical power will be supplied from circuit No. 3 at the No. 8 substation. 200 feet of 500 MCM cable will be installed (rings and saddles) from No. 3 circuit at the NE corner of Bldg. CT to the existing MCC building.

A lighting transformer and small lighting panel will be required for the low voltage lighting.

The new motor control center shall be installed in the existing MCC building. The new MCC shall consist of 4 vertical NEMA 1 front-mounting sections. New starters are required for motors as indicated:

Item No.	Description	HP	Remote P.B.	Inter-Lock
1-306-001	Still Circ. Pump Motor	30	yes	yes
1-325-001	Tempered Water Pump Motor	20	yes	no
1-311-001	Residue Pump Motor	7½	no	no
1-315-001	Storage Tank Pump Motor	25	no	no
1-317-001	Fuel Oil Pump Motor	1½	yes	yes
1-330-001	Inter. Surge Pump Motor	20	yes	yes
1-331-001	Light Ends Pump Motor	20	no	no
1-320-002	Slurry Agitator Motor	5	no	no
1-342-001	Storage Tank Pump Motor	25	no	no
1-345-001	Storage Tank Pump Motor	25	no	no
1-347-001	Blow Tank Pump Motor	5	yes	no
1-350-001	Absorber Pump	15	yes	no

A new 15-point annunciator panel is also included.

14 - Site Preparation

None required.

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15 - Sewers - Drains and Plumbing

The new process equipment will be installed within the Dept. 246 battery limits in an area approximately 40 feet wide and 80 feet long.

A sewer trench approximately 50 feet long will be installed running north-south down the center of the new area which will be paved and curbed. A section of trench approximately 20 feet long will run north from the north-south trench. A vitrified clay sewer will run from the north end of this trench to a settling basin to be provided on a plant project.

16 - Underground Mains

None required.

17 - Yards, Roads and Fencing

The area in the existing tank farm where the new product storage tanks are to be set will be paved and provided with a curb.

Estimated concrete required - 10 cu.yds.
Estimated excavation required - 20 cu.yds.
Estimated backfill required - 3 cu.yds.

18 - Railroads

None required.

19 - Insulation

The thermal insulation system for elevated temperatures will be calcium silicate, Spec. 100. For insulated piping, asbestos felt jacketing (Spec. 50) will be used. For insulated vessels, PVC-coated steel jacketing (Spec. 26) will be used.

Approximately 75% of the steel and aluminum piping shown under Code 11 (Piping) will be insulated.

The new equipment to be insulated is as follows:

Item No.	Description	Spec.	Surface Sq.Ft.
1-301-000	Column	-	450*
1-302-000	Col. Condenser	-	Exist. Insul.
1-305-000	Still Pot	3½"-100-26	1500
1-325-000	Tempered Water Pump	1"-100-15	5
1-312-000	Residue Surge Tank	3½"-100-26	790
1-314-000	Prod. Storage Tank	2"-100-26	940
1-315-000	Storage Pump	1"-100-15	5
1-330-000	Intermediate Surge Pump	1"-100-15	5
1-320-000	Lime Slurry Tank	1½"-100-26	90
1-331-000	Light Ends Pump	1"-100-15	5
1-324-000	Vent Condenser	1"-100-26	30
1-329-000	Intermediate Surge Tank	2"-100-26	1100
1-328-000	Light Ends Receiver	2"-100-26	500
1-340-000	Storage Tank	2"-100-26	940
1-342-000	Storage Pump	1"-100-15	5
1-343-000	Storage Tank	2"-100-26	940
1-345-000	Storage Pump	1"-100-15	5
1-346-000	Blow Tank	2"-100-26	160
1-347-000	Blow Tank Pump	1"-100-15	5
1-348-000	Absorber	2"-100-26	170
1-350-000	Absorber Pump	1"-100-15	5
Existing #7	Storage Tank	2"-100-26	940

*Insulation for new straight wall section added; see Code 92 for insulation repairs to Items 301 and 302.

19 - Insulation (cont'd)

Allowance should be made for instrument metering applications. Insulation will also be required on steam and condensate lines of steam trap assemblies.

20 - Painting

The following protective coatings are to be provided, using the W.G.K. local interest standards as a guide:

Pump bases (11 total)	Coal Tar Epoxy	Kl.3 Std 601
Still Pot, 1-305	Inorg. Zinc	Kl.3 Std 1320
Residue Surge Tank, 1-312	Inorg. Zinc	Kl.3 Std 1320
Fuel Oil Stg. Tank, 1-316	Inorg. Zinc	Kl.3 Std 1300
Vent Condenser, 1-324	Inorg. Zinc	Kl.3 Std 1300
Lime Slurry Tank, 1-320	Inorg. Zinc	Kl.3 Std 1300
Inter. Storage Tank, 1-329	Inorg. Zinc	Kl.3 Std 1320
Light Ends Receiver, 1-328	Inorg. Zinc	Kl.3 Std 1320
Blow Tank, 1-347	Inorg. Zinc	Kl.3 Std 1320
Absorber, 1-348	Inorg. Zinc	Kl.3 Std 1320

Equipment items such as pumps, motors, speed reducers, etc., will be painted by manufacturer using mfg. std. paint system. All piping 3" and above (uninsulated) shall be painted.

21 - Walls, Masonry, Roofs and Roofing

None required.

22 - Spares

None required.

90 - Dismantling

The following equipment items will be dismantled at the Chocolate Bayou plant for transfer to the W.G.K. plant for use on this project:

a) Item 1-301 Fractionating Column and Skirt
Note: The column condenser supporting structure, 24" aluminum overhead vapor duct plus all ladders, catwalks and platforms are to be relocated with the column for reuse at W.G.K.

b) Item 302 Column Condenser

c) Item 1-306 Still Circulating Pump

The following equipment will be dismantled at the W.G.K. plant for use on this project:

a) Item 1-325 Tempered Water Pump

b) Item 1-329 Intermediate Surge Tank

c) Item 1-330 Intermediate Surge Pump

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90 - Dismantling (cont'd)

(Refer to the equipment information summary sheets - Appendix B - for equipment sizes.)

Dismantle approximately 2 feet of the existing Dept. 246 (old) control panel to make room for the new panel.

92 - Repairs Expense

Repair Item 306, Still Pot Circulating Pump.

Allowance should be made for repairs to the column (1-301) and condenser (1-302) insofar as insulation is concerned. It is anticipated that part of the insulation on these items will be damaged during the dismantling procedure. Also repair existing controls for reboiler furnace.

93 - Relocation and Modification Expense

The following equipment modifications and relocations are included:

a) Install 1 new overflow nozzle on existing biphenyl head tank to accommodate a larger "high boiler" charge volume to the batch chlorinator.

b) Install 4 new nozzles (1 on #1, 2 on #2 and 1 on #3 chlorinator) on the batch chlorinators to accommodate the new "continuous line" piping additions.

c) Install blanking strips on approximately 18 of the existing 25 sieve trays in fractionator 1-301. This is required to prevent these trays from weeping at the anticipated column operating conditions.

d) Relocate the existing hydrogen lines around the new reboiler furnace: 150 feet of 6" - F41 pipe for the low pressure line; 150 feet of 1" - F62 pipe for the high pressure line.

e) Break out approximately 500 ft^2 of old concrete pad to make room for foundations in the new process area.

f) Install larger impeller and motor on existing CW pump.