

PLAINTIFF'S
EXHIBIT

UC-P-130

PART IX - ADDITIONS TO UNIT SERVICES

POLYETHYLENE UNIT - PLANT 510

PROJECT 64-12

930-6548

Poly²

PORT LAVACA, TEXAS

NOVEMBER 10, 1964

017445

UNION CARBIDE CHEMICALS COMPANY		SHOP ORDER TRANSMITTAL		DATE 11-10-64	SHEET 1 of 1
PROJECT 930-6548 - Part IX - Additions to Unit Services LOCATION Poly "A" Expansion		MAJOR SUBJECT Design Report		TRANSMITTAL NO.	
ISSUED FOR					
DISTRIBUTION		TRANSMITTAL		ATTACHMENTS	
J. F. Tamborello		2		3	
D. F. Peyton		1		1	
T. D. Adkison		1		1	
D. L. Buchanan		1		1	
J. H. Wieting		1		1	
Brown & Root - See Note		1		5	
J. M. McBride		1		2	
R. G. Ziefle		1		1	
L. Wiley		1		1	
T. Rogstad		1		1	
J. J. Walthall		1		1	
G. L. Funk	SHOP ORDER	ISSUE	B.M. NO.	DESCRIPTION	
DRAWING NUMBER					
SK-80517	930-6548			Design Report - High Pressure Polyethylene Plant No. 1 Expansion - Seadrift Plant - Part IX - Additions to Unit Services	
SK-80523				Flow Sheet	
				Flow Sheet	
as either a copy of the trans. & submit to the design department as follows copy #1 File 0.13 " #2 R. C. Johnson " #3 H. J. Lee " #4 B. E. Houghton					
REMARKS					
Please acknowledge receipt by signing copy of transmittal and returning to Jo Ann Goldman.					
J. F. Tamborello					
ISSUED BY					

017446

UNION CARBIDE CHEMICALS COMPANY		SHOP ORDER TRANSMITTAL		DATE 12-2-64	SHEET 1 of 1
OBJECT 930-6548 - Part IX - Additions to Unit Services LOCATION Poly "A" Expansion		MAJOR SUBJECT Design Report Addendum ISSUED FOR See Remarks		TRANSMITTAL NO.	

DISTRIBUTION	TRANSMITTAL	ATTACHMENTS
J. F. Tamborello	2	3
D. F. Peyton	1	1
D. Adkison	1	1
D. L. Buchanan	1	1
J. H. Wieting	1	1
Brown & Root - See Note	1	5
J. M. McBride	1	2
R. G. Zieffle	1	1
L. Wiley	1	1
T. Rogstad	1	1
J. J. Walthall	1	1
G. L. Funk	1	1

DRAWING NUMBER	SHOP ORDER	ISSUE	B.M. NO.	DESCRIPTION	
	930-6548	2		Design Report - High Pressure Polyethylene Plant No. 1 Expansion - Seadrift Plant - Part IX - Additions to Unit Services Job IV Page 7 - Instrument Sketch 510-6548E-902	

E. L. McEver:

Please acknowledge receipt by returning signed copy of transmittal to
Jo Ann.

I will let you know whether or not Part IV is to be done by us.

Marina:
Please attach copies of this transmittal to
distributors as follows:

- 1 - R. O. [unclear]
- 2 - Bill [unclear]
- 3 - H. [unclear]
- 4 - D. [unclear]
- 5 - [unclear] (File Copy)

RECEIVED
 DEC 7 1964
 BY _____

REMARKS:

Please replace Page 1 and add Page 6a to the Design Report -
 High Pressure Polyethylene Plant No. 1 Expansion - Seadrift
 Part IX - Addition to Unit Services. Also replace page 7.

017447

J. F. Tamborello

ISSUED BY

Design Report
High Pressure Polyethylene
Plant No. 1 Expansion
Seadrift Plant

Part IX - Additions to Unit Services

930-6548

Foreword

This section of the design report describes miscellaneous additions to unit services required in support of the polyethylene plant expansion. Unit services additions are to be issued with individual job numbers and added to this report as needs arise. This report initially contains.

- Job I - Addition of Dowtherm Pump Cooling Water System
- Job II - Revisions to North Reactor Panel Board
- Job III - Air Conditioning of Reactor Console Area Bldg. 102
- Job IV - Rearrange No. 3 Reciprocating Primary Pump Piping

017448

Job IV

Rearrange No. 3 Reciprocating Primary Pump Piping
Sketch None

The existing reciprocating primary pumps Items 6036E-201 thru 203 are connected to ethylene inlet piping and intensifier suction piping in such a manner that pumps labeled 1 and 2 serve as spare primary pumps for the No. 1 plant and pump No. 3 serves as an isolated spare for the No. 2 plant. In this arrangement, production is curtailed when either primary pump 4 or 5 is out of service for repair because the capacities of the replacement reciprocating pump so piped is inadequate.

The purpose of this rearrangement of reciprocating primary pump piping is to connect the pump in parallel so that they operate together as an effective spare for either pump 4 or 5.

This is a rearrangement of existing piping and all work to complete the job should be charged to 03711-9-26993.

1. Disconnect and blank the connection of No. 3 reciprocating primary pump to the No. 2 plant suction header 3" 6256-P-101. Reconnect No. 3 reciprocating primary pump suction to blanked off connection in No. 1 plant suction header 4" 6034-P-101.
2. Disconnect and blank the connection of No. 3 reciprocating primary pump to the No. 2 plant primary pump discharge header 3" 6256 P-102. Reconnect No. 3 reciprocating pump discharge to blanked off connection in the No. 1 plant primary pump discharge header 6036 3" P-225.
3. Rearrangement of primary pump suction line should conform to piping specification No. 155.
4. Rearrangement of primary pump discharge piping should conform to piping specification No. 158.
5. The existing extensions of the No. 3 reciprocating primary pump piping to the No. 2 plant piping are sufficiently long to be reusable as material to reconnect the pump to No. 1 plant header. Plans should be made to complete the necessary pipe revisions during the all plant shutdown which will be required as part of Project 64-12.

017449

[illegible]

- 1.) MOVE N₂, CYCLE H₂O, 15 # STEAM INSTRUMENTS TO SOUTH PANEL IN FRONT OF NO. 4 CELL OUTSIDE AIR CONDITIONING.
- 2.) PANELS DESIGNATED BY "I" WILL BE LEFT AS IS.
- 3.) PANELS DESIGNATED BY "II" WILL BE EMPTIED FOR CONSTRUCTION'S USE PRIOR TO 1-15-65 BY UCC.
- 4.) INSTRUMENTS SHOWN IN PANELS DESIGNATED BY "III" TO BE HANDLED BY UCC ENGINEERING.
- 5.) ROOM MUST BE LEFT ABOVE THE EXISTING MASTER PANEL NO. 1 (SEE DWG. 510-BL102-6.12 - 272-1) FOR AN ADDITIONAL ALARM ANNUNCIATOR.

UCC - PLANT 510
INSTRUMENT ENGINEERING DEPARTMENT
W.O. NO. 930-6548 - ADDITIONAL
TO UNIT SERVICES - NORTH
P.B. INSTRUMENT LOCATIONS
UNIT POLY "A" BLDG. 102
BY R.M. DATE 12-2-64
CKD BUCK DATE 12-2-64
APPD *WAW* DATE 12/2/64
SHEET NO. 1 OF 1
SK 510-6548E-902

UNION CARBIDE CHEMICALS COMPANY		SHOP ORDER TRANSMITTAL		DATE 11-10-64	SHEET 1 of 1
PROJECT 930-6548 - Part IX - Additions to Unit Services LOCATION Poly "A" Expansion		MAJOR SUBJECT Design Report ISSUED FOR		TRANSMITTAL NO.	
DISTRIBUTION		TRANSMITTAL		ATTACHMENTS	
J. F. Tamborello		2		3	
D. F. Peyton		1		1	
D. Adkison		1		1	
D. L. Buchanan		1		1	
J. H. Wieting		1		1	
Brown & Root - See Note		1		5	
J. M. McBride		1		2	
R. G. Ziefle		1		1	
L. Wiley		1		1	
L. Rogstad		1		1	
J. J. Walthall		1		1	
G. L. Funk	SHOP ORDER	ISSUE	B.M. NO.	DESCRIPTION	1
DRAWING NUMBER					
SK-80517	930-6548			Design Report - High Pressure Polyethylene Plant No. 1 Expansion - Seadrift Plant - Part IX - Additions to Unit Services	
SK-80523				Flow Sheet	
				Flow Sheet	
<i>Man:</i> Please attach 4 copies of this trans. & distribute w/ design reports as follows copy #1 File 0.13 " #2 R. C. Thomsen " #3 R. G. Ziefle " #4 Ball & Lee " #5 J. E. Houghton					
REMARKS:					
Please acknowledge receipt by signing copy of transmittal and returning to Jo Ann Goldman.					
017451					
J. F. Tamborello					
ISSUED BY					

UNION CARBIDE CHEMICALS COMPANY		SHOP ORDER TRANSMITTAL		DATE 12-2-64	SHEET 1 of 1
PROJECT 930-6548 - Part IX - Additions to Unit Services LOCATION Poly "A" Expansion		MAJOR SUBJECT Design Report Addendum ISSUED FOR See Remarks		TRANSMITTAL NO.	
DISTRIBUTION		TRANSMITTAL		ATTACHMENTS	
J. F. Tamborello		2		3	
D. F. Peyton		1		1	
D. Adkison		1		1	
D. L. Buchanan		1		1	
J. H. Wieting		1		1	
Brown & Root - See Note		1		5	
J. M. McBride		1		2	
R. G. Ziefle		1		1	
L. Wiley		1		1	
T. Rogstad		1		1	
J. J. Walthall		1		1	
G. L. Funk		1		1	
DRAWING NUMBER	SHOP ORDER	ISSUE	B.M. NO.	DESCRIPTION	
	930-6548	2		Design Report - High Pressure Polyethylene Plant No. 1 Expansion - Seadrift Plant - Part IX - Additions to Unit Services Job IV Page 7 - Instrument Sketch 510-6548E-902	
E. L. McEver: Please acknowledge receipt by returning signed copy of transmittal to Jo Ann.					

MARKS:

Please replace Page 1 and add Page 6a to the Design Report -
 High Pressure Polyethylene Plant No. 1 Expansion - Seadrift
 Part IX - Addition to Unit Services. Also replace page 7.

017452

J. F. Tamborello

Design Report
High Pressure Polyethylene
Plant No. 1 Expansion
Seadrift Plant

Part IX - Additions to Unit Services

930-6548

Foreword

This section of the design report describes miscellaneous additions to unit services required in support of the polyethylene plant expansion. Unit services additions are to be issued with individual job numbers and added to this report as needs arise. This report initially contains.

- Job I - Addition of Dowtherm Pump Cooling Water System
- Job II - Revisions to North Reactor Panel Board
- Job III - Air Conditioning of Reactor Console Area Bldg. 102

UNION CARBIDE CHEMICALS COMPANY		SHOP ORDER TRANSMITTAL		DATE 12-2-64	SHEET 1 of 1
OBJECT 930-6548 - Part IX - Additions to Unit Services LOCATION Poly "A" Expansion		MAJOR SUBJECT Design Report Addendum ISSUED FOR See Remarks		TRANSMITTAL NO.	

DISTRIBUTION	TRANSMITTAL	ATTACHMENTS
J. F. Tamborello	2	3
D. F. Peyton	1	1
D. Adkison	1	1
D. L. Buchanan	1	1
J. H. Wieting	1	1
Brown & Root - See Note	1	5
J. M. McBride	1	2
R. G. Ziefle	1	1
L. Wiley	1	1
T. Rogstad	1	1
J. J. Waltheall	1	1
G. L. Funk	1	1

DRAWING NUMBER	SHOP ORDER	ISSUE	B.M. NO.	DESCRIPTION
	930-6548	2		Design Report - High Pressure Polyethylene Plant No. 1 Expansion - Seadrift Plant - Part IX - Additions to Unit Services Job IV Page 7 - Instrument Sketch 510-6548E-902

E. L. McEver:

Please acknowledge receipt by returning signed copy of transmittal to
Jo Ann.

Maria:
 Please obtain 4 copies of this transmittal and
 distribute as follows:
 1- R. O. Ziefle
 2- Bill Lee
 3- H. L. Wieting
 4- Don E. Wieting
 5- Robert E. Wieting (File Copy)

*I will let you know whether
or not Part IX is to be done by me.*
 E. L.

RECEIVED
 DEC 7 1964
 BY _____

REMARKS:

Please replace Page 1 and add Page 6a to the Design Report -
 High Pressure Polyethylene Plant No. 1 Expansion - Seadrift
 Part IX - Addition to Unit Services. Also replace page 7.

017454

J. F. Tamborello

ISSUED BY

Design Report
High Pressure Polyethylene
Plant No. 1 Expansion
Seadrift Plant

Part IX - Additions to Unit Services

930-6548

Foreword

This section of the design report describes miscellaneous additions to unit services required in support of the polyethylene plant expansion. Unit services additions are to be issued with individual job numbers and added to this report as needs arise. This report initially contains.

- Job I - Addition of Dowtherm Pump Cooling Water System
- Job II - Revisions to North Reactor Panel Board
- Job III - Air Conditioning of Reactor Console Area Bldg. 102
- Job IV - Rearrange No. 3 Reciprocating Primary Pump Piping

017455

Job IV

Rearrange No. 3 Reciprocating Primary Pump Piping
Sketch None

The existing reciprocating primary pumps Items 6036E-201 thru 203 are connected to ethylene inlet piping and intensifier suction piping in such a manner that pumps labeled 1 and 2 serve as spare primary pumps for the No. 1 plant and pump No. 3 serves as an isolated spare for the No. 2 plant. In this arrangement, production is curtailed when either primary pump 4 or 5 is out of service for repair because the capacities of the replacement reciprocating pump so piped is inadequate.

The purpose of this rearrangement of reciprocating primary pump piping is to connect the pump in parallel so that they operate together as an effective spare for either pump 4 or 5.

This is a rearrangement of existing piping and all work to complete the job should be charged to 03711-9-26993.

1. Disconnect and blank the connection of No. 3 reciprocating primary pump to the No. 2 plant suction header 3" 6256-P-101. Reconnect No. 3 reciprocating primary pump suction to blanked off connection in No. 1 plant suction header 4" 6034-P-101.
2. Disconnect and blank the connection of No. 3 reciprocating primary pump to the No. 2 plant primary pump discharge header 3" 6256 P-102. Reconnect No. 3 reciprocating pump discharge to blanked off connection in the No. 1 plant primary pump discharge header 6036 3" P-225.
3. Rearrangement of primary pump suction line should conform to piping specification No. 155.
4. Rearrangement of primary pump discharge piping should conform to piping specification No. 158.
5. The existing extensions of the No. 3 reciprocating primary pump piping to the No. 2 plant piping are sufficiently long to be reusable as material to reconnect the pump to No. 1 plant header. Plans should be made to complete the necessary pipe revisions during the all plant shutdown which will be required as part of Project 64-12.

017456

[illegible]

- 1.) MOVE N2, CYCLE H2O, 15 * STEAM INSTRUMENTS TO SOUTH PANEL IN FRONT OF NO. 4 CELL OUTSIDE AIR CONDITIONING.
- 2.) PANELS DESIGNATED BY "I" WILL BE LEFT AS IS.
- 3.) PANELS DESIGNATED BY "II" WILL BE EMPTIED FOR CONSTRUCTION'S USE PRIOR TO 1-15-65 BY UCC.
- 4.) INSTRUMENTS SHOWN IN PANELS DESIGNATED BY "III" TO BE HANDLED BY UCC ENGINEERING.
- 5.) ROOM MUST BE LEFT ABOVE THE EXISTING MASTER PANEL NO. 1 (SEE DWG. 510-BL102-6.12 - 272-1) FOR AN ADDITIONAL ALARM ANNUNCIATOR.

UCC - PLANT 310
INSTRUMENT ENGINEERING DEPARTMENT
W.O. NO. 930-6540 - ADDITIONS
TO UNIT SERVICES - NORTH
P.B. INSTRUMENT LOCATIONS
UNIT POLY "A"
BY R.M.
CRD BUSE
APPRO *Waw*
SHEET NO. 1 OF 1
SK 510-6540E-907

017457

DESIGN REPORT
HIGH PRESSURE POLYETHYLENE
PLANT NO. 1 EXPANSION
SEADRIFT PLANT

PART IX - ADDITIONS TO UNIT SERVICES

930-6548

Written by: J. F. Tamborello

ENGINEERING DEPARTMENT
UNION CARBIDE CHEMICALS DIVISION
PORT LAVACA, TEXAS

NOVEMBER 10, 1964

017458

Design Report
High Pressure Polyethylene
Plant No. 1 Expansion
Seadrift Plant

Part IX - Additions to Unit Services

930-6548

Foreword

This section of the design report describes miscellaneous additions to unit services required in support of the polyethylene plant expansion. Unit services additions are to be issued with individual job numbers and added to this report as needs arise. This report initially contains.

- Job I - Addition of Dowtherm Pump Cooling Water System
- Job II - Revisions to North Reactor Panel Board
- Job III - Air Conditioning of Reactor Console Area Bldg. 102
- Job IV - Rearrange No. 3 Reciprocating Primary Pump Piping

017459

Job I

Closed Cooling Water Cycle for Dowtherm Pump
Jackets & Bearing Housings

SK-80517

Existing plant cooling water piping servicing Dowtherm pump jacket and bearing housings is too small to handle additional Dowtherm pumps to be added as part of project 64-12. Additional services must be provided.

The closed cooling water system (Job I) will:

1. Provide adequate supply of cooling water to all Dowtherm pumps in Poly "A" area.
2. Eliminate the sewerage of approximately 190 gpm of plant cooling water.
3. Provide a clean, salt free, cooling water avoiding the fouling of pump cooling jackets.

Job Description

- (1) Extend existing No. 1 plant pelletier water cycle header 6047W-907 and pelletier return water header 6041W-764, as shown on sketch with new 4" and 3" piping 6548W-901, 902, 903 and 904.
- (2) Provide ~~1~~ - 1 ~~3/4~~" take off piping from each header 6548W-902 and 903. Use 3 ~~1/2~~" supply and return branch lines ~~from the 3/4" take-off lines~~ to each Dowtherm pump. Provide ~~3/4~~" valves No. 1 on each individual ~~3/4~~" supply and return branch.
- (3) All new piping is to be charged to 930-6548.
- (4) This job should be accomplished in the following sequence:
 - (a) Install header 6548W-902 and all header valves in advance of the plant shut down.
 - (b) With 3" header valve (Y) closed, supply cooling water to new Dowtherm pumps by connecting fire hose to valve and temporarily sewerage the water from the pump.
 - (c) When the final No. 1 plant reactor is shut down the rest of this system as shown can be installed, and placed in service.
 - (d) Connect existing pumps to new cooling water headers as No. 2 plant reactors are shut down for routine purposes.

- (5) Remove and retire headers 6112W-763 and 764 under product room floor. All work done to remove headers is to be charged to 829-34.
- (6) Heat exchangers 6047E-937 and 950 are to be left mounted on existing bases. New system is arranged so that a closed cooling water circuit is provided for Dowtherm pumps, utilizing pump 6047E-936A or 936B and one of the existing coolers.

Description of Job II

SK-80523

- (1) Move existing instruments on north panel board, (A), which is adjacent to reactor console to accommodate the following:
 - (a) New panel mounted instrument switches and alarm lights for the return gas system additions on work order 930-6545.
 - (b) Relocation of instruments on south panel, (B), as described in Job III this report.
 - (c) Relocation of instruments from the Dowtherm instrument panel.
- (2) Provide for future instrument additions which will be required by work order 930-6550.
- (3) The cost to relocate all existing instruments is to be charged to 03711-9-26993.
- (4) See SK 510-6548E-902 for location of new instruments on north panel board.

017462

Job III

Air Condition Reactor Console Area in northeast corner of Building No. 102. (Engineering of Job III is to be handled by the Seadrift Plant Engineering Group.)

SK-80523

Job Description

- (1) Remove 2 instruments labeled "No. 1 Plant Primary Pump Discharge Pressure" and "High Pressure Pump Suction" from instrument panel B shown on SK-80523. Both of these instruments service the same pressure measurement. The former is a recorder and the latter is an indicating on off control actuating an alarm in the event of low pressure.

Combine the functions of both these instruments into one case and relocate the combined instrument to panel board C shown on SK-80523.

See Job II SK-930-6545E-902 for new location on panel board C.

- (2) Remove two existing ventilating fans in east wall of console area and seal off wall to conform with existing architecture. Costs to remove fans and seal off wall opening is to be charged to 829-34. Ventilating fans are to be retired.
- (3) Install new prefabricated insulating type walls shown as "new wall" on SK-80523.
 - (a) Provide 3 access doors in new wall as shown.
 - (b) Provide window in new south wall to view No. 5 reactor pressure gauge.
 - (c) West new wall to be solid to wainscoat height and glassed above wainscoat.
 - (d) New south wall in front of panel board B to block and seal off door C.
- (4) Make ceiling height uniform in area confined by new wall. Ceiling height to conform with existing ceiling height immediately above reactor console. Ceiling to be acoustic type.
- (5) Provide florescent lighting on new ceiling of the type now located above existing reactor console.

017463

- (6) Relocate unit header, conduit, switches and equipment at the direction of unit operating personnel as required to install new walls.
- (7) Air condition the area confined by the new wall to provide temperatures at recognized comfort levels both in winter and in summer.
- (8) All relocation of existing equipment to be charged to 03711-9-26993.
- (9) Cost of all new installations to be charged to 930-6548.
- (10) Air conditioner to take suction of make up air from the north roof east end of Building 102.
- (11) Electric, water and steam services are to be provided. Service requirement will be determined when the air conditioner is sized.

017464

Job IV

Rearrange No. 3 Reciprocating Primary Pump Piping Sketch None

The existing reciprocating primary pumps Items 6036E-201 thru 203 are connected to ethylene inlet piping and intensifier suction piping in such a manner that pumps labeled 1 and 2 serve as spare primary pumps for the No. 1 plant and pump No. 3 serves as an isolated spare for the No. 2 plant. In this arrangement, production is curtailed when either primary pump 4 or 5 is out of service for repair because the capacities of the replacement reciprocating pump so piped is inadequate.

The purpose of this rearrangement of reciprocating primary pump piping is to connect the pump in parallel so that they operate together as an effective spare for either pump 4 or 5.

This is a rearrangement of existing piping and all work to complete the job should be charged to 03711-9-26993.

1. Disconnect and blank the connection of No. 3 reciprocating primary pump to the No. 2 plant suction header 3" 6256-P-101. Reconnect No. 3 reciprocating primary pump suction to blanked off connection in No. 1 plant suction header 4" 6034-P-101.
2. Disconnect and blank the connection of No. 3 reciprocating primary pump to the No. 2 plant primary pump discharge header 3" 6256 P-102. Reconnect No. 3 reciprocating pump discharge to blanked off connection in the No. 1 plant primary pump discharge header 6036 3" P-225.
3. Rearrangement of primary pump suction line should conform to piping specification No. 155.
4. Rearrangement of primary pump discharge piping should conform to piping specification No. 158.
5. The existing extensions of the No. 3 reciprocating primary pump piping to the No. 2 plant piping are sufficiently long to be reusable as material to reconnect the pump to No. 1 plant header. Plans should be made to complete the necessary pipe revisions during the all plant shutdown which will be required as part of Project 64-12.

017465

[illegible]

- 1.) MOVE N2, CYCLE H2O, 15 * STEAM INSTRUMENTS TO SOUTH PANEL IN FRONT OF NO. 4 CELL OUTSIDE AIR CONDITIONING.
- 2.) PANELS DESIGNATED BY "I" WILL BE LEFT AS IS.
- 3.) PANELS DESIGNATED BY "II" WILL BE EMPTIED FOR CONSTRUCTION'S USE PRIOR TO 1-15-65 BY UCC.
- 4.) INSTRUMENTS SHOWN IN PANELS DESIGNATED BY "III" TO BE HANDLED BY UCC ENGINEERING.
- 5.) ROOM MUST BE LEFT ABOVE THE EXISTING MASTER PANEL NO. 1 (SEE DWG. 310-BL102-6.12 - 272-1) FOR AN ADDITIONAL ALARM ANNUNCIATOR.

UCC - PLANT 510
INSTRUMENT ENGINEERING DEPARTMENT
W.O. NO. 930-6548 - ADDITIONS:
TO UNIT SERVICES - NORTH
P.B. INSTRUMENT LOCATIONS
UNIT POLY "A"
BY R.M.
CHKD GUCK
APPRO *Waw*
DATE 12-2-64
DATE 12-2-64
DATE 12-2-64
SHEET NO. 1 OF 1
SK 510-6548E - 902

Line List
(Line Numbers Refer to SK-80517)

All Line Numbers are Preceded by 6548

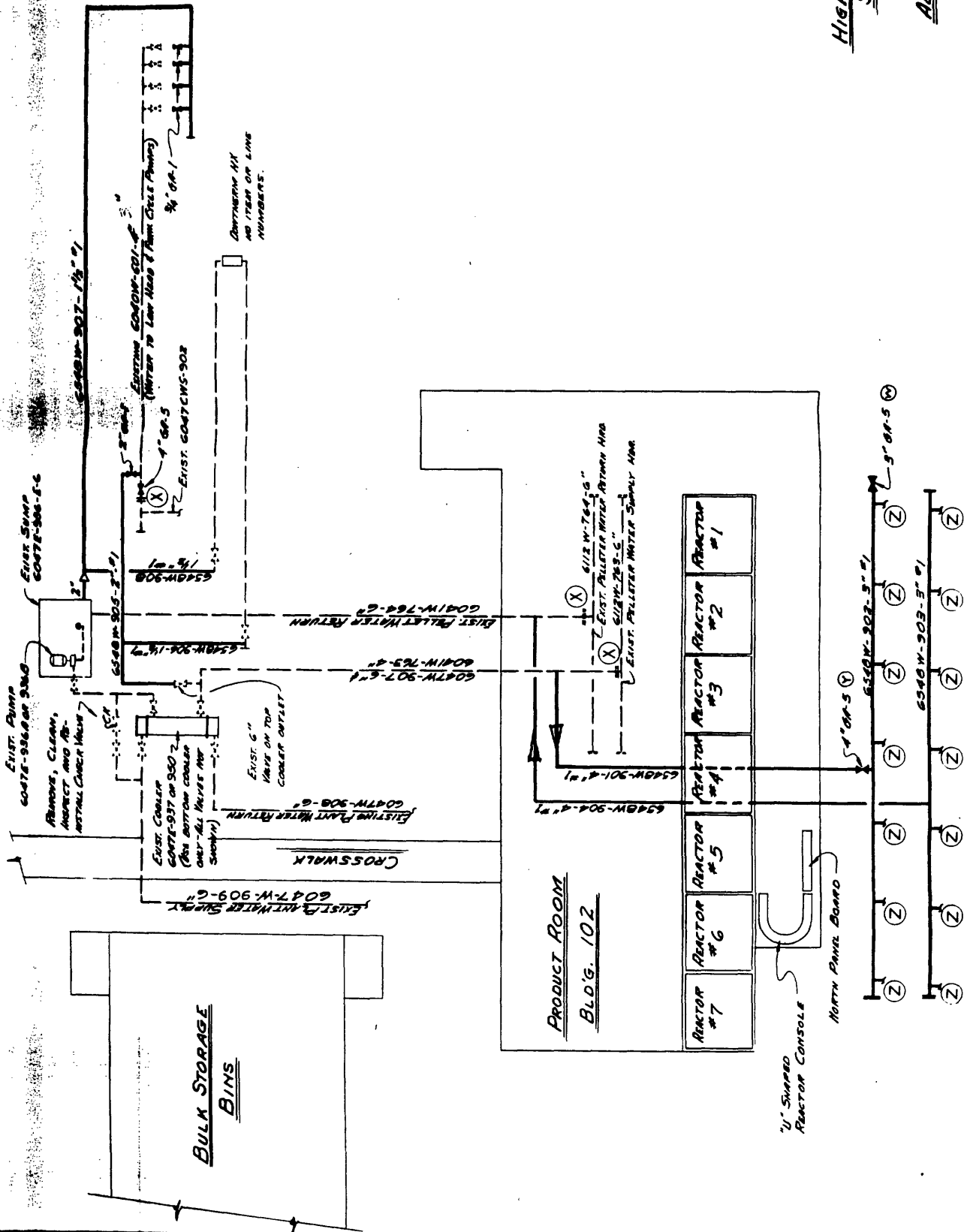
<u>Line No.</u>	<u>Size</u>	<u>Spec.</u>	<u>From</u>	<u>To</u>	<u>Material Handled</u>	<u>Remarks</u>
W-901	4"	1	Exist 6" 6047W-907	W-902	Water	
W-902	3"	1	W-901	Dowtherm Pumps	Water	
W-903	3"	1	Dowtherm Pumps	W-904	Water	
W-904	4"	1	W-903	Existing 6041W-764	Water	
W-905	2"	1	Existing 6047W-907 6"	Exist 6040W-601	Water	
W-906	1 1/2"	1	W-905	Dowtherm Cooler	Water	
W-907	1 1/2"	1	Dowtherm Pumps	Sump 6047E-936	Water	
W-908	1 1/2"	1	Dowtherm Cooler	Sump 6047E-936		

GENERAL NOTES

1. ALL NEW WATER LINES ARE TO BE INSTALLED IN ACCORDANCE WITH STANDARD PLANT REVISED SPECIFICATIONS No. 1.
2. ALL EXISTING LINES ARE TO BE ISOLATED WITH VALVES AND CAPS.
3. EXISTING 6" WATER MAIN TO BE REPLACED WITH 8" WATER MAIN.
4. EXISTING 4" WATER MAIN TO BE REPLACED WITH 6" WATER MAIN.
5. EXISTING 2" WATER MAIN TO BE REPLACED WITH 4" WATER MAIN.
6. EXISTING 1 1/2" WATER MAIN TO BE REPLACED WITH 2" WATER MAIN.
7. EXISTING 1" WATER MAIN TO BE REPLACED WITH 1 1/2" WATER MAIN.
8. EXISTING 3/4" WATER MAIN TO BE REPLACED WITH 1" WATER MAIN.
9. EXISTING 1/2" WATER MAIN TO BE REPLACED WITH 3/4" WATER MAIN.
10. EXISTING 1/4" WATER MAIN TO BE REPLACED WITH 1/2" WATER MAIN.
11. EXISTING 1/8" WATER MAIN TO BE REPLACED WITH 1/4" WATER MAIN.
12. EXISTING 1/16" WATER MAIN TO BE REPLACED WITH 1/8" WATER MAIN.
13. EXISTING 1/32" WATER MAIN TO BE REPLACED WITH 1/16" WATER MAIN.
14. EXISTING 1/64" WATER MAIN TO BE REPLACED WITH 1/32" WATER MAIN.
15. EXISTING 1/128" WATER MAIN TO BE REPLACED WITH 1/64" WATER MAIN.
16. EXISTING 1/256" WATER MAIN TO BE REPLACED WITH 1/128" WATER MAIN.
17. EXISTING 1/512" WATER MAIN TO BE REPLACED WITH 1/256" WATER MAIN.
18. EXISTING 1/1024" WATER MAIN TO BE REPLACED WITH 1/512" WATER MAIN.
19. EXISTING 1/2048" WATER MAIN TO BE REPLACED WITH 1/1024" WATER MAIN.
20. EXISTING 1/4096" WATER MAIN TO BE REPLACED WITH 1/2048" WATER MAIN.
21. EXISTING 1/8192" WATER MAIN TO BE REPLACED WITH 1/4096" WATER MAIN.
22. EXISTING 1/16384" WATER MAIN TO BE REPLACED WITH 1/8192" WATER MAIN.
23. EXISTING 1/32768" WATER MAIN TO BE REPLACED WITH 1/16384" WATER MAIN.
24. EXISTING 1/65536" WATER MAIN TO BE REPLACED WITH 1/32768" WATER MAIN.
25. EXISTING 1/131072" WATER MAIN TO BE REPLACED WITH 1/65536" WATER MAIN.
26. EXISTING 1/262144" WATER MAIN TO BE REPLACED WITH 1/131072" WATER MAIN.
27. EXISTING 1/524288" WATER MAIN TO BE REPLACED WITH 1/262144" WATER MAIN.
28. EXISTING 1/1048576" WATER MAIN TO BE REPLACED WITH 1/524288" WATER MAIN.
29. EXISTING 1/2097152" WATER MAIN TO BE REPLACED WITH 1/1048576" WATER MAIN.
30. EXISTING 1/4194304" WATER MAIN TO BE REPLACED WITH 1/2097152" WATER MAIN.
31. EXISTING 1/8388608" WATER MAIN TO BE REPLACED WITH 1/4194304" WATER MAIN.
32. EXISTING 1/16777216" WATER MAIN TO BE REPLACED WITH 1/8388608" WATER MAIN.
33. EXISTING 1/33554432" WATER MAIN TO BE REPLACED WITH 1/16777216" WATER MAIN.
34. EXISTING 1/67108864" WATER MAIN TO BE REPLACED WITH 1/33554432" WATER MAIN.
35. EXISTING 1/134217728" WATER MAIN TO BE REPLACED WITH 1/67108864" WATER MAIN.
36. EXISTING 1/268435456" WATER MAIN TO BE REPLACED WITH 1/134217728" WATER MAIN.
37. EXISTING 1/536870912" WATER MAIN TO BE REPLACED WITH 1/268435456" WATER MAIN.
38. EXISTING 1/1073741824" WATER MAIN TO BE REPLACED WITH 1/536870912" WATER MAIN.
39. EXISTING 1/2147483648" WATER MAIN TO BE REPLACED WITH 1/1073741824" WATER MAIN.
40. EXISTING 1/4294967296" WATER MAIN TO BE REPLACED WITH 1/2147483648" WATER MAIN.
41. EXISTING 1/8589934592" WATER MAIN TO BE REPLACED WITH 1/4294967296" WATER MAIN.
42. EXISTING 1/17179869184" WATER MAIN TO BE REPLACED WITH 1/8589934592" WATER MAIN.
43. EXISTING 1/34359738368" WATER MAIN TO BE REPLACED WITH 1/17179869184" WATER MAIN.
44. EXISTING 1/68719476736" WATER MAIN TO BE REPLACED WITH 1/34359738368" WATER MAIN.
45. EXISTING 1/137438953472" WATER MAIN TO BE REPLACED WITH 1/68719476736" WATER MAIN.
46. EXISTING 1/274877907344" WATER MAIN TO BE REPLACED WITH 1/137438953472" WATER MAIN.
47. EXISTING 1/549755814688" WATER MAIN TO BE REPLACED WITH 1/274877907344" WATER MAIN.
48. EXISTING 1/1099511629376" WATER MAIN TO BE REPLACED WITH 1/549755814688" WATER MAIN.
49. EXISTING 1/2199023258752" WATER MAIN TO BE REPLACED WITH 1/1099511629376" WATER MAIN.
50. EXISTING 1/4398046517504" WATER MAIN TO BE REPLACED WITH 1/2199023258752" WATER MAIN.
51. EXISTING 1/8796093035008" WATER MAIN TO BE REPLACED WITH 1/4398046517504" WATER MAIN.
52. EXISTING 1/17592186070016" WATER MAIN TO BE REPLACED WITH 1/8796093035008" WATER MAIN.
53. EXISTING 1/35184372140032" WATER MAIN TO BE REPLACED WITH 1/17592186070016" WATER MAIN.
54. EXISTING 1/70368744280064" WATER MAIN TO BE REPLACED WITH 1/35184372140032" WATER MAIN.
55. EXISTING 1/140737488560128" WATER MAIN TO BE REPLACED WITH 1/70368744280064" WATER MAIN.
56. EXISTING 1/281474977120256" WATER MAIN TO BE REPLACED WITH 1/140737488560128" WATER MAIN.
57. EXISTING 1/562949954240512" WATER MAIN TO BE REPLACED WITH 1/281474977120256" WATER MAIN.
58. EXISTING 1/1125899908481024" WATER MAIN TO BE REPLACED WITH 1/562949954240512" WATER MAIN.
59. EXISTING 1/2251799816962048" WATER MAIN TO BE REPLACED WITH 1/1125899908481024" WATER MAIN.
60. EXISTING 1/4503599633924096" WATER MAIN TO BE REPLACED WITH 1/2251799816962048" WATER MAIN.
61. EXISTING 1/9007199267848192" WATER MAIN TO BE REPLACED WITH 1/4503599633924096" WATER MAIN.
62. EXISTING 1/18014398537696384" WATER MAIN TO BE REPLACED WITH 1/9007199267848192" WATER MAIN.
63. EXISTING 1/36028797075392768" WATER MAIN TO BE REPLACED WITH 1/18014398537696384" WATER MAIN.
64. EXISTING 1/72057594150785536" WATER MAIN TO BE REPLACED WITH 1/36028797075392768" WATER MAIN.
65. EXISTING 1/144115188301571072" WATER MAIN TO BE REPLACED WITH 1/72057594150785536" WATER MAIN.
66. EXISTING 1/288230376603142144" WATER MAIN TO BE REPLACED WITH 1/144115188301571072" WATER MAIN.
67. EXISTING 1/576460753206284288" WATER MAIN TO BE REPLACED WITH 1/288230376603142144" WATER MAIN.
68. EXISTING 1/1152921506412568576" WATER MAIN TO BE REPLACED WITH 1/576460753206284288" WATER MAIN.
69. EXISTING 1/2305843012825137152" WATER MAIN TO BE REPLACED WITH 1/1152921506412568576" WATER MAIN.
70. EXISTING 1/4611686025650274304" WATER MAIN TO BE REPLACED WITH 1/2305843012825137152" WATER MAIN.
71. EXISTING 1/9223372051300548608" WATER MAIN TO BE REPLACED WITH 1/4611686025650274304" WATER MAIN.
72. EXISTING 1/18446744102601097216" WATER MAIN TO BE REPLACED WITH 1/9223372051300548608" WATER MAIN.
73. EXISTING 1/36893488205202194432" WATER MAIN TO BE REPLACED WITH 1/18446744102601097216" WATER MAIN.
74. EXISTING 1/73786976410404388864" WATER MAIN TO BE REPLACED WITH 1/36893488205202194432" WATER MAIN.
75. EXISTING 1/147573952818808777728" WATER MAIN TO BE REPLACED WITH 1/73786976410404388864" WATER MAIN.
76. EXISTING 1/295147905637617555456" WATER MAIN TO BE REPLACED WITH 1/147573952818808777728" WATER MAIN.
77. EXISTING 1/590295811275235110912" WATER MAIN TO BE REPLACED WITH 1/295147905637617555456" WATER MAIN.
78. EXISTING 1/1180591622550470221824" WATER MAIN TO BE REPLACED WITH 1/590295811275235110912" WATER MAIN.
79. EXISTING 1/2361183245100940443648" WATER MAIN TO BE REPLACED WITH 1/1180591622550470221824" WATER MAIN.
80. EXISTING 1/4722366490201880887296" WATER MAIN TO BE REPLACED WITH 1/2361183245100940443648" WATER MAIN.
81. EXISTING 1/9444732980403761774592" WATER MAIN TO BE REPLACED WITH 1/4722366490201880887296" WATER MAIN.
82. EXISTING 1/18889465960807523549184" WATER MAIN TO BE REPLACED WITH 1/9444732980403761774592" WATER MAIN.
83. EXISTING 1/37778931921615047098368" WATER MAIN TO BE REPLACED WITH 1/18889465960807523549184" WATER MAIN.
84. EXISTING 1/75557863843230094196736" WATER MAIN TO BE REPLACED WITH 1/37778931921615047098368" WATER MAIN.
85. EXISTING 1/151115727686460188393472" WATER MAIN TO BE REPLACED WITH 1/75557863843230094196736" WATER MAIN.
86. EXISTING 1/302231455372920376786944" WATER MAIN TO BE REPLACED WITH 1/151115727686460188393472" WATER MAIN.
87. EXISTING 1/604462910745840753573888" WATER MAIN TO BE REPLACED WITH 1/302231455372920376786944" WATER MAIN.
88. EXISTING 1/1208925821491681507147776" WATER MAIN TO BE REPLACED WITH 1/604462910745840753573888" WATER MAIN.
89. EXISTING 1/2417851642983363014295552" WATER MAIN TO BE REPLACED WITH 1/1208925821491681507147776" WATER MAIN.
90. EXISTING 1/4835703285966726028591104" WATER MAIN TO BE REPLACED WITH 1/2417851642983363014295552" WATER MAIN.
91. EXISTING 1/9671406571933452057182208" WATER MAIN TO BE REPLACED WITH 1/4835703285966726028591104" WATER MAIN.
92. EXISTING 1/19342813143866904114364416" WATER MAIN TO BE REPLACED WITH 1/9671406571933452057182208" WATER MAIN.
93. EXISTING 1/38685626287733808228728832" WATER MAIN TO BE REPLACED WITH 1/19342813143866904114364416" WATER MAIN.
94. EXISTING 1/77371252575467616457457664" WATER MAIN TO BE REPLACED WITH 1/38685626287733808228728832" WATER MAIN.
95. EXISTING 1/154742505150935232914915328" WATER MAIN TO BE REPLACED WITH 1/77371252575467616457457664" WATER MAIN.
96. EXISTING 1/309485010301870465829830656" WATER MAIN TO BE REPLACED WITH 1/154742505150935232914915328" WATER MAIN.
97. EXISTING 1/618970020603740931659661312" WATER MAIN TO BE REPLACED WITH 1/309485010301870465829830656" WATER MAIN.
98. EXISTING 1/1237940041207481863319322624" WATER MAIN TO BE REPLACED WITH 1/618970020603740931659661312" WATER MAIN.
99. EXISTING 1/2475880082414963726638645248" WATER MAIN TO BE REPLACED WITH 1/1237940041207481863319322624" WATER MAIN.
100. EXISTING 1/4951760164829927453277290496" WATER MAIN TO BE REPLACED WITH 1/2475880082414963726638645248" WATER MAIN.
101. EXISTING 1/9903520329659854906554580992" WATER MAIN TO BE REPLACED WITH 1/4951760164829927453277290496" WATER MAIN.
102. EXISTING 1/19807040659319709813109161984" WATER MAIN TO BE REPLACED WITH 1/9903520329659854906554580992" WATER MAIN.
103. EXISTING 1/39614081318639419626218323968" WATER MAIN TO BE REPLACED WITH 1/19807040659319709813109161984" WATER MAIN.
104. EXISTING 1/79228162637278839252436647936" WATER MAIN TO BE REPLACED WITH 1/39614081318639419626218323968" WATER MAIN.
105. EXISTING 1/15845632527457767850487329584" WATER MAIN TO BE REPLACED WITH 1/79228162637278839252436647936" WATER MAIN.
106. EXISTING 1/31691265054915535700974659168" WATER MAIN TO BE REPLACED WITH 1/15845632527457767850487329584" WATER MAIN.
107. EXISTING 1/63382530109831071401949318336" WATER MAIN TO BE REPLACED WITH 1/31691265054915535700974659168" WATER MAIN.
108. EXISTING 1/126765060219662142803898636672" WATER MAIN TO BE REPLACED WITH 1/63382530109831071401949318336" WATER MAIN.
109. EXISTING 1/253530120439324285607797273344" WATER MAIN TO BE REPLACED WITH 1/126765060219662142803898636672" WATER MAIN.
110. EXISTING 1/507060240878648571215594546688" WATER MAIN TO BE REPLACED WITH 1/253530120439324285607797273344" WATER MAIN.
111. EXISTING 1/1014120481757297142431189093376" WATER MAIN TO BE REPLACED WITH 1/507060240878648571215594546688" WATER MAIN.
112. EXISTING 1/2028240963514594284862378186752" WATER MAIN TO BE REPLACED WITH 1/1014120481757297142431189093376" WATER MAIN.
113. EXISTING 1/4056481927029188569724756373504" WATER MAIN TO BE REPLACED WITH 1/2028240963514594284862378186752" WATER MAIN.
114. EXISTING 1/8112963854058377139449512747008" WATER MAIN TO BE REPLACED WITH 1/4056481927029188569724756373504" WATER MAIN.
115. EXISTING 1/16225927708116754278899025494016" WATER MAIN TO BE REPLACED WITH 1/8112963854058377139449512747008" WATER MAIN.
116. EXISTING 1/32451855416233508557798050988032" WATER MAIN TO BE REPLACED WITH 1/16225927708116754278899025494016" WATER MAIN.
117. EXISTING 1/64903710832467017115596101976064" WATER MAIN TO BE REPLACED WITH 1/32451855416233508557798050988032" WATER MAIN.
118. EXISTING 1/129807421664934034231192203952128" WATER MAIN TO BE REPLACED WITH 1/64903710832467017115596101976064" WATER MAIN.
119. EXISTING 1/259614843329868068462384407904256" WATER MAIN TO BE REPLACED WITH 1/129807421664934034231192203952128" WATER MAIN.
120. EXISTING 1/519229686659736136924768815808512" WATER MAIN TO BE REPLACED WITH 1/259614843329868068462384407904256" WATER MAIN.
121. EXISTING 1/1038459373314672273849537631617024" WATER MAIN TO BE REPLACED WITH 1/519229686659736136924768815808512" WATER MAIN.
122. EXISTING 1/2076918746629344547699075263234048" WATER MAIN TO BE REPLACED WITH 1/1038459373314672273849537631617024" WATER MAIN.
123. EXISTING 1/4153837493258689095398150526468096" WATER MAIN TO BE REPLACED WITH 1/2076918746629344547699075263234048" WATER MAIN.
124. EXISTING 1/8307674986517378190796301052936192" WATER MAIN TO BE REPLACED WITH 1/4153837493258689095398150526468096" WATER MAIN.
125. EXISTING 1/1661534997303475638159260210582384" WATER MAIN TO BE REPLACED WITH 1/8307674986517378190796301052936192" WATER MAIN.
126. EXISTING 1/3323069994606951276318520421164768" WATER MAIN TO BE REPLACED WITH 1/1661534997303475638159260210582384" WATER MAIN.
127. EXISTING 1/6646139989213902552637040842329536" WATER MAIN TO BE REPLACED WITH 1/3323069994606951276318520421164768" WATER MAIN.
128. EXISTING 1/13292279978427805105274081684659072" WATER MAIN TO BE REPLACED WITH 1/6646139989213902552637040842329536" WATER MAIN.
129. EXISTING 1/26584559956855610210548163369318144" WATER MAIN TO BE REPLACED WITH 1/13292279978427805105274081684659072" WATER MAIN.
130. EXISTING 1/53169119913711220421096326738636288" WATER MAIN TO BE REPLACED WITH 1/26584559956855610210548163369318144" WATER MAIN.
131. EXISTING 1/106338239827422440842192653477272576" WATER MAIN TO BE REPLACED WITH 1/53169119913711220421096326738636288" WATER MAIN.
132. EXISTING 1/212676479654844881684385306954545152" WATER MAIN TO BE REPLACED WITH 1/106338239827422440842192653477272576" WATER MAIN.
133. EXISTING 1/425352959309689763368770613909090304" WATER MAIN TO BE REPLACED WITH 1/212676479654844881684385306954545152" WATER MAIN.
134. EXISTING 1/850705918619379526737541227818180608" WATER MAIN TO BE REPLACED WITH 1/425352959309689763368770613909090304" WATER MAIN.
135. EXISTING 1/1701411837238759053475082455636361216" WATER MAIN TO BE REPLACED WITH 1/850705918619379526737541227818180608" WATER MAIN.
136. EXISTING 1/3402823674477518106950164911272722432" WATER MAIN TO BE REPLACED WITH 1/1701411837238759053475082455636361216" WATER MAIN.
137. EXISTING 1/6805647348955036213900329822545444864" WATER MAIN TO BE REPLACED WITH 1/3402823674477518106950164911272722432" WATER MAIN.
138. EXISTING 1/13611294697910072427800659645090889728" WATER MAIN TO BE REPLACED WITH 1/6805647348955036213900329822545444864" WATER MAIN.
139. EXISTING 1/27222589395820144857601319290181779456" WATER MAIN TO BE REPLACED WITH 1/13611294697910072427800659645090889728" WATER MAIN.
140. EXISTING 1/54445178791640289715202638580363558912" WATER MAIN TO BE REPLACED WITH 1/27222589395820144857601319290181779456" WATER MAIN.
141. EXISTING 1/108890357583280579430405277160727117824" WATER MAIN TO BE REPLACED WITH 1/54445178791640289715202638580363558912" WATER MAIN.
142. EXISTING 1/217780715166561158860810554321454235648" WATER MAIN TO BE REPLACED WITH 1/108890357583280579430405277160727117824" WATER MAIN.
143. EXISTING 1/435561430333122317721621108642908471296" WATER MAIN TO BE REPLACED WITH 1/217780715166561158860810554321454235648" WATER MAIN.
144. EXISTING 1/871122860666244635443242217285816942592" WATER MAIN TO BE REPLACED WITH 1/435561430333122317721621108642908471296" WATER MAIN.
145. EXISTING 1/1742245721332489270886484434571633851184" WATER MAIN TO BE REPLACED WITH 1/871122860666244635443242217285816942592" WATER MAIN.
146. EXISTING 1/3484491442664978541772968869143267702368" WATER MAIN TO BE REPLACED WITH 1/1742245721332489270886484434571633851184" WATER MAIN.
147. EXISTING 1/6968982885329957083545937738286535404736" WATER MAIN TO BE REPLACED WITH 1/3484491442664978541772968869143267702368" WATER MAIN.
148. EXISTING 1/13937965770659914167091875476573070809472" WATER MAIN TO BE REPLACED WITH 1/6968982885329957083545937738286535404736" WATER MAIN.
149. EXISTING 1/27875931541319828334183750953146141618944" WATER MAIN TO BE REPLACED WITH 1/13937965770659914167091875476573070809472" WATER MAIN.
150. EXISTING 1/55751863082639656668367501906292283237888" WATER MAIN TO BE REPLACED WITH 1/27875931541319828334183750953146141618944" WATER MAIN.
151. EXISTING 1/111503726165279313336735003812584566475776" WATER MAIN TO BE REPLACED WITH 1/55751863082639656668367501906292283237888" WATER MAIN.
152. EXISTING 1/223007452330558626673470007625169132951552" WATER MAIN TO BE REPLACED WITH 1/111503726165279313336735003812584566475776" WATER MAIN.
153. EXISTING 1/446014904661117253346940015250338265903104" WATER MAIN TO BE REPLACED WITH 1/223007452330558626673470007625169132951552" WATER MAIN.
154. EXISTING 1/892029809322234506693880030500676531806208" WATER MAIN TO BE REPLACED WITH 1/446014904661117253346940015250338265903104" WATER MAIN.
155. EXISTING 1/178405961864468901338776006100135306361248" WATER MAIN TO BE REPLACED WITH 1/892029809322234506693880030500676531806208" WATER MAIN.
156. EXISTING 1/356811923728937802677552012200270612722496" WATER MAIN TO BE REPLACED WITH 1/178405961864468901338776006100135306361248" WATER MAIN.
157. EXISTING 1/713623847457875605355104024400541225444992" WATER MAIN TO BE REPLACED WITH 1/356811923728937802677552012200270612722496" WATER MAIN.
158. EXISTING 1/1427247694915751210710208048801082450889984" WATER MAIN TO BE REPLACED WITH 1/713623847457875605355104024400541225444992" WATER MAIN.
159. EXISTING 1/2854495389831502421420416097602164901779968" WATER MAIN TO BE REPLACED WITH 1/1427247694915751210710208048801082450889984" WATER MAIN.
160. EXISTING 1/5708990779663004842840832195204329803559936" WATER MAIN TO BE REPLACED WITH 1/2854495389831502421420416097602164901779968" WATER MAIN.
161. EXISTING 1/11417981559326009685681664390408597607119872" WATER MAIN TO BE REPLACED WITH 1/5708990779663004842840832195204329803559936" WATER MAIN.
162. EXISTING 1/22835963118652019371363328780817195214239744" WATER MAIN TO BE REPLACED WITH 1/11417981559326009685681664390408597607119872" WATER MAIN.
163. EXISTING 1/45671926237304038742726657561634390428479488" WATER MAIN TO BE REPLACED WITH 1/22835963118652019371363328780817195214239744" WATER MAIN.
164. EXISTING 1/91343852474608077485453315123268780856958976" WATER MAIN TO BE REPLACED WITH 1/45671926237304038742726657561634390428479488" WATER MAIN.
165. EXISTING 1/182687704949216154970906630246537561713917952" WATER MAIN TO BE REPLACED WITH

GENERAL NOTES

1. ALL REACTOR PUMPS ARE TO BE INSTALLED TO EXISTING PLANT REVISED DRAWING NO. 1.
2. ALL REACTOR PUMPS ARE TO BE INSTALLED WITH EXISTING COOLING WATER.
3. ALL REACTOR PUMPS ARE TO BE INSTALLED WITH EXISTING COOLING WATER.
4. ALL REACTOR PUMPS ARE TO BE INSTALLED WITH EXISTING COOLING WATER.
5. ALL REACTOR PUMPS ARE TO BE INSTALLED WITH EXISTING COOLING WATER.
6. ALL REACTOR PUMPS ARE TO BE INSTALLED WITH EXISTING COOLING WATER.
7. ALL REACTOR PUMPS ARE TO BE INSTALLED WITH EXISTING COOLING WATER.
8. ALL REACTOR PUMPS ARE TO BE INSTALLED WITH EXISTING COOLING WATER.
9. ALL REACTOR PUMPS ARE TO BE INSTALLED WITH EXISTING COOLING WATER.
10. ALL REACTOR PUMPS ARE TO BE INSTALLED WITH EXISTING COOLING WATER.



017469

HIGH PRESSURE POLYETHYLENE EXPANSION SEADRIFT PROJECT 64-12

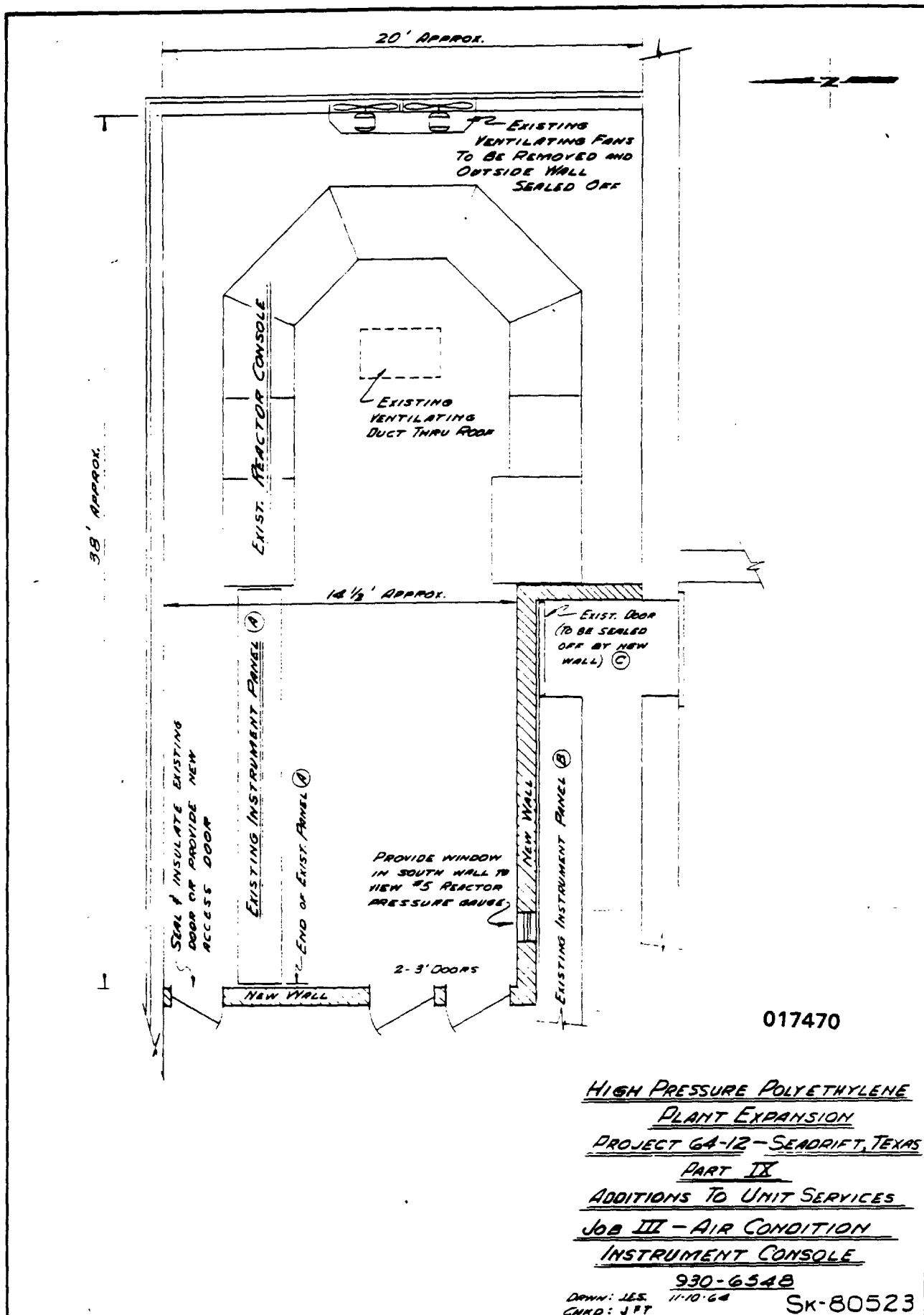
930-6548

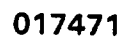
ADDITIONS TO UNIT SERVICE

PART II - JOB 1

OWN BY: JES DATE: 11-10-64
CHG BY: SJP APP'D BY: JEP

SK-80517





930-6548

DRAWN: LES
 CHECKED: JPT

SK-80523

R

ENGINEERING DEPARTMENT

UNION CARBIDE CHEMICALS

Poly A

DESIGN REPORT

ISOPROPANOL RECOVERY SYSTEM

HIGH PRESSURE POLYETHYLENE UNIT

PLANT 510

930-6550

*1835
6600
8435*

PORT LAVACA, TEXAS

JANUARY 26, 1965

017472

UNION CARBIDE CHEMICALS COMPANY	SHOP ORDER TRANSMITTAL	DATE 1-26-65	SHEET 1 of 1
PROJECT 930-6650 H.P. Poly Isopropanol Recovery System LOCATION Plant 510	MAJOR SUBJECT Design Report ISSUED FOR	TRANSMITTAL NO.	

DISTRIBUTION	TRANSMITTAL	ATTACHMENTS
J. W. Warner	1	
J. F. Tamborello	3	
T. Rogstad	1	
D. F. Peyton	1	
G. L. Funk	1	
R. G. Ziefle	1	
J. J. Walthall	1	
J. H. Wieting	1	
D. L. Buchanan	1	
J. M. McBride	1	CHG. TO J. BREWER
D. L. Wiley	1	

J. C. Upchurch DRAWING NUMBER	SHOP ORDER	ISSUE	B.M. NO.	DESCRIPTION
5K-80586	930-6550			Design Report Isopropanol Recovery System High Pressure Polyethylene Unit Flow Diagram

REMARKS:

017473

J. F. Tamborello

ISSUED BY

DESIGN REPORT

ISOPROPANOL RECOVERY SYSTEM

HIGH PRESSURE POLYETHYLENE UNIT

SEADRIFT PLANT

930-6550

Written by: D. L. Buchanan
J. F. Tamborello
J. C. Upchurch
J. L. Warner

Engineering Department
Union Carbide Chemicals Division
Port Lavaca, Texas

January 26, 1965

017474

Design Report

Isopropanol Recovery System High Pressure Polyethylene Unit Seadrift Plant

930-6550

Foreword

This report specifies the design of a system for continuous recovery of isopropanol from a mixture of isopropanol and oils. Standard distillation methods are used to recover isopropanol of a quality reuseable in the polyethylene process.

This report contains:

- Equipment List
- Safety Valve Schedule
- Pressure Gage Schedule
- Equipment Specifications
- Instrument Specifications
- Equipment to be Insulated
- Piping to be insulated
- Line List
- Flow Diagram SK-80586

017475

Equipment List

SK-80586

6550E-100 - EXISTING OIL POT

An existing vessel which serves to vent dissolved gases from an accumulate polyethylene oil and isopropanol from No. 2 oil column bases. Service of this vessel will not be changed by this work order, however, it is to be equipped with automatic liquid level controls.

Normal tank operating pressure	30 psig
Tank size - diameter	48"
length	10'-6"
Tank details shown on Dwg.	937-A-6136
Original Item Number	6256E-1005
Property Number	6392-642

6550E-101	- LIQUID LEVEL INDICATOR
6550E-101-1	- CONTROLLER
6550E-101A	- TRANSMITTER
6550E-101B	- CONTROLLED VALVE
6550E-101C	- PRESSURE SWITCH
6550E-101D	- PRESSURE SWITCH
6550E-101E	- ALARM LIGHT (HI LEVEL)
6550E-101F	- ALARM LIGHT (LO LEVEL)

To control the liquid level in Item 6550E-100 by controlling the amount of liquid released by differential pressure to tank 6550E-102. Existing alarm horn to sound and alarm lights 101E and 101F to light when either the tank level is high or low. Control instrument and alarm lights to be located in control room of No. 1 Gas Separation.

Instrument Flow Range	. 2 to 12 gpm
Normal Tank Level	22" liquid - 17" H ₂ O
Low Level Alarm	- 7" H ₂ O
High Level Alarm	- 27" H ₂ O
Label Instrument	"No. 2 Oil Clm. Oil Pot L. L."
See Instrument Specifications	SK-510-6550-101

017476

6550E-102 - EXISTING TANK

To serve as a feed and surge tank for Isopropanol Recovery Column 6550E-106. This tank is now in caustic service but is to be made available for this work order by 2-1-65. No alterations to this tank are required, but tank is to be cleaned and inspected before use in new service.

Nominal Capacity	10,000 gallons
Size - Diameter	96"
Length	34'-10"
Tank Details Shown on Dwg. General Welding - S/O 4450B	
Original Item Number	GRA-104
Property Number	6392-352

6550E-102B - ORIFICE FLANGES

To be installed in 3" vent line P-102 from tank 6550E-102 to flare header for possible future measurement of vent gas flow. No orifice plate is to be provided. Orifice flange to be specified by instrument engineer.

6550E-103	- LIQUID LEVEL INDICATOR
6550E-103-1	- LIQUID LEVEL INDICATOR
6550E-103-2	- LIQUID LEVEL CONTROLLER
6550E-103A	- TRANSMITTER
6550E-103B	- CONTROLLED VALVE
6550E-103C	- PRESSURE SWITCH
6550E-103D	- ALARM LIGHT

To indicate and control the liquid level in isopropanol feed and surge tank 6550E-102 by controlling the amount pumped to the isopropanol recovery column 6550E-106.

Items 6550E-103 and 103D are to be located on the control panel of the No. 1 Gas Separation Unit.

Item 6550E-103-1 to be located on the north instrument panel near the Polyethylene "A" reactor console.

Instrument and alarm light to be labeled: "Iso Feed Tank L. L."

017477

Control Valve Flow Range	4 to 10 gpm
Normal Tank Liquid Level	48" Liquid - 37" H ₂ O
High Level Alarm	78" Liquid - 60" H ₂ O
See Instrument Specifications	SK-510-6550-103

6550E-104 - FEED PUMP
6550E-104A - MOTOR

To pump P. E. oils - isopropanol mixture from tank 6550E-102 to isopropanol recovery column 6550E-106.

Pump to be started and stopped from its field location.

See specifications page 15.

<u>Item</u>	<u>Property No.</u>
6550E-104 (Pump)	6306-1465
6550E-104A (Motor)	6213-1967

6550E-104C - ORIFICE FLANGES
6550E-104D - RESTRICTION ORIFICE

To provide for a continuous recycled flow from pump 6550E-104 to feed tank 6550E-102. Recycle flow to prevent pump overheating and provide flows more suitable to pump characteristics.

Flow	12 gpm
Orifice Differential	28 psi
Location	P-107

6550E-105 - FILTER

To remove non abrasive particles from feed to distillation column 6550E-106. Use surplus filter (Property Number 6311-128).

Make	Cuno
Type	Auto Klean No-AK-234 Type EGLF-4-8
Flow (Maximum)	10 gpm
See Specifications	Surplus Item Record F7-58

6550E-106 - DISTILLATION COLUMN
6550E-106A - TRAYS

To separate isopropanol from a mixture of isopropanol and polyethylene oils. Except for materials of construction column design and auxiliary equipment to be suitable for future recovery of acetaldehyde. Substitution of materials or coatings are to be used in the event acetaldehyde is to be recovered.

Performance Information

Feed	96% Isopropanol 4% P. E. Oils Some Water and light Hydrocarbons
Feed Rate	4 to 8 gpm
Feed Temperature	35°C Normal
Base Temperature	120°C Normal
Head Temperature	100°C Normal
Head Pressure Normal	15 psig
Design	50 psig
Column Differential	45" Minimum, 50" Maximum
Make Quality	Isopropanol and <.5% H ₂ O and <.3% Oils
Reflux Ratio	1:1
Tails Composition	50% Isopropanol - 50% Oils
Recovery Efficiency	90% Minimum

Construction Information

Size	30" ID 53'-6" High
No. Trays and Spacing	30 - 12"
Type Trays	Valve
Tray Capacity	See BM-15893
Feed Point	9th Tray Normal, 5th Tray Alternate
Make	25th Tray Normal, 21st Tray Alternate
Head Cut	Thief Top Tray
Kettle Capacity	370 gallons
Design Wind Load	30 Lbs/in. ²
Materials of Construction	Steel

See Specifications SK-654169-81-4

Property Number	6471-1012.
-----------------	------------

6550E-106B - CALANDRIA

One external calandria for column 6550E-106.

Head load	1,680,000 BTUs/Hr	
Heat Exchange Area	165 Sq Ft.	
Material	Shell 75# Steam	Tubes 50% Isopropanol 50% Oils
Operating Pressure	Approx 70#/in. ²	17#/in. ²
Design Pressure	" 150#/in. ²	75#/in. ²
Flow	1850#/Hr.	-
Operating Temperature	-	120°C

See Specification SK-564169-81-2

Property Number 6376-1824

6550E-106B-2 - STEAM TRAP

Make	Strong
Model	9392
Type	Inverted Bucket
Connections, Size, in.	1 1/2"
Type	Screwed
Operating Pressure, Max. psig	75 psig
Design Pressure	150 psig
Condensate, Lb/hr	Min. 3,700
Differential Pressure, Psi, Min.	25
Orifice Size	11/32"

81

11"

17/64"

4 10 p
CIP

The condensate load specified is the continuous discharge capacity of the trap.

6550E-106B-3 - STRAINER

Size	1-1/2"
Pressure Rating, Psig Min.	150
Body Material	Cast Iron
Screen Material	STD

Case iron strainers will have threaded end connections. Screen perforations will be 1/32 in., approximately. Screen material specified as "Standard" will be either brass, monel, or stainless steel.

017480

6550E-106C - INTERNAL CONDENSER

U Bend, internal total condenser to be located in top head of column 6550E-106.

Heat load	2,165,000 BTU/hr.	
Heat exchange area	240 sq. ft.	
	<u>Tube Side</u>	<u>Outside of Tubes</u>
Material	Cooling Water	Isopropanol
Temperature in (Approx.)	30°C	100°C Vapor
Temperature Out	45°C	Approx. 50°C Liquid
Design Pressure	50 psi	
Flow (Max.)	160 gpm (Approx)	6,000#/hr
Sub Cooling To: °C		50°C

See Detailed Specifications SK-564169-81-3

Property No. 6376-1825

6550E-107 - PRESSURE INDICATOR
6550E-107-1 - PRESSURE CONTROLLER
6550E-107A - PRESSURE TRANSMITTER
6550E-107B - CONTROLLED VALVE
6550E-107C - CONTROLLED VALVE

One instrument system to control the pressure in Distillation Column 6550E-106 by venting column to atmosphere or by making up hydrogen methane gas.

Indicating controller to be mounted on north instrument panel near polyethylene "A" reactor console.

Control Instruments to be labeled: "Iso Clm Pressure"

See Instrument Specifications SK-510-6550-107

017481

6550E-108 - PRODUCT COOLER

To sub cool refined isopropanol from the 25th or 21st tray of recovery column 6550E-106 by heat exchange with plant cooling water.

<u>Performance Information</u>	<u>Tubes</u>	<u>Shell</u>
Material	Water	Isopropanol
Quantity, Max.	24 gpm	4,100#/hr
Temperature inlet	30°C	100°C
Outlet	45°C	50°C
Operating Pressure	30 psig	15 psig
Design Pressure	75 psig	75 psig
Design Pressure Drop	4.6 psi	0.24 psi
Heat Transferred	292,000 BTUs/hr	292,000 BTUs/hr
Materials of Construction	Steel	Steel

See Specification SK 564169-81-1

Property Number 6376-1826

6550E-109 - FLOW AND DIFFERENTIAL RECORDER (Two Pen)
 6550E-109-1 - FLOW CONTROLLER
 6550E-109A - TRANSMITTER (Product Make)
 6550E-109A-1 - TRANSMITTER (Column Differential)
 6550E-109B - PRESSURE SELECTOR
 6550E-109C - ORIFICE FLANGES
 6550E-109D - ORIFICE PLATE

To record the column differential and flow of make from isopropanol recovery column 6550E-106. Controller shall override the column feed valve 6550E-103B when make rates become excessive (at 8 gpm).

The two pen recorder controller shall be located on north instrument panel near the Polyethylene "A" reactor console.

Controller to be labeled: "Iso Colm Diff. and Make".

Make Flow Range	4 to 10 gpm
Feed Flow Override Setting	8 gpm
Clm Differential	45" H ₂ O Min.
	50" H ₂ O Max.
Units for Flow Conversion Graph	GPH

See Instrument Specifications SK-510-6550-109

6550E-110 - FLOW RECORDER (Two Pen)
 6550E-110-1 - FLOW CONTROLLER
 6550E-110A - RATIO CONTROLLER
 6550E-110B - TRANSMITTER (Feed Flow)
 6550E-110C - TRANSMITTER (Steam Flow)
 6550E-110D, 110D-1 - ORIFICE FLANGES
 6550E-110E, 110E-1 - ORIFICE PLATES
 6550E-110F - CONTROLLED VALVE

To record the flow of feed to column 6550E-106 and steam to calandria 6550E-106B. Controller to control the flow of steam in selected ratio to the flow of feed to the column.

Feed Flow Range	4.0 to 10.0 gpm
Steam Flow	1850#/hr at + 8.0 gpm feed flow
Units for Conversion Graphs	
Steam Flow	#/hr
Feed Flow	GPH

See Instrument Specification SK-510-6550-110

6550E-III	-	TEMPERATURE RECORDER (Two Pen)
6550E-III-1	-	TEMPERATURE CONTROLLER
6550E-III A	-	TRANSMITTER (Head Temperature)
6550E-III B	-	TRANSMITTER (Base Temperature)
6550E-III C	-	THERMO WELL
6550E-III D	-	THERMO WELL
6550E-III E	-	CONTROLLED VALVE
6550E-III F	-	CONTROLLED VALVE
6550E-III G	-	SELECTOR SWITCH

To record the temperature in the head of isopropanol recovery column 6550E-106.

To record and control the temperature in the base of the isopropanol recovery column by controlling the flow of isopropanol make from the column to either of the make tanks 6550E-114 or 115. Control instrument and switch to direct flow to either of the make tanks to be located on the north instrument panel near the polyethylene "A" reactor console.

Make Instrument flow Range	0 to 10 gpm
Normal Head Temperature	100°C
Normal Base Temperature	120°C

See Instrument Specifications SK-510-6550-111

6550E-112	-	LIQUID LEVEL RECORDER
6550E-112-1	-	LIQUID LEVEL CONTROLLER
6550E-112 A	-	TRANSMITTER

To control the liquid level in the base of the isopropanol recovery column by controlling the amount pumped from the column base by variable capacity pump 6550E-113.

See Instrument Specifications SK-510-6550-112.

6550E-113 - COLUMN BASE PUMP
6550E-113A - MOTOR

Positive displacement, reciprocating plunger pump with automatic remote speed or adjustable stroke to pump base liquid from isopropanol recovery column to Polyethylene Unit tank 6034E-125 or to the "Dirty Oil" tank at No. 1 Gas Separation.

See Pump Specifications, page 23.

<u>Item</u>	<u>Property Number</u>
Pump 6550E-113	6306-1466
Motor 6550E-113A	6213-1968

6550E-114
6550E-115 - ISOPROPANOL MAKE AND STORAGE TANK

Type	Horizontal Dished Head
Nominal Capacity	10,000 gallons
Operating Pressure	5 psig
Design Pressure	50 psig

See Specifications Page 25.

<u>Item Number</u>	<u>Property Number</u>
6550E-114	6392-1126
6550E-115	6392-1127

6550E-116, 117 - LIQUID LEVEL INDICATORS
6550E-116A, 117A - TRANSMITTERS
6550E-116B, 117B - PRESSURE SWITCH
6550E-116C, 117C - ALARM LIGHTS

To indicate the level in tank 6550E-114 and 115, respectively, sound existing alarm horn and high alarm lights in the event of hi-level.

See Instrument Specifications SK-510-6550-116, 117

017484

6550E-118 - TRANSFER PUMP
6550E-118A - MOTOR

To transfer refined isopropanol from tanks 6550E-114 and 115 to an existing isopropanol feed tank.

Pump Capacity 100 gpm

See Specifications, page 26.

<u>Item Number</u>	<u>Property Number</u>
Pump 6550E-118	6306-1467
Motor 6550E-118A	6213-1969

6550E-119 - PRESSURE INDICATOR
6550E-119-1 - PRESSURE CONTROLLER
6550E-119A - TRANSMITTER
6550E-119B - CONTROLLED VALVE
6550E-119C - CONTROLLED VALVE

One instrument system to control the pressure in storage tanks 6550E-114 and 115 by venting tank pressure to atmosphere or by making up hydrogen methane gas.

Indicating Controller to be mounted on north instrument control panel near Polyethylene "A" reactor console.

Control instrument to be labeled "Iso Make Tank Pressure".

See Instrument Specifications SK-510-6550-119

6550E-120 - ROTOMETER

To measure the flow of water laden isopropanol drawn from the head of the isopropanol column 6550E-106. To be field mounted.

Flow Range 25 to 75 #/hr

See instrument Specifications SK-510-6550-120

017485

*for T. Therm well
or TEST well*

6550E-121 - THERMO WELL (Cooling Water Supply)
6550E-121-1 - THERMO WELL (Cooling Water Return from 6550E-108)
6550E-121-2 - THERMO WELL (Cooling Water Return from 6550E-106C)

For use with test thermometers.

122 - ORIFICE FLANGE

For possible future measurement of cooling water flow to 6550E-106C.

See Instrument Specifications SK-510-6550-120.

Notice:

DESIGN REPORT

1068-4 - 150P RER

017487

Safety Valve: No Pres. set Control

ITEM

106 D - Conserved 1905 Kc 3x4" ASA
150" RF same

106 E - DINTO 106 D.

same Fc 1.

106 B - ~~Conserved~~ 1910 Fc, 1 1/2" x 2"
300 # 150 # RF ASA Fc same

NOTE!

113 C - DINTO 106 B EXCEPT 1905 Fc
1" x 2" - 150 # RF ASA Fc, same

1068-4 - C.A. TYPE AC SAFETY VALVE
W/ LIFTING GEAR 1" NPT-MX

65
DRAFT

Safety Valve Schedule

Flow Diagram SK-80586

Item No.	Location	Size	Type (1)	Set Pressure, psig	Connections	
					Inlet	Outlet
6550E-102A ^{W/C}	6550E-102	6Q8	Crosby JO-25	60	150#RF	150#RF
6550E-106D ^{W/C}	6550E-106	3K4	Crosby JO-25 <i>Cross. 1405 Ec</i>	55	150#RF	150#RF
6550E-106E ^{W/C}	6550E-106	3K4	Crosby JO-25 <i>Cross. 1405 Ec</i>	45	150#RF	150#RF
6550E-106B-4 -	6550E-106B	1"	Lunkenheimer 1045(2)	82	NPT 1"	NPT 1-1/4"
6550E-108B	P-114	ID2	Crosby JO-25 <i>Cross. 1405 Ec</i>	75	1 1/2" 300# 1" 150#RF	2" 150#RF
6550E-113C	P-113	ID2	Crosby JO-25 <i>Cross. 1405 Ec</i>	125	1" 150#RF	2" 150#RF
6550E-114A	6550E-114	4P6	Crosby JO-25	50	4" 150#RF	6" 150#RF
6550E-115A	6550E-115	4P6	Crosby JO-25	50	4" 150#RF	6" 150#RF

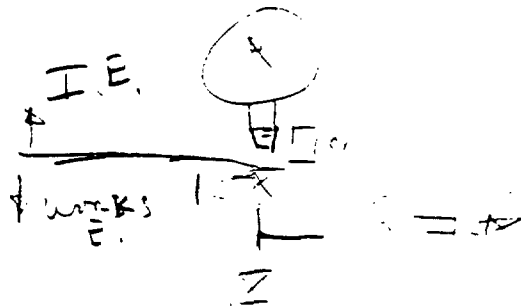
- (1) Suitable for operations at temperatures and pressures indicated by series number.
- (2) For steam service - provide valve with lifting device.

Pressure Gauge Schedule

Flow Diagram SK-80586

<u>Item No.</u>	<u>Location</u>	<u>Model US Gauge*</u>	<u>Range</u>	<u>Material Tube</u>	<u>Coil Syphon</u>
6550E-102C	6550E-102	1525	0-30	SS	Not Required
6550E-104B	P-105	1525	0-60	SS	Not Required
6550E-106F	6550E-106	1525	0-60	SS	Not Required
6550E-106B-1	MS-103	1525	0-100	SS	Required
6550E-113B	P-110	1525	0-160	SS	Not Required
6550E-114B	6550E-114	1525	0-60	SS	Not Required
6550E-115B	6550E-115	1525	0-60	SS	Not Required
6550E-118B	P-120	1525	0-60	SS	Not Required

*Or equivalent.



Back with order
 General
1/4" NPT MAF Gauge

017489

SPECIFICATIONS FOR PUMP AND MOTOR

ITEMS 930-6550E-104 and E-104A

SCOPE

One centrifugal, electric driven pump is required for continuous outdoor hazardous area operation.

PERFORMANCE

Volume	20 gpm
Total head	100'
Pressure, suction	5 psig normal
discharge	33 psig normal
Speed	By manufacturer to suit NPSH conditions.

PUMPED FLUID

Material	Mixture: 96% isopropanol, balance light hydrocarbon oil
Specific gravity	0.77 (Ref. 20°C water)
Viscosity:	Approximately 3 cp
Temperature:	95°F Normal 120°F Maximum
Suspended solids:	Not present
NPSH available	In excess of 10 ft.

DRIVER

Electric motor to be _____ HP, _____ RPM, 3 phase, 60 cycle 440 volt, fully impregnated, void free, epoxy encapsulated with drip-proof chemical plant enclosure, with cast iron terminal box and Parkerized hex head cap screws. Suitable for Class I, Division II locations. Ventilating fan shall be of spark-proof and corrosion-proof material. Air inlet opening shall have corrosion-proof screen covers, openings shall be small enough to prevent entry of 1/2" round rod. Internal metal surfaces of frame and enclosure are to be of non-corroding material or properly prepared and coated with epoxy base or approved equal paint. Nameplate shall be of corrosion-proof metal and bearings shall be double shielded.

HP/Speed	By manufacturer but size for maximum 20 gpm flow.
----------	---

MECHANICAL DETAILS

Centrifugal, in-line mount, or horizontal, end suction. Closed impeller, solid shaft, oil lube, ball bearing, fitted with shaft seal.

Cast iron casing, cast iron impeller, steel shaft. Flanged connections 150# ASA, RF.

Shaft seal to be single, inside, unbalanced. Pump manufacturer shall quote Durametallic type ROTT in 316 SS as extra if not an O. E. M. standard. Preferred materials are Kalamate, #5 carbon and glass filled teflon.

SURPLUS CONTROL AND DISPOSAL DEPARTMENT

Union Carbide Chemicals Company
Division of
Union Carbide Corporation
South Charleston, West Virginia

Oil Filter

Surplus
Item No. F7-58

Type of Property:

Oil Filter

Capacity (3# drop)

120 gpm at 100 SSU

100 gpm at 300 SSU

61.2 gpm at 700 SSU

35.2 gpm at 2500 SSU

Equiv. Mesh 70

Free Area 63.2 Sq. In.

Property No. 6311-128

Date of Listing 3/31/64

Classification: Surplus for Disposal - Installed ☐ Not Installed ☒

Surplus - Hold - Installed ☐ Not Installed ☐

Location 510

Building 160 EE 14-3

If Surplus for Disposal, this Property Item is available for transfer within the Chemicals Company upon an "as is - where is" basis for a period of one year from date of listing.

DESCRIPTION

Oil Filters, Cuno, Auto-Kleen, NO-AK-234, Type EGLF-4-8, Manually Operated, Stainless Steel, Length 8", Spacing .008, Specify #12272-6.

Unit consists of four sumps and cartridges with a common head.

Serial No. None.

CONDITION

First Class Condition.

017492

Item No. 6257E-231C

Former Service: Esstic Oil Service

Estimated Repair Cost: --

Date of Purchase: 9/61

Work Order: 930-6257

Original Cost: \$452.

DISPOSITION

Transferred to Plant:

Departmental Symbol:

Sold to:

Value Received:

Scrapped:

Value Received:

Upon disposition of this item, Surplus Program Representative of Owning Plant will fill in above disposition data and immediately forward this sheet to R. S. Wright, Surplus Control and Disposal Department, South Charleston, West Virginia.

514-56128 (INTER-OFFICE COPY)

WORKS ENGINEERING DEPARTMENT

UNION CARBIDE CORPORATION
CHEMICALS DIVISION
Texas City, Texas

BILL OF MATERIAL

BM 15893 ISSUE 1
G. NO. DATE 11/17/64 PAGE 1 OF 2
DATE ISSUED 12-17-64 CHARGE 93000-00-06550-600 AW 564169
ISOPROPANOL RECOVERY SYSTEM - Seadrift, Texas
DETAIL Valve Trays

Valve Trays in accordance with the following specifications:
ITEM NO. 6550E-106

K 49315

Tray Specifications

Tray type:	Valve
Number required:	30
Tray diameter:	To be specified by vendor
Tray spacing:	To be specified by vendor
Materials of construction:	Steel
Tray thickness:	To be specified by vendor
Maximum point load without permanent deflection:	250-lbs.
Method of support and peripheral seal:	To be specified by vendor

Process Requirements

Trays to be designed for efficient performance over the range of the following conditions:

	<u>Top</u>		<u>Base</u>	
	<u>Maximum</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Minimum</u>
Vapor rate, #/hr.:	5480	2740	7370	3680
Liquid rate, #/hr.:	2740	1370	7750	3870
Vapor density, #/ft. ³ :	0.244		0.304	
Liquid density, #/ft. ³ :	44.9		41.4	
Liquid viscosity, cp:	0.35		0.28	
Surface tension, Dynes/cm:	15		15	

017494

120" tube length

8"

3

5

4"

2

6

PT

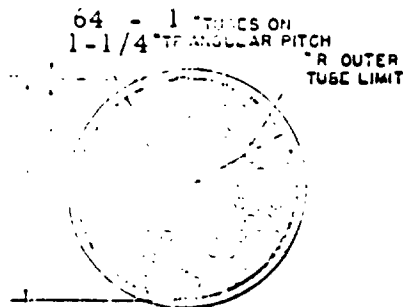
2"

6"

PT

- ## Notes

1. Impingement plate required on the tube bundle opposite the 4" steam nozzle. Remove 2 or 3 tubes if necessary.
2. Heads with sharp re-entrance angles are not acceptable. Minor angles will be allowed according to customer's judgment.
3. Design, material, fabrication, and testing according to the ASME Code and TEMA Class C unless noted.



SCHEMATIC SECTION THRU SHELL
(NUMBER OF TUBES NOT CORRECT)

NOTES

DIMENSIONS ARE APPROXIMATE. MANUFACTURER IS RESPONSIBLE FOR MECHANICAL DESIGN. ~~XX~~
~~XX~~ ESTIMATED WEIGHT,
 FILLED WITH WATER _____ LBS.

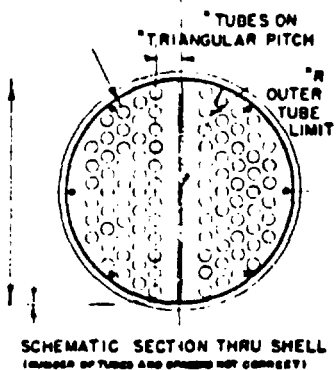
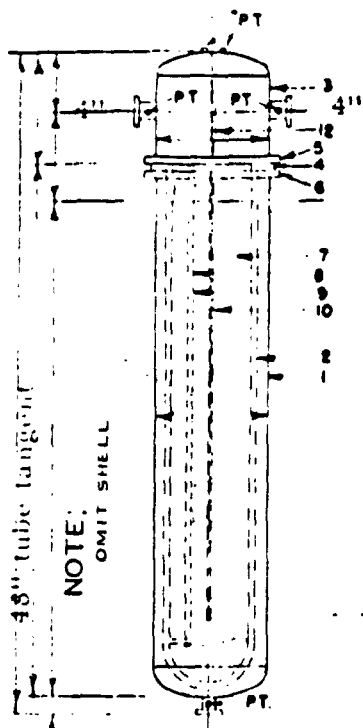
FLANGED CONNECTION DRILLING-150 LB. ASA, SHELL SIDE; 150 LB. ASA TUBE SIDE.

017495

	DESIGN PRESSURE	DESIGN TEMP	TEST PRESSURE HYDRO
TUBE SIDE	75 PSI	350 °F	PSI
SHELL SIDE	150 PSI	350 °F	PSI

TELE 6550E-100B
ENGINEERING DEPARTMENT
CARBIDE & CARBON CHEMICALS CORP
Texas City, Texas
CALADRIA
165 2 FT.
SV 564169-21-2

MECHANICAL SPECIFICATIONS



- 1 SHELL - NONE REQUIRED. or welded
2 TUBES 150-U. 3/4 "O.D. 16 BWG. SEAMLESS ~~COPPER~~ STAINLESS STEEL
3 CHANNEL-~~EXPOSED~~ ~~TO~~ ~~WATER~~ STEEL
4 TUBE SHEET- ~~1/2~~ ~~THICK~~ ~~SEAMLESS~~ STEEL, full face
5 CHANNEL FLANGE-STEEL
6 SHELL FLANGE- NONE REQUIRED.
7 BAFFLES/2 tube supports and 2 baffles
8 SPACERS/ ~~SPACERS~~ ~~BAFFLES~~ ~~EXPOSED~~ ~~TO~~ ~~WATER~~ ~~STAINLESS~~ STEEL
9 TIEROOS- ~~EXPOSED~~ ~~TO~~ ~~WATER~~ ~~STAINLESS~~ STEEL
10 LONGITUDINAL BAFFLE- NONE.
11 STEEL SUPPORTS- NONE REQUIRED.
12 CHANNEL PARTITION- ~~1/2~~ ~~THICK~~ ~~SEAMLESS~~ STEEL

Notes

1. 6-pass tube bundle and channel.
2. Tube bundle to fit inside 24" schedule 20 pipe as vertical knock-down condenser.
3. Choose tube pitch so that bundle fills the space provided.
4. Customer will furnish exact location of tube supports and baffles.
5. Connecting flange to 24" column will be TEMA 75 lb. class.

017496

NOTES

THIS EXCHANGER IS TO BE INSTALLED VERTICALLY. DIMENSIONS ARE APPROXIMATE. MANUFACTURER IS RESPONSIBLE FOR MECHANICAL DESIGN. WEIGHT LISTED IS FOR STEEL. ESTIMATED WEIGHT, FILLED WITH WATER _____ LBS

FLANGED CONNECTION DRILLING: ~~USE 1/2" DIA. DRILL FOR 1/2" DIA. TUBE~~; 75 LB. ASA TUBE SIDE

6. Design, material, fabrication and testing according to ASME Code and TEMA, Class C unless noted.

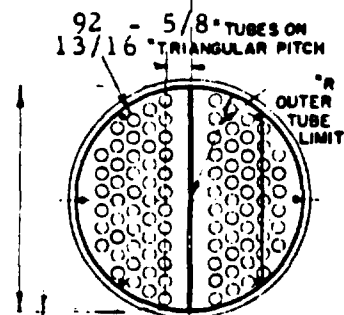
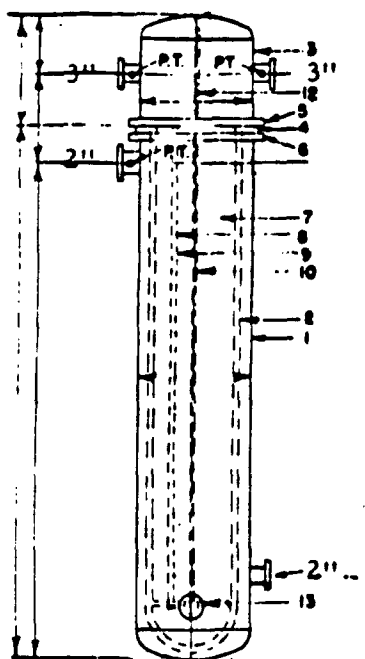
	DESIGN PRESSURE	DESIGN TEMP	TEST PRESSURES HYDRO.
TUBE SIDE	50 PSI	300 °F	PSI

ITEM No 6550E-106C

ENGINEERING DEPARTMENT
CARBIDE & CARBON CHEMICALS CORP
TEXAS CITY, TEXAS
HEAT EXCHANGER-MULTI-PASS-
RETURN BEND 240 50 FT.

11-27-64
JAM SK-564169-81-3

MECHANICAL SPECIFICATIONS



SCHEMATIC SECTION THRU SHELL
(NUMBER OF TUBES AND POWER SET SAME AS 17)

- 1 SHELL 10 "O.D. ~~SEAMLESS STEEL~~ STEEL OR
- 2 TUBES 46-U . 5/8 "O.D. 16 ~~SWS. SEAMLESS HORIZONTAL ROLLER~~ STEEL
- 3 CHANNEL-~~STEEL~~ STEEL
- 4 TUBE SHEET- "THICK ~~SEAMLESS~~ STEEL
- 5 CHANNEL FLANGE-STEEL
- 6 SHELL FLANGE-STEEL
Full set on 2-1/2" pitch
- 7 BAFFLES- "CROSS BAFFLES, ~~STEEL~~ STEEL
- 8 SPACERS- "O.D. ~~STEEL~~ STEEL
- 9 TIEROOS- "O.D. ~~STEEL~~ STEEL
- ~~FOR HORIZONTAL BAFFLES~~ "THICK ~~STEEL~~ STEEL
- 11 SUPPORTS-STEEL
- 12 CHANNEL PARTITION- "THICK ~~STEEL~~ STEEL

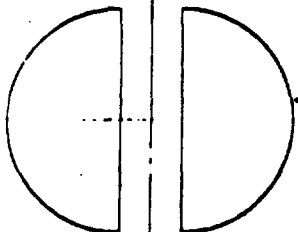
Notes

1. Single pass shell, 4-pass tube side.
2. Bend longest tube from 10 ft. length.
Make shell length to suit.
3. Baffle cut 20% of diameter.
4. Design, material, fabrication, and testing
according to ASME Code and TEMA Class C
unless noted.

NOTES

THIS EXCHANGER IS TO BE INSTALLED ~~VERTICALLY~~ HORIZONTALLY. DIMENSIONS ARE APPROXIMATE. MANUFACTURER IS RESPONSIBLE FOR MECHANICAL DESIGN. ~~WELDED STEEL~~
~~STEEL PIPE WITH A THICKNESS OF 0.06 IN. AND AN OUTSIDE DIAMETER OF 1.315 IN. WITH WELDED END FLANGES~~ STEEL,
~~CONCRETE OR ROCK BOND,~~ ESTIMATED WEIGHT, FILLED WITH WATER _____ LBS.

FLANGED CONNECTION DRILLING: 180LB. ASA, SHELL SIDE; 180LB. ASA TUBE SIDE



017497

	DESIGN PRESSURE	DESIGN TEMP	TEST PRESSURES HYDRO. AIR
TUBE SIDE	75 PSI	300°F	PSI 300
SHELL SIDE	75 PSI	300°F	PSI 300

ITEM No 6550E-108
ENGINEERING DEPARTMENT
CARBIDE & CARBON CHEMICALS CORP.
Texas City, Texas
HEAT EXCHANGER-MULTI-PASS-
RETURN BEND 7580 FT

SPECIFICATIONS FOR PUMP AND MOTOR

ITEMS 930-6550E-113 and E-113A

SCOPE

One, variable capacity, electric driven pump is required for continuous outdoor hazardous area operation.

PERFORMANCE

Volume, GPH	25 to 75 normal 100 Maximum 0 Minimum
Pressure, psig Discharge	35 normal 125 maximum
Suction	18 normal 50 maximum

FLUID PUMPED

Temperature:	230°F Normal ✓ 250°F Maximum
Classification:	Light hydrocarbon oil and isopropanol in 50-50% mixture, non-corrosive; no suspended solids.
Specific Gravity:	0.77 @ temperature
Viscosity:	Approximately 8 cp @ temperature
N. P. S. H. Available:	10 Ft., Minimum

017498

DRIVER

Electric motor to be _____ HP, _____ RPM, 3 phase, 60 cycle 440 volt, fully impregnated, void free, epoxy encapsulated with drip-proof chemical plant enclosure, with cast iron terminal box and Parkerized hex head cap screws. Suitable for Class I, Division II locations. Ventilating fan shall be of spark-proof and corrosion-proof material. Air inlet opening shall have corrosion-proof screen covers, openings shall be small enough to prevent entry of 1/2" round rod. Internal material surfaces of frame and enclosure are to be of non-corroding material or properly prepared and coated with epoxy base or approved equal paint. Nameplate shall be of corrosion-proof metal and bearings shall be double shielded.

VARIABLE CAPACITY DEVICE

To be offered by pump manufacturer in constant speed input, variable stroke or constant stroke, variable input (sheave) speed. Include pneumatic control for continuous remote operation of capacity variation.

MATERIALS OF CONSTRUCTION

Manufacturer's recommendation

GUARANTEE:

Manufacturer's standard on time limit

TECHNICAL DETAILS

Five copies of the selected manufacturer's certified installation drawings, parts lists and operating instructions are to be a part of these specifications and forwarded to Union Carbide Corporation, Chemicals Division, P. O. Box 186, Port Lavaca, Texas 77979; Attn: J. L. Warner. Questions on and information relating to these specifications may be similarly directed.

017499

SPECIFICATIONS FOR STORAGE TANK

6550E-114, 115

to be added later

SPECIFICATIONS FOR PUMP AND MOTOR

ITEMS 930-6550E-118 and 118A

SCOPE

One electric driven, centrifugal pump for transfer (intermittent) service in outdoor hazardous area operation.

PERFORMANCE

Volume	100 gpm
Total Head	100 ft.
Suction Pressure	7 psig
Discharge Pressure	40 psig

PUMPED FLUID

Material	Refined Isopropanol
Specific Gravity	0.75 (Ref. to 20°C water)
Viscosity	2.4 cp
Temperature	130°F
NPSH Available	in excess of 20'

DRIVER

Electric motor to be _____ HP, _____ RPM, 3 phase, 60 cycle 440 volt, fully impregnated, void free, epoxy encapsulated with drip-proof chemical plant enclosure, with cast iron terminal box and Parkerized hex head cap screws. Suitable for Class I, Division II locations. Ventilating fan shall be of spark-proof and corrosion-proof material. Air inlet opening shall have corrosion-proof screen covers, openings shall be small enough to prevent entry of 1/2" round rod. Internal metal surfaces of frame and enclosure are to be of non-corroding material or properly prepared and coated with epoxy base or approved equal paint. Nameplate shall be of corrosion-proof material and bearings shall be double shielded.

MECHANICAL DETAILS

017501

Centrifugal, in-line mount, or horizontal, end suction. Closed impeller, solid shaft, oil lube, ball bearing, fitted with shaft seal.

Cast iron casing, cast iron impeller, steel shaft. Flanged connections, 150# ASA, RF.

Shaft seal to be single, inside, unbalanced. Pump manufacturer shall quote Durametallic type ROTT in 316 SS as extra if not an O. E. M. standard. Preferred materials are Kalamate, #5 carbon and glass filled teflon.

UNION CARBIDE CHEMICALS COMPANY		SHOP ORDER TRANSMITTAL		DATE 2-26-65	SHEET 1 of 1
PROJECT 930-6550 - H. P. Poly Isopropanol Recovery System		MAJOR SUBJECT Instrumentation Specifications		TRANSMITTAL NO.	
LOCATION <u>Plant 510</u>		ISSUED FOR			

DISTRIBUTION	TRANSMITTAL	ATTACHMENTS
J. Warner	1	1
J. F. Tamborello	1	3
T. Rogstad	1	1
D. F. Peyton	1	1
G. L. Funk	1	1
R. G. Ziefle	1	1
J. J. Walthall	1	1
J. H. Wieting	1	1
D. L. Buchanan	1	1
J. M. McBride	1	1
D. L. Wiley	1	1
J. C. Upchurch	1	1

DRAWING NUMBER	SHOP ORDER	ISSUE	B.M. NO.	DESCRIPTION
SK-510-6550-101				<i>John R:</i> See - 10 List in 510-6550-117
SK-510-6550-103				
SK-510-6550-107				
SK-510-6550-109				
SK-510-6550-110				
SK-510-6550-111				
SK-510-6550-112				
SK-510-6550-116				
SK-510-6550-119				
SK-510-6550-120				

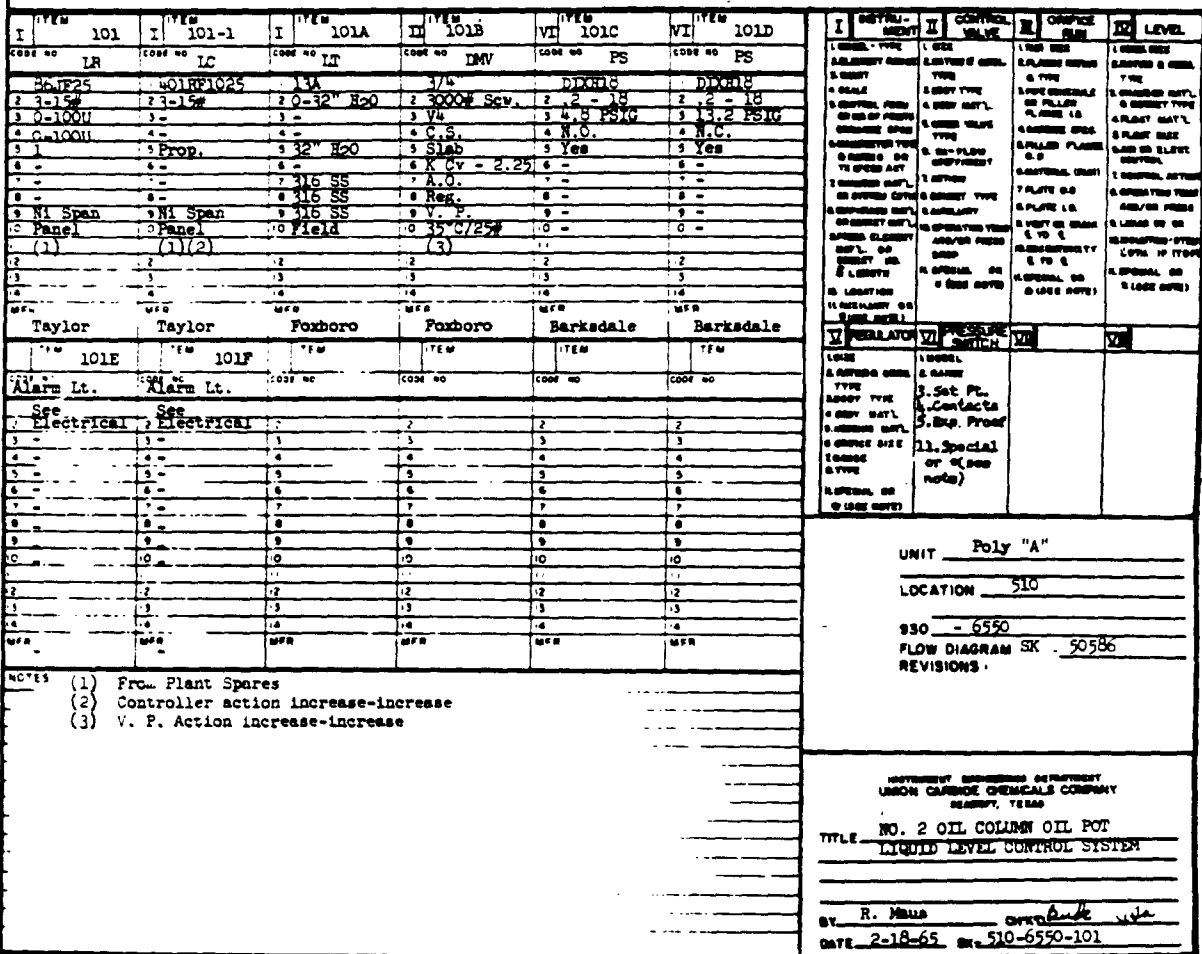
017502

REMARKS:

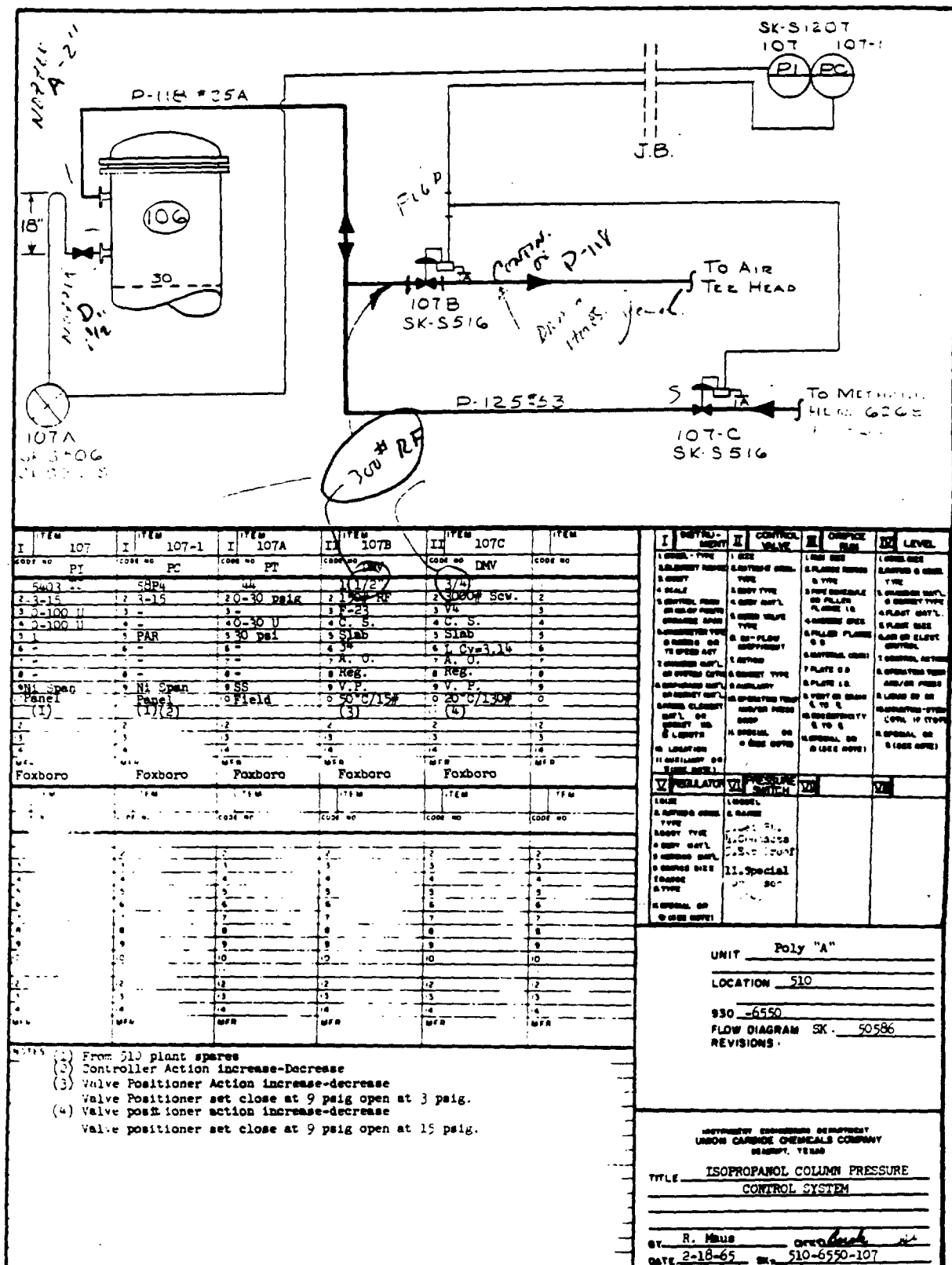
 Please insert these pages in your Design Report. Instrument Specification SK-510-6550-117 referred to on Page 27 of design report was combined with SK-510-6550-116 therefore -117 will not be issued. This completes all instrument specs.

D. L. Buchanan

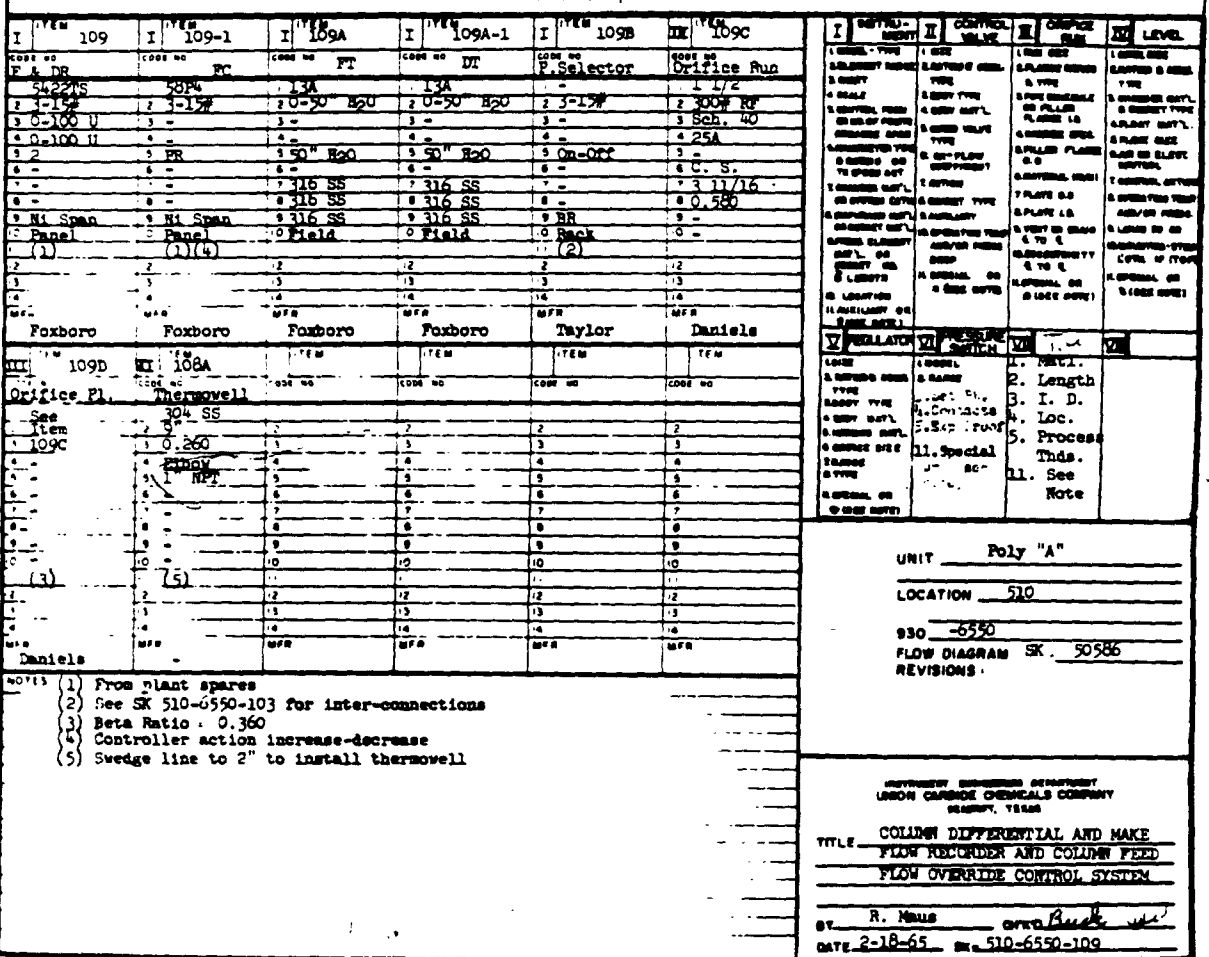
 ISSUED BY



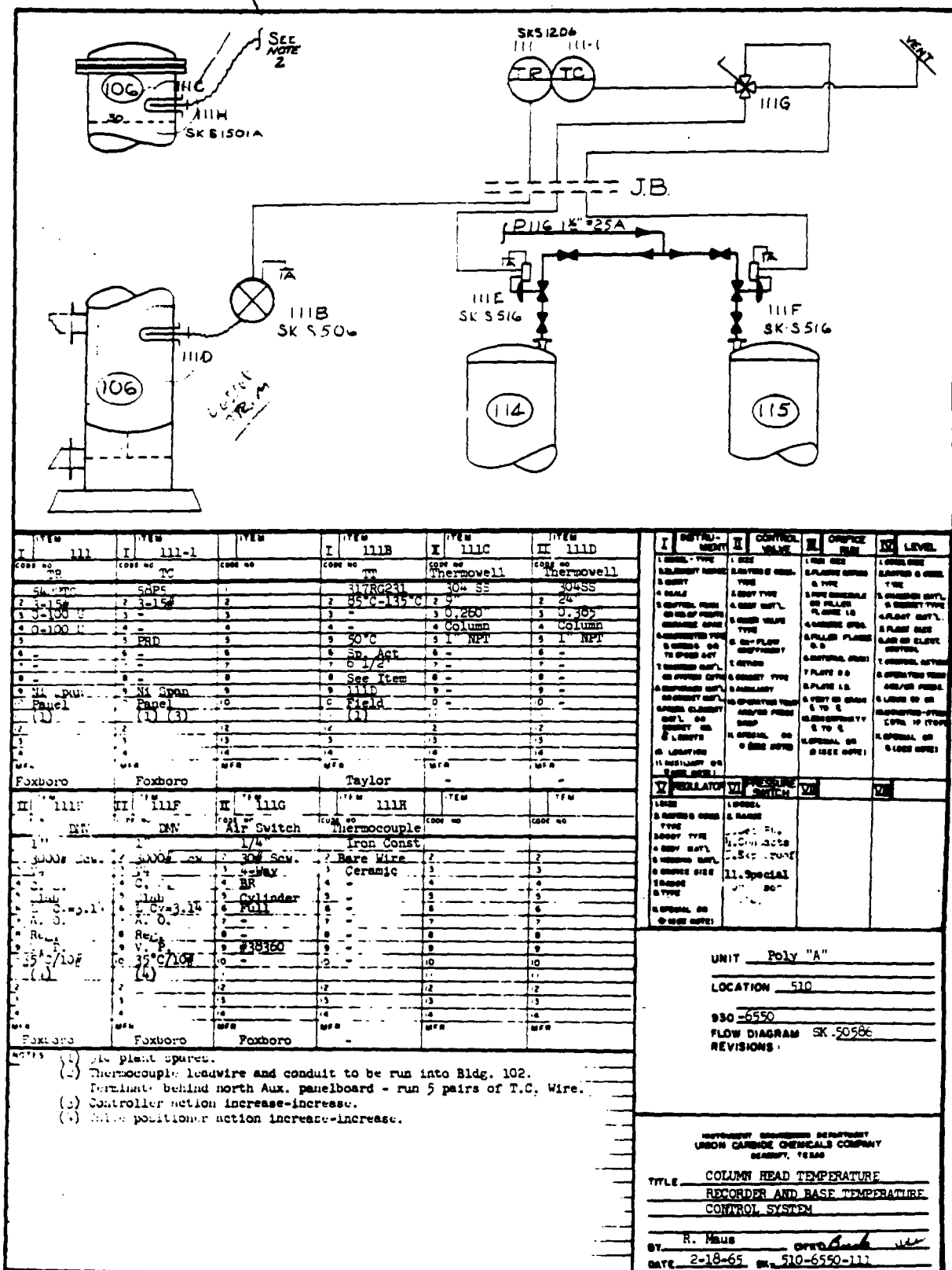
017503



017505

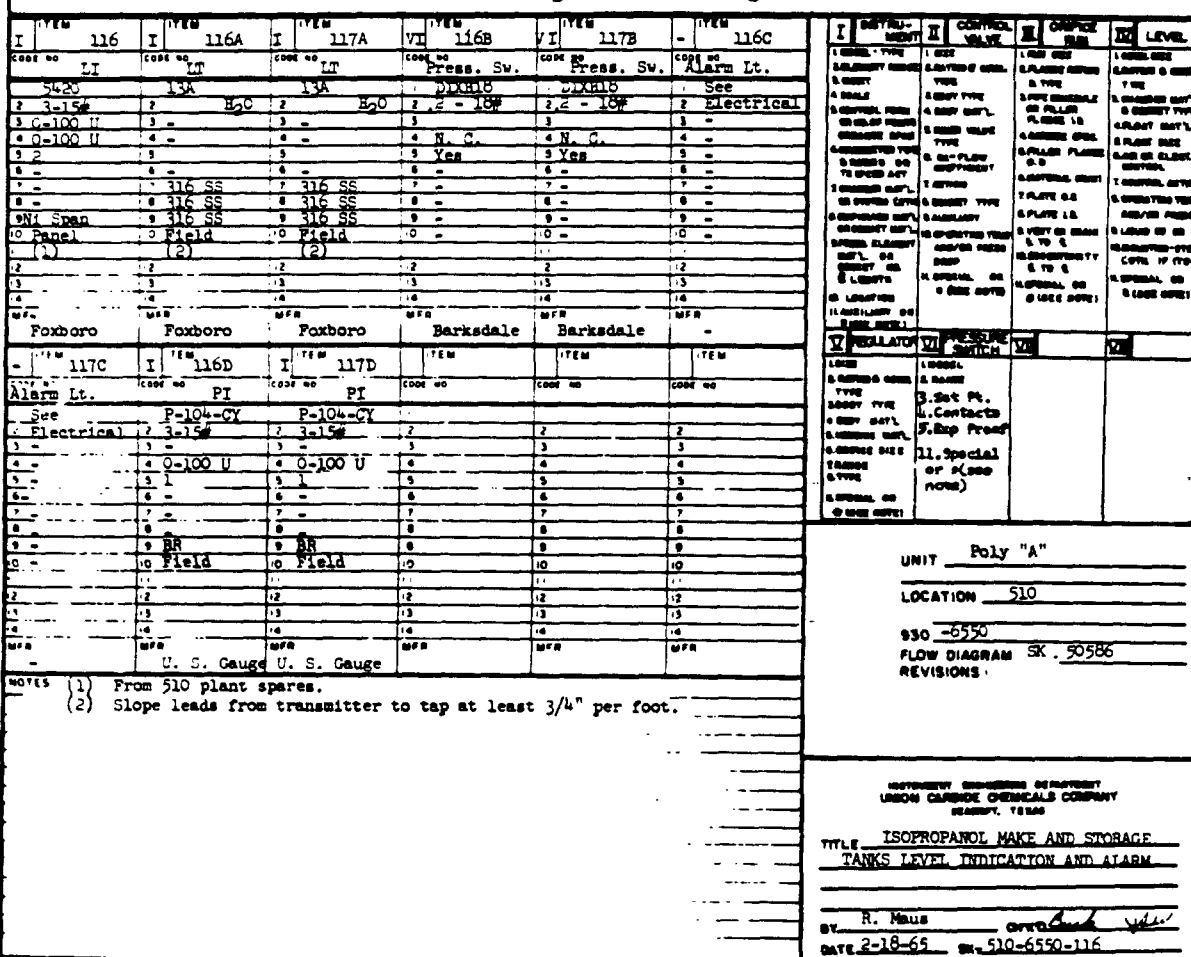


017506



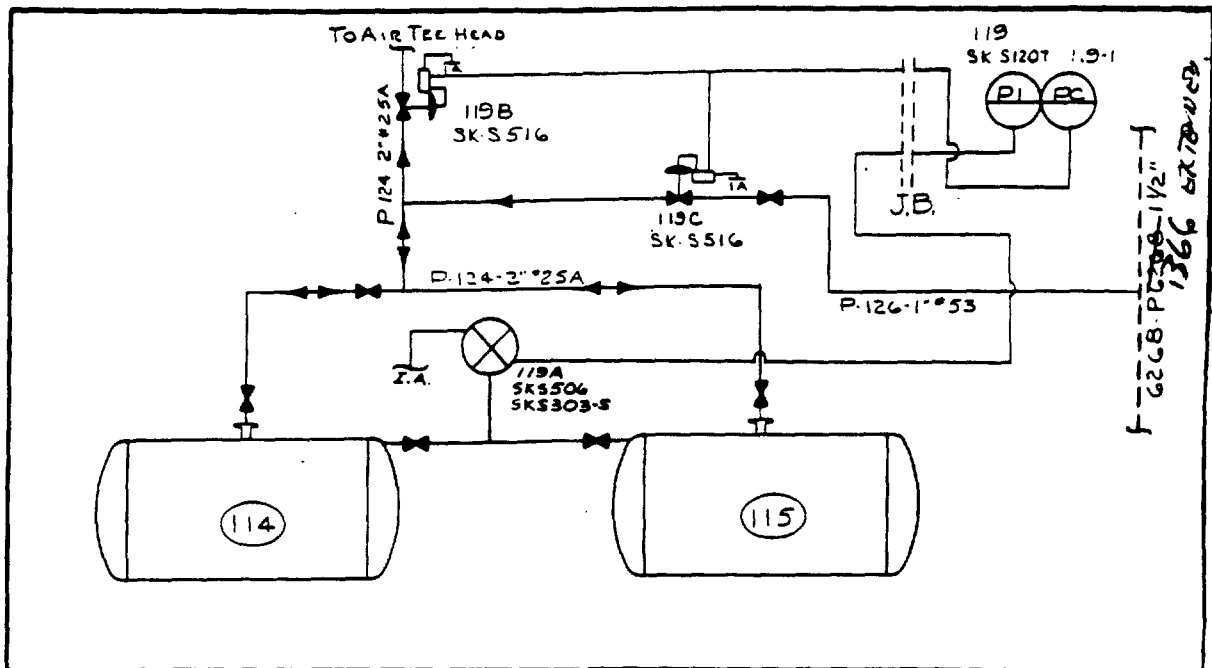
I ITEM	II ITEM	III ITEM	IV ITEM	V ITEM	VI ITEM
CODE NO	CODE NO	CODE NO	CODE NO	CODE NO	CODE NO
1 111	1 111-1	1 111	1 111B	1 111C	1 111D
2 3-150	2 3-150	2 3-150	2 3-150	2 3-150	2 3-150
3 3-150	3 3-150	3 3-150	3 3-150	3 3-150	3 3-150
4 0-100	4 0-100	4 0-100	4 0-100	4 0-100	4 0-100
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9
10	10	10	10	10	10
11	11	11	11	11	11
12	12	12	12	12	12
13	13	13	13	13	13
14	14	14	14	14	14
15	15	15	15	15	15
16	16	16	16	16	16
17	17	17	17	17	17
18	18	18	18	18	18
19	19	19	19	19	19
20	20	20	20	20	20
21	21	21	21	21	21
22	22	22	22	22	22
23	23	23	23	23	23
24	24	24	24	24	24
25	25	25	25	25	25
26	26	26	26	26	26
27	27	27	27	27	27
28	28	28	28	28	28
29	29	29	29	29	29
30	30	30	30	30	30
31	31	31	31	31	31
32	32	32	32	32	32
33	33	33	33	33	33
34	34	34	34	34	34
35	35	35	35	35	35
36	36	36	36	36	36
37	37	37	37	37	37
38	38	38	38	38	38
39	39	39	39	39	39
40	40	40	40	40	40
41	41	41	41	41	41
42	42	42	42	42	42
43	43	43	43	43	43
44	44	44	44	44	44
45	45	45	45	45	45
46	46	46	46	46	46
47	47	47	47	47	47
48	48	48	48	48	48
49	49	49	49	49	49
50	50	50	50	50	50
51	51	51	51	51	51
52	52	52	52	52	52
53	53	53	53	53	53
54	54	54	54	54	54
55	55	55	55	55	55
56	56	56	56	56	56
57	57	57	57	57	57
58	58	58	58	58	58
59	59	59	59	59	59
60	60	60	60	60	60
61	61	61	61	61	61
62	62	62	62	62	62
63	63	63	63	63	63
64	64	64	64	64	64
65	65	65	65	65	65
66	66	66	66	66	66
67	67	67	67	67	67
68	68	68	68	68	68
69	69	69	69	69	69
70	70	70	70	70	70
71	71	71	71	71	71
72	72	72	72	72	72
73	73	73	73	73	73
74	74	74	74	74	74
75	75	75	75	75	75
76	76	76	76	76	76
77	77	77	77	77	77
78	78	78	78	78	78
79	79	79	79	79	79
80	80	80	80	80	80
81	81	81	81	81	81
82	82	82	82	82	82
83	83	83	83	83	83
84	84	84	84	84	84
85	85	85	85	85	85
86	86	86	86	86	86
87	87	87	87	87	87
88	88	88	88	88	88
89	89	89	89	89	89
90	90	90	90	90	90
91	91	91	91	91	91
92	92	92	92	92	92
93	93	93	93	93	93
94	94	94	94	94	94
95	95	95	95	95	95
96	96	96	96	96	96
97	97	97	97	97	97
98	98	98	98	98	98
99	99	99	99	99	99
100	100	100	100	100	100

017508



TITLE ISOPROPANOL MAKE AND STORAGE
TANKS LEVEL INDICATION AND ALARM

BY R. Maus OK'D [Signature]
DATE 2-18-65 TEL. 510-6550-116



ITEM	ITEM	ITEM	ITEM	ITEM	ITEM
119	119-1	119A	119B	119C	
CODE NO PI	CODE NO PC	CODE NO PT	CODE NO DMV	CODE NO DMV	CODE NO
50335	58PL		1/2"	1/2"	
2 3-15#	2 3-15#	2 0-15#	2 3000# Scv.	2 3000# Scv.	2
3 -	3 -	3 -	3 V-1	3 V-1	3
4 0-100 U	4 -	4 0-15 U	4 C. S.	4 C. S.	4
5 1	5 PR	5 15#	5 Slab	5 Slab	5
6 -	6 -	6 -	6 C. Cv = .28	6 C. Cv = .28	6
7 -	7 -	7 -	7 A. O.	7 A. O.	7
8 -	8 -	8 -	8 Reg.	8 Reg.	8
9 Ni Span	9 Ni Span	9 SS	9 V. P.	9 V. P.	9
Panel (1)	Panel (1)(2)	Field (5)	0 Amp/5#	0 Amp/80#	0
10 -	10 -	10 -	10 -	10 -	10
11 -	11 -	11 -	11 -	11 -	11
12 -	12 -	12 -	12 -	12 -	12
13 -	13 -	13 -	13 -	13 -	13
14 -	14 -	14 -	14 -	14 -	14
MFR	MFR	MFR	MFR	MFR	MFR
Foxboro	Foxboro	Foxboro	Foxboro	Foxboro	

NOTES

- (1) From 510 plant spares.
- (2) Controller action increase-decrease.
- (3) Valve Positioner action increase-decrease.
- (4) Valve positioner action increase-increase.
- (5) Slope leads from 119A to tap at least 3/4" per foot.

I. DETAIL	II. CONTROL	III. INSTRUMENT	IV. LEVEL
1. INSTR. TYPE 2. INSTR. CODE 3. INSTR. TYPE 4. INSTR. CODE 5. INSTR. TYPE 6. INSTR. CODE 7. INSTR. TYPE 8. INSTR. CODE 9. INSTR. TYPE 10. INSTR. CODE 11. INSTR. TYPE 12. INSTR. CODE 13. INSTR. TYPE 14. INSTR. CODE 15. INSTR. TYPE 16. INSTR. CODE 17. INSTR. TYPE 18. INSTR. CODE 19. INSTR. TYPE 20. INSTR. CODE	1. INSTR. TYPE 2. INSTR. CODE 3. INSTR. TYPE 4. INSTR. CODE 5. INSTR. TYPE 6. INSTR. CODE 7. INSTR. TYPE 8. INSTR. CODE 9. INSTR. TYPE 10. INSTR. CODE 11. INSTR. TYPE 12. INSTR. CODE 13. INSTR. TYPE 14. INSTR. CODE 15. INSTR. TYPE 16. INSTR. CODE 17. INSTR. TYPE 18. INSTR. CODE 19. INSTR. TYPE 20. INSTR. CODE	1. INSTR. TYPE 2. INSTR. CODE 3. INSTR. TYPE 4. INSTR. CODE 5. INSTR. TYPE 6. INSTR. CODE 7. INSTR. TYPE 8. INSTR. CODE 9. INSTR. TYPE 10. INSTR. CODE 11. INSTR. TYPE 12. INSTR. CODE 13. INSTR. TYPE 14. INSTR. CODE 15. INSTR. TYPE 16. INSTR. CODE 17. INSTR. TYPE 18. INSTR. CODE 19. INSTR. TYPE 20. INSTR. CODE	1. INSTR. TYPE 2. INSTR. CODE 3. INSTR. TYPE 4. INSTR. CODE 5. INSTR. TYPE 6. INSTR. CODE 7. INSTR. TYPE 8. INSTR. CODE 9. INSTR. TYPE 10. INSTR. CODE 11. INSTR. TYPE 12. INSTR. CODE 13. INSTR. TYPE 14. INSTR. CODE 15. INSTR. TYPE 16. INSTR. CODE 17. INSTR. TYPE 18. INSTR. CODE 19. INSTR. TYPE 20. INSTR. CODE

UNIT Poly "A"

LOCATION 510

930-6550

FLOW DIAGRAM SK-50586

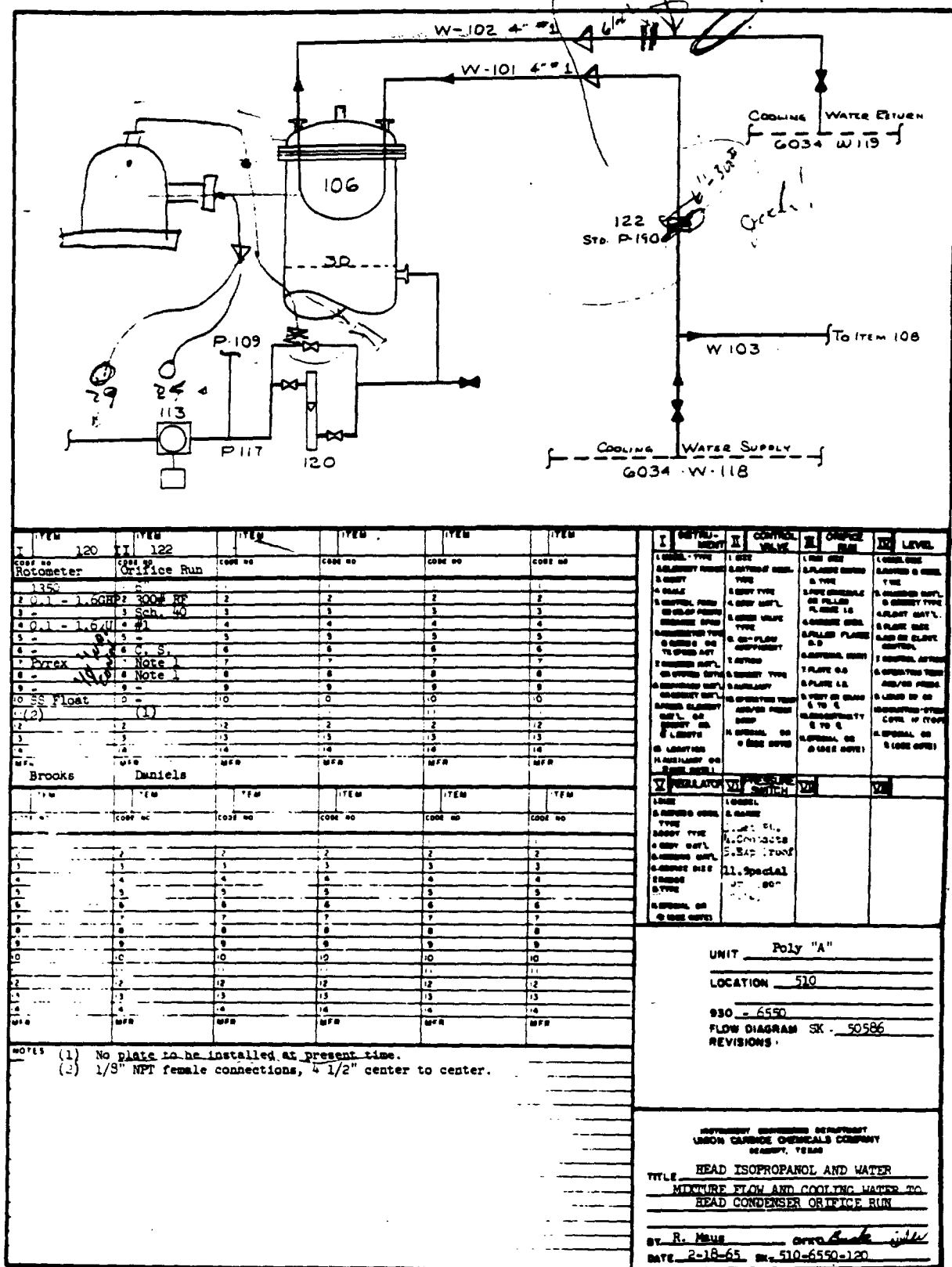
REVISIONS:

UNION CARBIDE CHEMICALS COMPANY
LABORATORY, TEXAS

TITLE ISOPROPANOL MAKE AND STORAGE
TANKS PRESSURE INDICATING CONTROL
SYSTEM

BY R. Maus

DATE 2-18-65



017512

~~The following Instrument Specifications to be completed and added later:~~

SK-510-6550-101

SK-510-6550-103

SK-510-6550-107

SK-510-6550-109

SK-510-6550-110

SK-510-6550-111

SK-510-6550-112

SK-510-6550-116, ~~117~~ 117-118-119

SK-510-6550-119

SK-510-6550-120

Equipment to be Insulated

SK-80586

<u>Item</u>	<u>Normal Operating Temperature</u>	<u>Remarks</u>
6550E-106 Column	Head - 100°C Base - 120°C	
6550E-106B Calandria	Shell - 160°C	
6550E-108 Cooler	Shell - 100°C	For personnel protection only
6550E-113 Pump	120°C	For personnel protection only

Piping to be Insulated

SK-80586

<u>Line No.</u>	<u>Normal Operating Temperature</u>	<u>Remarks</u>
P-109 <i>COND. TRAIL LINE</i>	130°C	For personnel protection only
P-110 <i>TO COND. TRAIL LINE</i>	130°C	For personnel protection only
P-112 <i>TO COND. TRAIL LINE</i>	130°C	For personnel protection only
P-113 <i>TO COND. TRAIL LINE</i>	130°C	For personnel protection only
P-114 <i>TO COND. TRAIL LINE</i>	110°C	For personnel protection only
P-115 <i>TO COND. TRAIL LINE</i>	110°C	For personnel protection only
P-118 <i>COND. TRAIL LINE</i>	120°C	Steam trace and insulate to prevent condensation
MS-101	175°C	-
MS-102	175°C	-
MS-103	175°C	-
MS-104	175°C	-
SC-101	150°C	-
SC-102	150°C	-

LINE LIST

Line Numbers Refer to SK-80586

(All line numbers are proceeded by prefix 6550)

<u>Line No.</u>	<u>Size</u>	<u>Spec.</u>	<u>From</u>	<u>To</u>	<u>Material Handled</u>
P-101	<u>P.S.</u> 1-1/2"	25A	6550E-100	6550E-102	Isop - Oils <u>ENDS</u>
P-102	<u>Spec.</u> 3"	25A	6550E-102	Flare Hdr	Hydrocarbon Gas
P-103			Not used		
P-104	<u>Spec.</u> 2"	25A	6550E-102	6550E-104	Isop - Oils
P-105	<u>P.S.</u> 1-1/2"	25A	6550E-104	6550E-106	Isop - Oils <u>ENDS</u>
P-106	<u>Spec.</u> 1-1/2"	25A	P-105	6550E-102	Isop - Oils
P-107	<u>Spec.</u> 1"	25A	P-105	6550E-102	Isop - Oils
P-108	<u>Spec.</u> 1-1/2"	25A	P-105	6550E-106	Isop - Oils
P-109	<u>Spec.</u> 1"	25A	6550E-106	6550E-113	Isop - Oils
P-110	<u>P.S.</u> 1", 1-1/2"	25A	6550E-113	Dirty oil tank	Isop - Oils <u>COL ENDS</u>
P-111	<u>P.S.</u> 1-1/2"	25A	6550E-102	P-110	Isop - Oils <u>@ TANK.</u>
P-112	<u>P.S.</u> 1"	25A	P-110	6034E-125	Isop - Oils <u>@ Pump.</u>
P-113	<u>Spec.</u> 1"	25A	P-110	P-109	Isop - Oils
P-114	<u>Spec.</u> 1-1/2"	25A	6550E-106	6550E-108	Isopropanol
P-115	<u>Spec.</u> 1-1/2"	25A	6550E-106	P-114	Isopropanol
P-116	<u>P.S.</u> 1-1/2"	25A	6550E-108	6550E-114 & 115	Isopropanol <u>from MIX TO RACIC</u>
P-117	<u>Spec.</u> 3/4"	25A	6550E-106	P-109	Isop - Water
P-118	<u>Spec.</u> 2"	25A	6550E-106	Air	Vent Gas
P-119	<u>Spec.</u> 3"	25A	6550E-114, 115	6550E-118	Isopropanol
P-120	<u>P.S.</u> 2"	25A	6550E-118	Isop Unloading Header	Isopropanol <u>@ Pump</u>

LINE LIST - SK-80586 (Continued)

<u>Line No.</u>	<u>Size</u>	<u>Spec.</u>	<u>From</u>	<u>To</u>	<u>Material Handled</u>
P-121 PS	2"	25A	P-120	Isop Feed Tank	Isopropanol @ Pump
P-122			Not Used		
P-123 ^{Feed} _{Dist.}	1-1/2"	25A	P-120	P-105	Isopropanol
P-124 Spool	2"	25A	6550E-114 & 115	Air	Vent Gas
P-125 PS	1"	53	6268-P-1366	P-118	Methane @ Column
P-126 PS	1"	53	6268-P-1366	P-124	Methane @ Column

SPECIAL SPOOLS —

UNDER REEFER VALVE — 106E (Column)
106D

3 Pump — 1.3.

TO MOBILE PUMP P-124 @ 104

PS (partial Spec)

LINE LIST

Line Numbers Refer to SK-50586

(All line numbers are preceded by prefix 6550)

<u>Line No.</u>	<u>Size</u>	<u>Spec.</u>	<u>From</u>	<u>To</u>	<u>Material Handled</u>	<u>Remarks</u>
MS -101	3" Spec-2		MS-103 4"	Isop System	75# Steam	Use Seadrift Spec. ^{Complete}
MS-102	1" Spec-2		MS-101	P-118	75# Steam	For Snuffing
MS-103	3", 2" Spec-2		MS-101	6550E-106B	75# Steam	
MS-104	1" PS 2		MS -101	P-124	75# Steam	For Snuffing @ Tanks
SC-101	2" Spec-2		6550E-106B	Stm Cond Hdr	Stm Condensate	
SC-102	1" Spec-2		MS-101	Stm Cond Hdr	Stm Condensate	
W-101	4" Spec-1		6034W-118	6550E-106	Water	
W-102	4" Spec-1		6550E-106	6034-119	Water	
W-103	1-1/2" 1 Spec		W-101	6550E-108	Water	
W-104	1-1/2" 1 Spec		6550E-108	W-102	Water	
W-105	1/2" - PS		W-101	Ground	Water	Use Cu Tubing @ Top
W-106	1/2" - PS		W-102	Ground	Water	Use Cu Tubing @ Top

- A ALL ITEM NUMBERS ARE PREPARED BY 6550.E UNLESS OTHERWISE NOTED
- B VALVES GA 1193 (SERIES) UP TO 1 1/2" SIZE MAY BE SUBSTITUTED FOR VALVES GA 1191
- C PROVIDE FULLER FLANGES UNDER RELIEF VALVES PER ENR 370, P. 89
- D PROVIDE GATE OUT FLANGE UNDER SAFETY VALVE 6550.E. 105.8-4
- E PROVIDE STEEL IN WATER SUPPLY HOSE FOR POSSIBLE FUTURE USE OF BOOSTER PUMP
- F TO BE ACCESSIBLE FROM GROUND LEVEL
- G DUE TO SAFETY VALVE TO BE EXTENDED SO THAT SAFETY VALVE IS MOUNTED ABOVE UPPER COLUMN, PING STAND SUPPORT
- H LINE 1222 TO BE INSTALLED IN SUCH A MANNER TO ACT AS COMMON OVER FLOW FOR TANKS 6550.E. 114 AND 115
- I PROVIDE DOWN HOLES IN LOW POINT OF LINES P. 119 AND P. 124 DOWN STREET OF VENT CONTROL VALVES
- J MOUNT PRESSURE GAGE 6550.E. 105.8-4 AT THE LEVEL ABOVE GAGE AND PROVIDE BLOWOUT ON GAGE LEG
- K PROVIDE 1 1/2" GA 1199 IN 6550.E. 105.8-4 AT ENTRANCE TO POLYETHYLENE UNIT TO SERVE AS AN EMERGENCY SHUT OFF VALVE. NOT SHOWN ON FLOW DIAGRAM
- L INSTALL METICAL STANDPIPE 24" HIGH IN PUMP SUCTION. FIELD ASSEMBLY FROM 2" SDR 40 EXTEND TANK INTO TANK 8". FURNISH TANK FROM 1/2" AND 1/4" OR CL TIONS

VALVE AND PUMP SPECIFICATION USED ARE AS FOLLOWS:

SPECIFICATION	SERVICE	DATE
SPEC. 11 (REAGENT PLANT)	WATER	NO DATE
SPEC. 12 (REAGENT PLANT)	STEAM	NO DATE
SPEC. 13 (REAGENT PLANT)	STEAM	NO DATE
SPEC. 14 (REAGENT PLANT)	STEAM	NO DATE
SPEC. 15 (REAGENT PLANT)	STEAM	NO DATE

LAST LINE NO. USED ON THIS DRAWING: P. 119, P. 123, P. 124, P. 125, P. 126

REVISION	DATE	BY	APP'D
1			
2			
3			

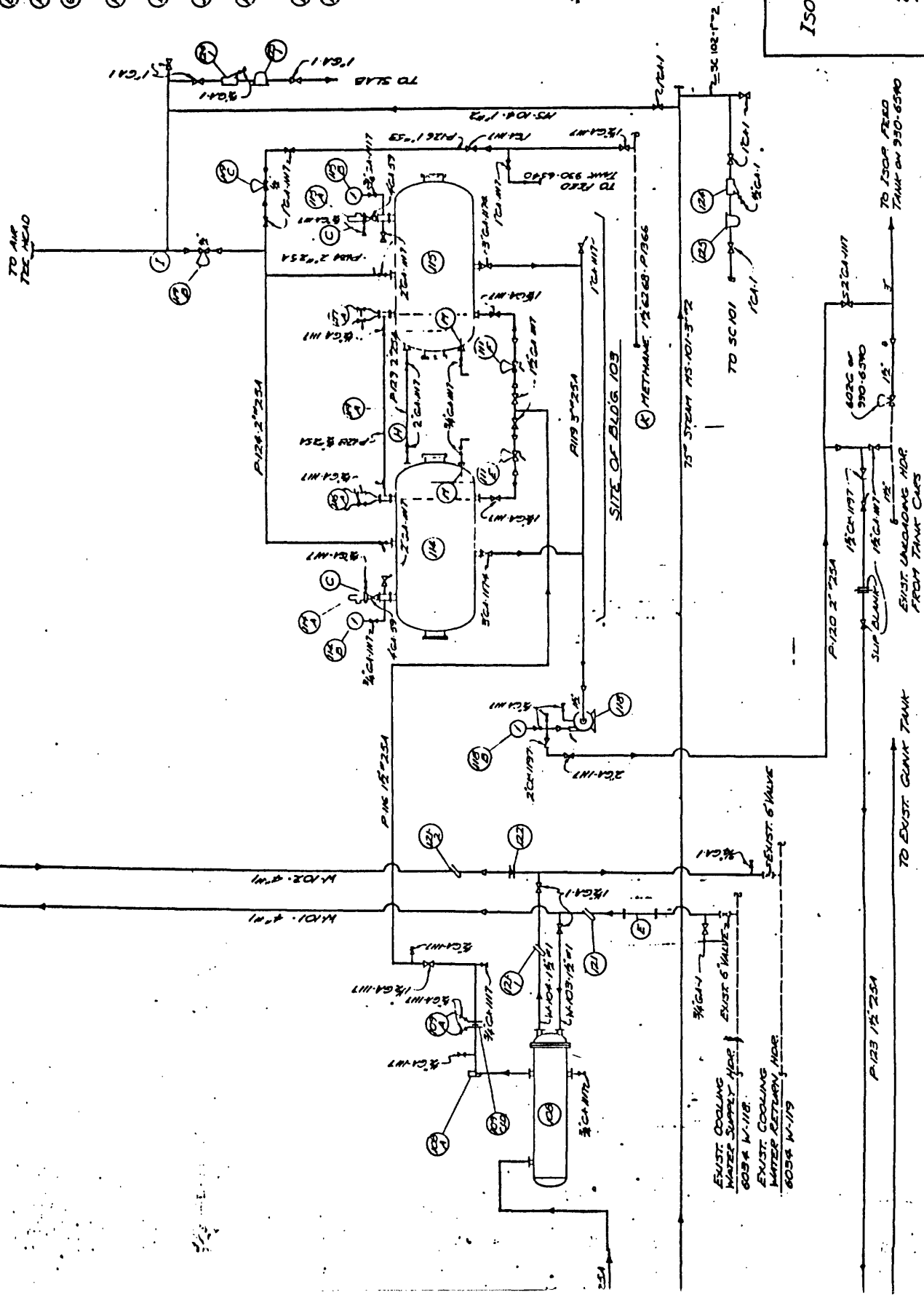
FLOW DIAGRAM

ISOPROPANOL RECOVERY SYSTEM HIGH PRESSURE POLYETHYLENE SEADRIFT, TEXAS

930-6550

OWN BY: PAN-AM
CUT BY: J. P. T.
APPROVED BY: J. P. T.

SK-50586



ISOPROPANOL RECOVERY SYSTEM HIGH PRESSURE POLYETHYLENE SEADRIFT, TEXAS

FLOW DIAGRAM

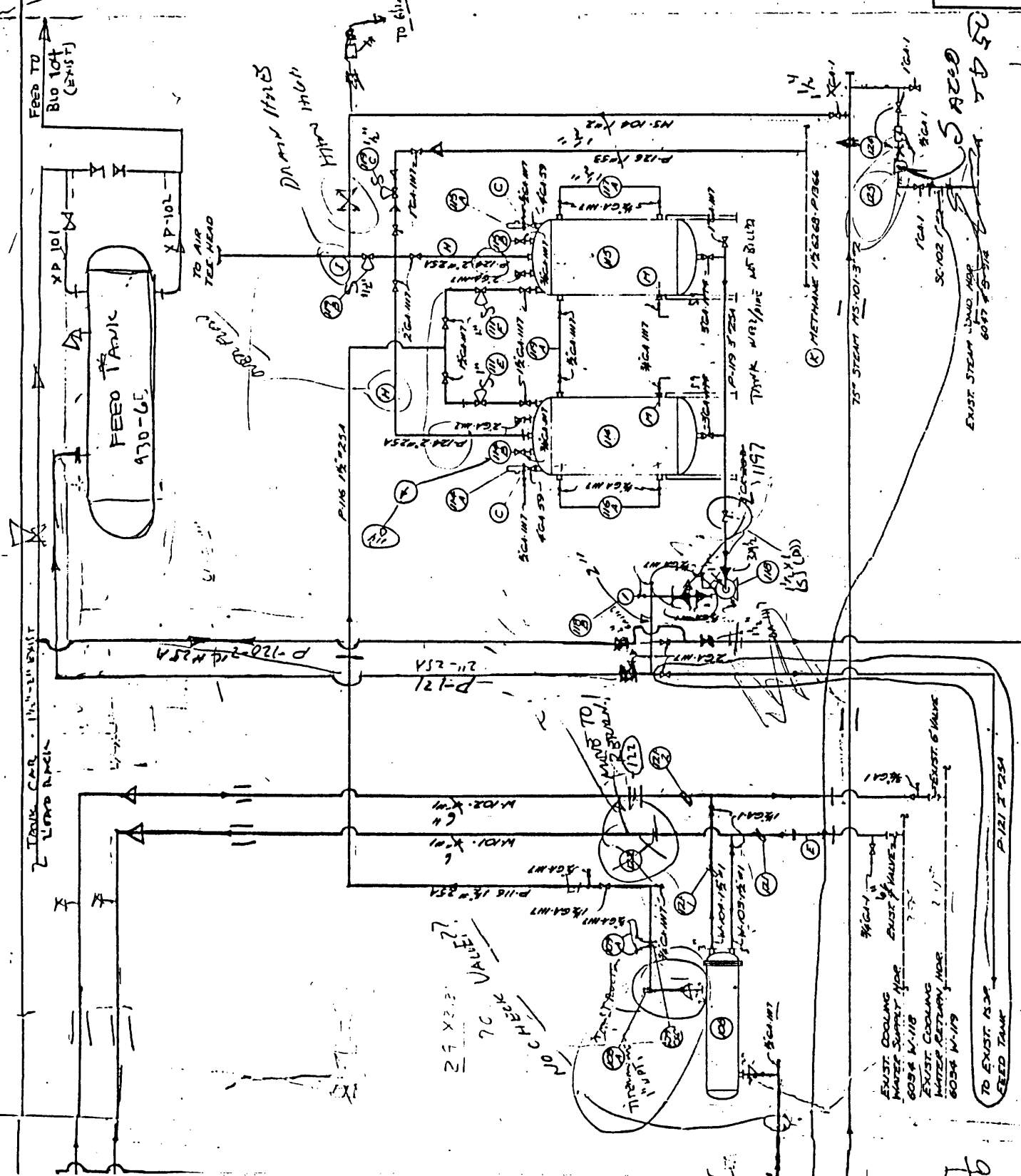
NOTES

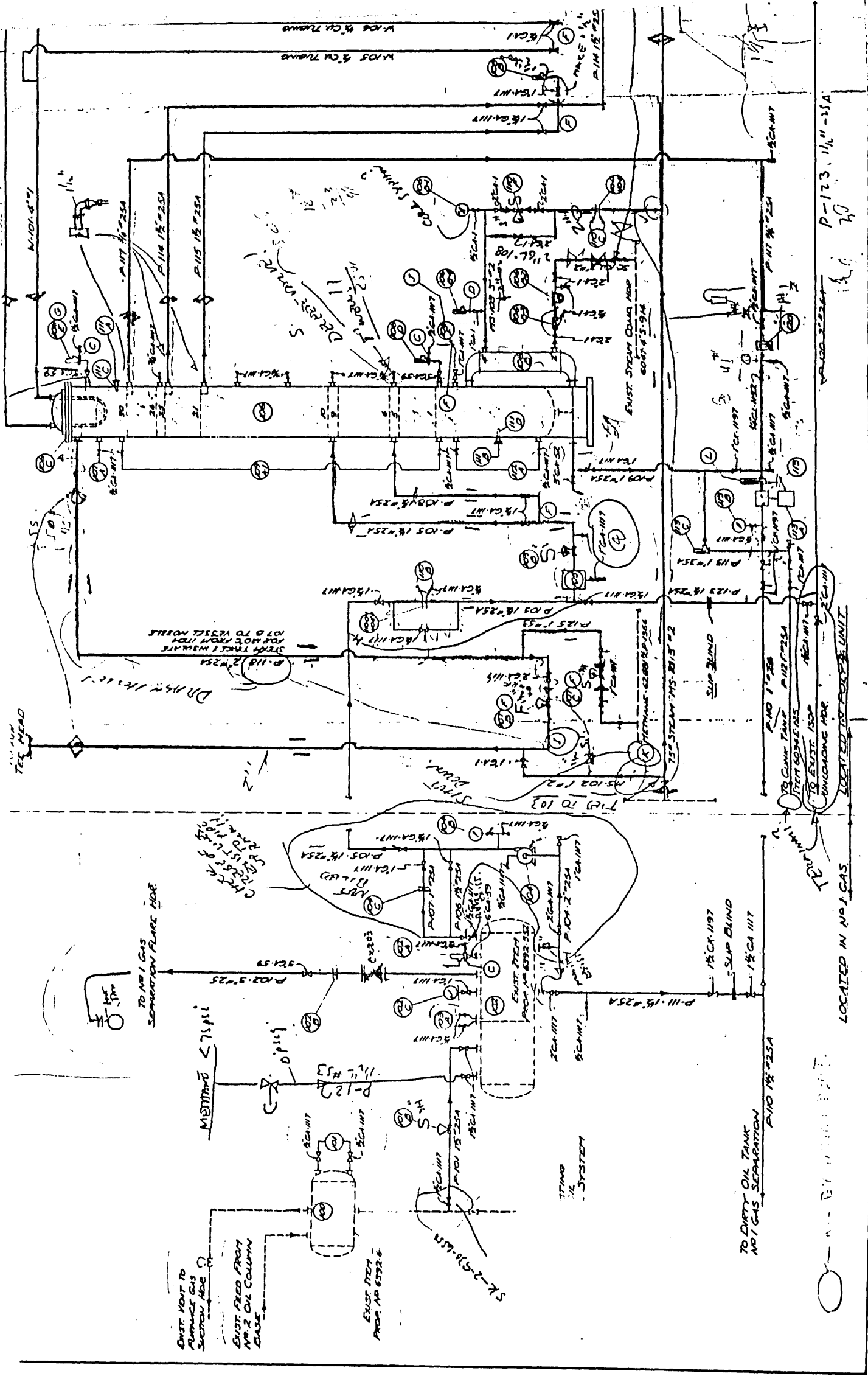
- (A) ALL ITEM NUMBERS ARE PREFIXED BY 6550E UNLESS OTHERWISE NOTED
- (B) VALVES CA-189 (SERVED) UP TO 1/2" SIZE MAY BE SUBSTITUTED FOR VALVES CA-187
- (C) PROVIDE FULLER FLANGE UNDER RELIEF VALVES PER ENG. 372 P. 89
- (D) PROVIDE BREAK OUT FLANGE UNDER SAFETY VALVE 6550E. 105.8-4
- (E) PROVIDE SPONGE IN WATER SUPPLY HOSE FOR POSSIBLE FUTURE USE OF BOOSTER PUMP
- (F) TO BE ACCESSIBLE FROM GROUND LEVEL
- (G) DUCT TO SAFETY VALVE TO BE EXTENDED SO THAT SAFETY VALVE IS MOUNTED ABOVE UPPER COLUMN AND STAND SUPPORT
- (H) LINE P-124 TO BE INSTALLED IN SUCH A MANNER TO ACT AS COMMON CHIEF FEED FOR TANKS 6550E. 114 AND 115
- (I) PROVIDE DOWN VALVES IN LOW POINT OF LINES P-118 AND P-119 DOWN STREET OF MOUNT CONTROL VALVES
- (J) MOUNT PRESSURE GAGE 6550E. 105.7 AT 1/2" LEAK, ABOVE GAGE AND PROVIDE BLOWOFF ON GAGE LEAD
- (K) PROVIDE 1/2" CA-189 IN 63.68. P. 186 AT ENTRANCE TO POLYETHYLENE UNIT TO SERVE AS AN EMERGENCY SHUT OFF VALVE. NOT SHOWN ON FLOW DIAGRAM
- (L) INSTALL VERTICAL STANDPIPE 24" HIGH IN PUMP SECTION. FIELD MOUNTED ABOUT 2' FROM THE EXTEND TOWARD INTO TANK 8". RELOCATE TOWER FROM 8" TO 0' OR CL. TUBING

VALVE AND PUMP SPECIFICATION USED ARE AS FOLLOWS:

SPECIFICATION	SERVICE	DATE
SPRUE #1 (REDAUNT PLANT)	WATER	NO DATE
SPRUE #2 (REDAUNT PLANT)	STEAM	NO DATE
SPRUE #3		2-1-64
SPRUE #33		2-1-64

LAST LINE WAS USED ON THIS DWG ARE:
P-126, H5-104, SC-102, N-105





P-123, 1 1/2" - 15A

LOCATED IN NO. 1 GAS

LOCATED TO PROCESS UNIT