

HARRISON

HCL PURIFICATION
PROCESS FAMILIARIZATION
VALVE OPERATION

PURPOSE: TO FAMILIARIZE YOU WITH THE LOCATION, TYPE, OPERATION AND PURPOSE OF ALL VALVES USED IN THE HCL PURIFICATION AREA. CONTROL VALVE OPERATION WILL BE COVERED IN "CONTROL AND SENSING SCHEMES" SECTION.

RESOURCES: PLANT FLOW SHEETS, EXPERIENCED PERSONNEL, PICS DISPLAY IPT RESOURCE INFORMATION SHEETS.

REQUIRED LEVEL OF PERFORMANCE: 100% CORRECT

OBJECTIVES:

* 1. PHYSICALLY LOCATE, OPERATE (AS APPLICABLE), AND STATE THE FUNCTION OF ALL MANUAL BLOCK VALVES IN YOUR AREA. YOU WILL BE TESTED AS A MINIMUM ON THE FOLLOWING:

- A. FRC(2052) FEED TO E-51 C/V MANUAL VALVES / BYPASS
- B. TRC(2056) OIL TO E-52 C/V MANUAL VALVES / BYPASS
- C. TRC(2067) V-70 TEMP C/V MANUAL VALVES / BYPASS
- D. MANUAL VALVES TO THE BTMS R-50
- E. MANUAL VALVES TO THE TOP R-50
- F. MANUAL VALVE TO THE INLET OF R-60
- G. MANUAL VALVE TO THE OUTLET OF R-60
- H. MANUAL BYPASS VALVE AROUND R-60
- I. MANUAL VALVE TO THE INLET OF E-72 SHELL SIDE
- J. MANUAL VALVE ON THE OUTLET OF E-72 TUBE SIDE
- K. FRC(2208) R-12 TO E-74 C/V MANUAL VALVES / BYPASS
- L. FRC(2212) R-12 TO E-73 C/V MANUAL VALVES / BYPASS
- M. MANUAL VALVE ON R-12 OUT OF E-73
- N. PRC(2200) C-70 OVHD PRES C/V MANUAL VALVES / BYPASS
- O. PRC(2179) USER PRESS C/V MANUAL VALVES / BYPASS
- P. LRC(2206) C70 BTMS LEVEL C/V MANUAL VALVES / BYPASS
- Q. D-71 LEVEL C/V MANUAL VALVES / BYPASS
- R. D-71 VENT C/V MANUAL VALVES / BYPASS
- S. MANUAL VALVES TO THROX FROM PURIFICATION
- T. MANUAL VALVE TO SOLVENTS AT CANAL
- U. MANUAL VALVE FROM V2 TO CMP AT CANAL

2. GIVEN ANY VALVE, STATE IF OPENED OR CLOSED.

2205 PRESS
2206 BOTTOM LEVEL
2207 TEMP T

HCL PURIFICATION
PROCESS FAMILIARIZATION
TANKS AND VESSELS

PURPOSE: TO FAMILIARIZE YOU WITH THE PURPOSE, DESIGN, AND OPERATION OF MAJOR TANKS AND VESSELS IN THE HCL PURIFICATION AREA. UPON COMPLETION, YOU WILL BE ABLE TO POINT OUT (ON A BLANK DRAWING) ALL TANKS AND VESSELS AND EXPLAIN THERE FUNCTION.

RESOURCES: P&ID'S, EXPERIENCED PERSONNEL, PRESSURE VESSEL DATA SHEETS, IPT RESOURCE INFORMATION

REQUIRED LEVEL OF PERFORMANCE: 100% CORRECT

OBJECTIVES:

1. LOCATE THE FOLLOWING TANKS AND VESSELS . EXPLAIN THEIR PURPOSE AND OPERATION, INCLUDING THE SERVICE FLOWS AND PRODUCT INLET AND OUTLET.

A. E-51
D. R-60
G. E-72

B. E-52
E. E-61
H. C-70

C. R-50
F. V-70
I. D-71

2. DRAW A SIMPLIFIED DIAGRAM OF THE EQUIPMENT LISTED ABOVE.
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HCL PURIFICATION
PROCESS FAMILIARIZATION
MECHANICAL EQUIPMENT

PURPOSE: TO FAMILIARIZE YOU WITH THE FUNCTION, LOCATION, AND MAINTENANCE OF THE MECHANICAL EQUIPMENT IN THE HCL PURIFICATION AREA. UPON COMPLETION, YOU WILL BE ABLE TO PHYSICALLY LOCATE AND STATE THE FUNCTION AND MAINTENANCE REQUIREMENTS OF ALL MECHANICAL EQUIPMENT.

RESOURCES: EXPERIENCED PERSONNEL, EQUIPMENT MANUALS, DATA SHEETS.
IPT RESOURCE INFORMATION

REQUIRED LEVEL OF PERFORMANCE: 100% CORRECT

OBJECTIVES:

1. PHYSICALLY LOCATE THE FOLLOWING PSV'S AND STATE THEIR SETPOINTS

A. PSV50 A/B R-50	B. PSV R-60	C. PSV70 A/B V-70
D. PSV71 A/B C-70	E. PSV73 A/B E-73	F. PSV72 A/B D-71

2. EXPLAIN ANY SPECIAL SAFETY HAZARDS ASSOCIATED WITH THE EQUIPMENT IN ITEM #1.

HCL PURIFICATION
PROCESS FAMILIARIZATION
CONTROL AND SENSING SCHEMES

PURPOSE: TO GIVE YOU A GOOD UNDERSTANDING OF THE CONTROL AND SENSING SCHEMES IN THE HCL PURIFICATION AREA, INCLUDING LOCATION AND PURPOSE OF KEY INSTRUMENTATION.

RESOURCES: P&ID'S, EXPERIENCED PERSONNEL, IPT RESOURCE INFORMATION

REQUIRED LEVEL OF PERFORMANCE: 100% CORRECT

OBJECTIVES:

1. EXPLAIN THE ~~THE~~ PURPOSE AND FUNCTION OF THE FOLLOWING CONTROLLERS:

- | | |
|-----------------------------|---------------------------|
| A. FRC(2052) FEED TO E-51 | B. TRC(2056) OIL TO E-52 |
| C. TRC(2067) V-70 TEMP | D. TRC(2083) E-61 TEMP |
| E. FRC(2208) R-12 TO E-74 | F. FRC(2212) R-12 TO E-73 |
| G. PRC(2200) C-70 OVHD PRES | H. PRC(2179) USER PRESS |
| I. LRC(2206) C70 BTMS LEVEL | |

2. PHYSICALLY LOCATE THE FOLLOWING INSTRUMENTATION AND EXPLAIN THEIR FUNCTION.

- ✓A. FT(2052) E-51 FEED FLOW TRANS
- ✓B. TT(2056) E-52 TEMP TRANS
- ✓C. DPT(2069) R50/60 DIFF PRES TRANS
- ✓D. DPT(2076) V-70 DIFF PRES TRANS
- ✓E. PIC(2200) C-70 OVHD PRESS TRANS
- ✓F. FT(2212) E-73 R-12 FLOW TRANS
- ✓G. LT(2210) E-73 LEVEL TRANS
- ✓H. FT(2208) E-74 R-12 FLOW TRANS
- ?I. FT(2214) C-70 BTMS FLOW TRANS
- ✓J. LT(2206) C-70 BTMS LEVEL TRANS
- ✓K. FT(2182) C-70 RECYCLE TO E-51
- ✓L. PT(2179) USER PLANTS PRESSURE TRANS
- ✓M. FT(2180) C-70 OVHD TO SOLVENTS FLOW TRANS
- ✓N. PT(2188) C-70 OVHD TO SOLVENTS PRESSURE TRANS.
- ✓O. FT(2181) C-70 OVHD TO CMP FLOW TRANS.
- ✓P. TT(2083) E-61 TEMP TRANS

2. DRAW A DETAILED DIAGRAM OF THE HCL PURIFICATION SYSTEM AND WITH ALL CONTROLLERS AND INSTRUMENTATION AND EXPLAIN THE FUNCTION OF THE CONTROLLERS AND/OR SENSING SCHEMES OF THE ITEM LISTED ABOVE

HCL PURIFICATION
PROCESS FAMILIARIZATION
AREA HAZARDS & PROTECTIVE MEASURES

PURPOSE: TO FAMILIARIZE YOU WITH THE HAZARDS AND PROTECTIVE MEASURES TO REDUCE THOSE HAZARDS IN YOUR AREA.

RESOURCES: S&LP, EXPERIENCED PERSONNEL, SAFETY PROCEDURES AND IPT RESOURCE INFORMATION

REQUIRED LEVEL OF PERFORMANCE: 100% CORRECT

OBJECTIVES:

1. STATE THE CORRECTIVE ACTION FOR THE FOLLOWING HAZARDS AND IDENTIFY THE EQUIPMENT AND/OR LOCATIONS WHERE THESE HAZARDS EXIST.
 - A. CHEMICAL HAZARDS
 - B. ROTATING EQUIPMENT
 - C. ELECTRICAL HAZARDS
 2. STATE ENVIRONMENTAL PROBLEMS AND ACTIONS TO BE TAKEN IN EVENT OF THE FOLLOWING SPILLS:
 - A. HCL
 - B. HOT OIL
 3. STATE THE PROTECTIVE EQUIPMENT REQUIREMENTS FOR MAINTENANCE ON THE FOLLOWING:
 - A. ALL OF PURIFICATION
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HCL PURIFICATION
PROCESS FAMILIARIZATION
OPERATING DISCIPLINE

PURPOSE: TO GIVE YOU A GOOD UNDERSTANDING OF OPERATING PARAMETERS OF THE MAJOR EQUIPMENT IN YOUR AREA. THE PROBLEMS ASSOCIATED WITH THE PROCESS BEING OUT OF OPERATING PARAMETERS AND NECESSARY CORRECTIVE ACTION TO GET THE PROCESS BACK INTO OPERATING PARAMETERS.

RESOURCES: EXPERIENCED PERSONNEL, OPERATING MANUALS,

REQUIRED LEVEL OF PERFORMANCE: 100% CORRECT

OBJECTIVES:

1. STATE THE NORMAL OPERATING CONDITIONS OF THE FOLLOWING:

- | | |
|--------------------|--------------------------|
| A. E-51 FEED FLOW | F. ETHYLENE IN C-70 OVHD |
| B. E-52 TEMP | G. RECYCLE PRESSURE |
| C. R-50 TEMP | H. C-70 OVHD TEMP |
| D. R-60 TEMP | I. C-70 OVHD PRES |
| E. V1 IN C-70 OVHD | |

2. STATE THE RESULTS OF HIGH OR LOW PARAMETERS AND THE RESULTS IF IT REMAINS HIGH OR LOW.

HCL PURIFICATION
SPECIAL SKILLS

PURPOSE: TO ALLOW YOU TO DEMONSTRATE YOUR ABILITY TO PERFORM
TASKS IN A LOGICAL AND SAFE SEQUENCE, USING
ESTABLISHED JOB PROCEDURES.

RESOURCES: PROCEDURES, EXPERIENCED PERSONNEL

REQUIRED LEVEL OF PERFORMANCE: 100% CORRECT

OBJECTIVES:

1. GIVEN ANY OF THE FOLLOWING JOB PROCEDURES/CHECKLIST
DEMONSTRATE/SIMULATE IN THE FIELD COMPLETING EACH TASK IN A
LOGICAL SAFE MANNER.

- A. LINE UP PURIFICATION FOR START UP.
- B. BYPASSING R-60
- C. SWAPPING R-50 FLOWS (REVERSE FLOWING)

2. LIST THE STEPS (IN SEQUENCE) NECESSARY TO MAKE THE FOLLOWING
EQUIPMENT READY FOR MAINTENANCE:

- A. E-51 THRU C-70
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HCL PURIFICATION
ROUTINE CHECKLISTS

PURPOSE: TO FAMILIARIZE AND ALLOW YOU TO DEMONSTRATE COMPLETING
ROUTINE CHECKLISTS IN YOUR AREA.

RESOURCES: EXPERIENCED PERSONNEL, ROUND SHEETS, OPERATING MANUALS

REQUIRED LEVEL OF PERFORMANCE: 100% CORRECT

OBJECTIVES:

1. DEMONSTRATE MAKING A ROUND USING THE EXISTING HCL PURIFICATION
ROUND SHEET EXPLAINING EACH ITEM AND ITS IMPORTANCE.
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HCL PURIFICATION
CAPACITY AND EFFICIENCY

PURPOSE: TO FAMILIARIZE YOU WITH AREA CAPACITIES AND EFFICIENCIES
RELATING TO HCL PURIFICATION.

RESOURCES: AREA ENGINEER, OPERATING MANUALS, MATERIAL BALANCE SHEETS

REQUIRED LEVEL OF PERFORMANCE: 100% CORRECT

OBJECTIVES: ✓

1. STATE THE MAXIMUM CAPACITY OF THE FOLLOWING EQUIPMENT:

A. C-70

2. STATE HOW EACH OF THE FOLLOWING AFFECTS EFFICIENCY:

- A. C-70 OVERHEAD TEMP TO HIGH
 - B. C-70 OVERHEAD PRES TO LOW
 - C. C-70 BTMS TEMP TO LOW
 - D. E-52 TEMP TO LOW
-

DO 013929
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HCL PURIFICATION
EMERGENCY PROCEDURES

PURPOSE: TO FAMILIARIZE YOU WITH EMERGENCY CONDITIONS AND PROCEDURES
IN THIS AREA.

RESOURCES: EMERGENCY STARTUP & SHUTDOWN PROCEDURES, PLANT PERSONNEL,

REQUIRED LEVEL OF PERFORMANCE: 100% CORRECT

OBJECTIVES:

1. GIVEN AN EMERGENCY SITUATION AND SHUTDOWN PROCEDURE IN THIS AREA, SIMULATE (IN SEQUENCE) SHUTTING THE AREA DOWN. EXPLAIN WHAT IS OCCURRING IN EACH STEP. INCLUDE PRECAUTIONARY MEASURES SUCH AS WASHING OUT AND PURGING EQUIPMENT. YOU WILL BE TESTED ON THE FOLLOWING:
 - A. LEAK ON C70 BTMS LINE UPSTREAM OF EBV
 - B. R-50 TEMP INCREASING RAPIDLY
 - C. LOSS OF REFRIGERATION
 2. YOUR AREA HAS JUST EXPERIENCED A POWER FAILURE. EXPLAIN YOUR ACTIONS. (POWER IS STILL OFF). YOUR ANSWER SHOULD BE STEP-BY-STEP.
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HCL PURIFICATION
PROBLEM ANALYSIS

PURPOSE: TO ALLOW YOU TO DEMONSTRATE YOUR ABILITY TO HANDLE
ABNORMAL SITUATIONS (UPSETS) WHEN THEY OCCUR IN YOUR AREA.

RESOURCES: PROCEDURES, EXPERIENCED PERSONNEL, OPERATING MANUALS

REQUIRED LEVEL OF PERFORMANCE: 100% CORRECT

OBJECTIVES: ✓

1. LIST THE SEQUENCE OF STEPS YOU WOULD TAKE IF THE FOLLOWING
CONDITIONS WERE TO OCCUR AND WHY.

- A. HIGH V1 IN C-70 OVERHEADS
 - B. HIGH ETHYLENE IN C-70 OVERHEADS
 - C. E-51 CONTROL VALVE WIDE OPEN
 - D. LOW TEMP IN C-70 BTMS
 - E. TRAY 6 TEMP IS HIGH
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DO 013931
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CHLORINATED METHANES
GENERAL RESOURCE INFORMATION

Department: CMP

Job Title: HCL PURIFICATION General Resource Information

Scope: To provide the operator with the necessary information needed for the current IPT program

HCL enters the plant thru E-51 feed control valve FRC-2052. The max feed rate is approx. 33,000# hr. From E-51 the HCL flow to E-52, where it is heated up with hot oil to a temp of 110-115 deg C. From E-52 the HCL flows into R-50 where the ACETYLENE and HCL are reacted to form VINYL. From R-50 the HCL flows to R-60 where the ETHYLENE in the HCL is reacted to ETHYLENE CHLORIDE (ETCL). From R-60 the HCL flows enter the tube side of E-51, where it heats up the incoming HCL feed. From E-51 the HCL flows to E-61, where it is cool d prior to entering V-70. The HCL then enters V-70, where any MERCURY or MERCURIC CHLORIDE from R-50 is absorbed. From V-70 the HCL flows to K-55 where its pressure is increased to approx. 240 psig. From K-55 the flow goes to D-55, where the oil from K-55 will be knocked out. From D-55 the flow goes to V-55, which are filters to catch any oil that wasn't knocked out in D-55. From V-55 the flow goes to E-72, where it is cross exchanged with cold HCL from C-70 overheads. This cools down the feed to approx 7-11 deg C. From E-72 the flow goes into C-70. The overhead of C-70 goes through pressure control valve PRC-2200 and through the tube side of E-72 and onto the HCL user plants. The bottoms of C-70 goes through LRC-2206 level control valve to D-751. From D-751 the product goes to R-750 where it is burned.

PRC-2179 is the pressure control valve that controls the pressure on the HCL user plants line. IT accomplishes this by taking any excess HCL and recycling it back to the inl t of E-51.

GR 6/19/90

HCLPRGEN.RES

DO 013932
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CHLORINATED METHANES
GENERAL RESOURCE INFORMATION

Department: CMP

Job Title: E-51 General Resource Information

Scope: To provide the employee with the necessary information needed for the current IPT program.

E-51 is a shell/tube exchanger, which cross exchange cold HCL from the Vinyl 2 plant, with hot HCL from the outlet of R-60. This is done to assist the heating up of the cold HCL prior to it entering R-50 and also cooling down the HOT HCL out of R-60 prior to entering V-70.

DESIGN PRESSURE	220#	DESIGN TEMPERATURE	260F
DRY WEIGHT	6520	WET WEIGHT	8850
HYDRO TEST TO	330#	MAX FLOW HR.	33710 LBS
TOTAL LENGTH	15'9 7/8''	TUBE LENGTH	11'11 3/4"
NORMAL THICKNESS	3/8''	MINIMUM THICKNESS	1/4''
TUBES	342, 3/4'' O.D., .085 WALL, 12' IN LENGTH		
ORIGINAL COST	\$ 10285.00		

GR 6/18/90

E-51GEN.RES

DO 013933
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CHLORINATED METHANES
GERNERAL RESOURCE INFORMATION

Department: CMP

Job Title: E-52 General Resource Information

Scope: To provide the operator with the necessary information needed for the current IPT program

E-52 purpose is to heat up the HCL feed from E-51 to its control setpoint of approx 110-115 deg C prior to entering R-50. This helps start the reaction in R-50 and keeps it going. It accomplishes this by using TRC-2056 temperature control valve which flows HOT OIL thru the shell side of E-52.

In the event the ethylene in C-70 overheads starts to increase E-52 temp can be raised slightly. This will raise R-60 temp which will help convert more of the ethylene to ethyl chloride.

The HOT OIL comes from and returns to the R-250 hot oil system (D470). (see hot oil ipt module).

	SHELL	TUBE
MAWP	252	232
TEST PRESS	380	380
DESIGN TEMP.	500 F	260 F
WEIGHT	2,130	
EFF. SURF	160 SQ FT	

GR 6/19/90

E52GEN.RES

DO 013934
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CHLORINATED METHANES
GENERAL RESOURCE INFORMATION

Department: CMP

Job Title: R-50 General Resource Information

Scope: To provide the operator with the necessary information needed for the current IPT program

R-50 is a reactor which uses ~~40% mercuric chloride on activated~~ ~~carbon catalyst~~, to react ACETYLENE with HCL to form VINYL and small amounts of ALPA DI. The associated equipment with R-50 is E-51, E-52, R-60 and V-70. E51 cross exchanges R-50 feed with R-60 effluent. This heats up R-50 feed. The feed then enters E-52 where it is heated up with hot oil, then on to R-50. R-50 can be feed in through the top or the bottom of the reactor. This is due to the migration of the mercuric chloride. The flows are swapped at the first of each month. After leaving R-50 the HCL goes to R-60 then on to E-51 E61, then to V70.

The minimum temperature that R-50 can run is 95 degrees C. The mercuric chloride combines with the acetylene and hcl, which breaks down to form VINYL and MERCURIC CHLORIDE. If the temp is below 95 degrees the ACETYLENE and MERCURIC CHLORIDE will not fully break down.

The maximum temperature is 140 degrees c. at 150 degrees the mercuric chloride will start to vaporize driving the mercuric chloride out of R-50. A high concentration of VINYL in the incoming HCL can cause R-50 temp to increase rapidly. If R-50 should ever reach 140 degrees, R-50 should be shut down and a N2 purge started on it.

Through experience we found that we can get a 100% conversion at 100 degrees C.

R-50 is 30 feet tall and 6 feet in diameter with a 24 foot packed section. It has 5 thermowells and 3 manways.

MAWP	230#	DESIGN PRESS.	220#
MAX TEMP.	260 F.	TEST PRESS.	382 PSI.

GR 6/18/90

R50GEN.RES

DO 013935
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CHLORINATED METHANES
GENERAL RESOURCE INFORMATION

Department: CMP

Job Title: R-60 general information

Scope: Resource information provide to employees for use with IPT program

R-60 is a fixed bed catalytic reactor as is R-50. In fact, it has the same dimensions as R-50. It has a 24' packed section. R-60 is packed with a 30% by weight zinc chloride ($ZnCl_2$) on carbon catalyst.

The purpose of R-60 is to enable us to further purify the anhydrous HCL. The Zinc chloride catalyst will react ethylene with HCL to form ethyl chloride ($EtCl$). This $EtCl$ will be distilled out in C-70. An added benefit of the catalyst system is that it converts the V1 out of R-50 to alpha-di. This unloads C-70 significantly because there will be only 25ppm to remove in C-70 instead of 1800ppm V1.

R-60 was designed to be operated at the same temperature and pressure as R-50. The only difference is that the $ZnCl_2$ is not as mobile as the gCl_2 in R-50. This means that R-60 will not have to be reverse flowed every month as is R-50.

Research shows that $ZnCl_2$ catalyst will deactivate slowly over a 1-1.5 yrs. This deactivation is due to the carbon formation and temperature of operation. (NOTE: THE $ZnCl_2$ IN R-60 HAS BEEN THERE FOR APPROX 5 YEARS WITHOUT RECHARGE). This means that the conversion of ethylene has to be watched closely as well as R-60 temperature. Thru research we have found that we can run R-60 at approx 100 deg C and get a total conversion. However; as the catalyst starts deactivating the control temperature will have to be increased. We have to also remember that too high of a temperature will shorten the life of the catalyst.

MAWP	=	232 PSIG
MAX TEMP	=	550 DEG F
HYDRO TEST PRESS	=	423 PSIG
EMPTY WEIGHT	=	32,000 LBS
FULL WEIGHT	=	87,000 LBS
DIMENSIONS	=	6' DIA X 30' LTH 24' PACKED SECTION
CUBIC FEET	=	628.6
COST	=	\$36,252.00

CHLORINATED METHANES
GENERAL RESOURCE INFORMATION

Department: CMP

Job Title: E-61 General Resource Information

Scope: To provide the operator with the necessary information needed for the current IPT program

E-61 is a fin fan cooler which cools down the HCL prior to entering V-70. E-61 has a 7.5 horsepower, 213T frame, 1800 rpm. 1.15 s.f. 460 volt 3 phase, 60 cycle tefc motor at 632 rpm. E-61 is a product of marley cooling tower inc.

TRC(2083) controls the pitch of the fan blades. It gets its signal from TT(2083). As the temperature increases the pitch of the fan blades increases to supply more air flow.

MAX FLOW	33,710 LBS.	
NOR/MAX TEMP.	149/257 IN	105/150 OUT
MAX PRESS.	240 #	
DESIGN PRESS.	220#	
DESIGN TEMP	260 F.	
ROWS	5	
PASSES	2	
TUBE LENGTH	8'X 8"	
ORIGINAL COST	\$ 25,088.00	

GR 6/18/90

E61GEN.RES

DO 013937
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CHLORINATED METHANES
GENERAL RESOURCE INFORMATION

Department: CMP

Job Title: V-70 General Resource Information

Scope: To provide the operator with the necessary information needed for
the current IPT program

~~V-70 is a SULFUR Impregnated bed on activated carbon.~~ Its purpose is to absorb any mercuric chloride that may be entrained with the HCL from R-50. The HCL temperature should run approx 40 deg C. The minimum operating temperature is 30 deg. If the temperature drops below 30 deg C V-70 will loose its efficiency in absorbing MERCURY and MERCURIC CHLORIDE. The maximum temperature is 75 deg C. At 85 degs the SULFUR will start vaporizing off of the carbon.

DIAMETER	6'
HEIGHT	13'
PACKED SECTION	7'
INLET PRES	250 PSIG
OUTLET PRESS	244 PSIG
INLET/OUTLET TEMP	65 DEG C

GR 6/18/90

V70GEN.RES

CHLORINATED METHANES
GENERAL RESOURCE INFORMATION

Department: CMP

Job Title: E-72 General Resource Information

Scope: To provide operators with the necessary information needed for
the current IPT program

E72 is a vertical (U) tube exchanger which cross exchanges COLD HCL from C-70 overheads on the tube side with HOT HCL from K-55 discharge on the shell side. This process cools down the HCL f d prior to entering C-70 and also heats up the overhead product from C-70 before it is sent to the HCL user plants

	SHELL	TUBES
MAX FLOW	33,710 LBS. HR.	33,420 LBS.HR
MAWP	245#	242#
DESIGN PRESS	302#	
DESIGN TEMP.	-20/300 F.	
TEST PRESS.	453#	
CORRIS. ALLOW	1/16"	
# OF PASSES	2	
EMPTY WEIGHT	11,400 LBS.	FULL WEIGHT 16,500 LBS.
BUNDLE WEIGHT	7,800 LBS.	
OVERALL LENGTH	28'7"	
BAFFELS	10 - 2' 3 3/16" SPACING.	
TUBES	189 - X.75 OD. X .085 WALL X 48'-U TUBE / 23' 6 9/16" ONE WAY	
ORIGNAL COST	\$ 12,805.00	

GR 6/18/90

E72GEN.RES

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CHLORINATED METHANES
GENERAL RESOURCE INFORMATION

Department: CMP

Job Title: C-70 General Resource Information

Scope: To provide the operator with the necessary information needed for the current IPT program.

C-70 is a distillation column which along with its associated equipment (E-73, E74 and D71) purifies hcl from V2. C-70 contains a total of 30 trays. Tray 1-4 are bubble cap trays made of carbon steel and stainless steel. Tray 5-30 are ballast trays made of carbon steel. C-70 is 36" in diameter and is 38' 10 1/2" high (this is C-70 not including E-73).

HCL enters C-70 at tray 4 in the column and is boiled up by the use of hot freon on E-74. The vapors going up through the column pass through E-73 which is an intergal overhead condenser which helps condense the heavies in the overhead of the column. The heavies then act as a reflux on the column, only allowing purified HCL to leave C-70. The overhead of the column run approx. -15 deg. C. with less than 1 ppm vinyl chloride/ethylene in the overhead product. The product leaving C-70 is cross exchanged with the hot HCL in E-72 and is then used at SOLVENTS, POLY C and here at METHANES.

E-73 is a shell/tube exchanger which has freon on the shell side and process on the tubes. The freon is level controlled to E-73. The freon vapors out E-73 return to the 1st stage of K-1001.

C-70 pressure is controlled by PRC(2200) on C-70 overhead flow. The control pressure setpoint is approx. 220#. As the pressure raises the control valve will open up and let more flow exit C-70. The overhead flow from C-70 goes to the tube side of E-72. The operating range on this controller is approx. 220# thru 240#. If pressure is too low C-70 would have inadequate reflux to operate correctly. If the pressure is too high we would be too close to K-55 discharge shutdown pressure.

The bottom of the columns (C-70) which contains the heavies V1 and ALPH DI are level controlled LRC(2206) to D-71 which is a knock out pot and then sent to R-750 (THROX) where they are burned. If the bottoms temp is too low there will be an excess amount of HCL in the bottoms flow to D-71 which we will be wasting.

Normal operating conditions.

Tray 6 = -14	Tray 14 = -14.5	Tray 30 = -14.7	Overhead = -15
Feed temp = 7	Pressure = 223#	E-73 fl = 7.5	Btms lvl = 60-70%

MAWP = 356#	DESIGN PRESS. = 300#	DESIGN TEMP. = -20/300 F
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TEST PRESS. = 534#	MAX TEMP = 300 F.	MIN. TEMP = NA.
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DRY WEIGHT = 14,250 LBS.	WET WEIGHT = 47,800 LBS.
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GR 6/18/90

C70GEN.RES
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CHLORINATED METHANES
GENERAL RESOURCE INFORMATION

Department: CMP

Job Title: E-73 General Resource Information

Scope: To provide the operator with the necessary information needed for
the current IPT program

E-73 is a vertical intergal overhead exchanger, with a fixed tube sheet. Freon is level by LIC-2210 or flow controlled by FIC-2212 to the shell side of E-73 where it is cross exchanged with HCL in the tubes from C-70. The heavies that are in the HCL are condensed and flow back down the column and the pure HCL with less than 1 ppm vinyl chloride/etcl, leaves the column and are used at METHANES, SOLVENTS and POLY C.

The signal from both controllers go to a low signal select controller LSS-2211. This control scheme allows the level and freon flow to be set with neither setpoint being exceeded.

DESIGN FLOW SHELL	7.945 LBS.	TOTAL FLOW TUBES	37.097 LBS.
NOR/MAX TEMP. SHELL	-18/100	NOR/MAX TUBES	-5/100
DESIGN TEMP.	-20/250 F.		
DESIGN PRESS. SHELL	150#	DESIGN PRESS. TUBES	300#
TUBES	600 - 8' X 1" O.D.	70-30 CU-NI.	
DRY WEIGHT	9,294 LBS.	WET WEIGHT	14,849 LBS.

GR 6/18/90

E73GEN.RES

DO 013941
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CHLORINATED METHANES
GENERAL RESOURCE INFORMATION

Department: CMP

Job Title: E-74 General Resource Information

Scope: To provide the operator with the necessary information needed for the current IPT program.

E-74 is a "U" tube exchanger, with the tubes inside of C-70. E-74's purpose is to vaporizes any HCL which may have been condensed and is in the bottoms of the column. It accomplishes this by flow controlling FRC(2208) HOT liquid freon from K-1001 through the tubes of E-74, thus vaporizing the HCL and cooling the freon. The cooler freon is then returned to the liquid freon header downstream of E-1050.

SHELL	TUBE
TOTAL FLOW 1,851 LB/HR	21,740 LB/HR.
DESIGN PRESS. 300#	200#
DESIGN TEMP. -20/300 F.	250 F.
NUMBER OF PASSES	6
ID 17 3/8"	
TUBES 48 - 3/4" X 6'X 14 GUAGE	

GR 6/18/90

E74GEN.RES

DO 013942
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CHLORINATED METHANES
GENERAL RESOURCE INFORMATION

Department: CMP

Job Title: HCL PURIFICATION/K55 safety devices

Scope: To provide the operator with the necessary information needed for
the current IPT program

PSV NUMBER -----	SET PRESSURE -----	PSV LOCATION -----
PSV 50 A/B	220 PSIG	R-50
PSV 60 A/B	220 PSIG	R-60
PSV 55 A/B	330 PSIG	D-55
PSV 56 A/B	330 PSIG	D-56
PSV 71 A/B	300 PSIG	C-70
PSV 73 A/B	150 PSIG	E-73
PSV 74 A/B	300 PSIG	D-71

GR 6/20/90

HCLPRPSV.RES

DO 013943
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CHLORINATED METHANES
SAFE JOB PROCEDURE

Department: CMP

Job Title: K-55 Start Up procedure

Scope: Safe start up of K-55 and Purification

Major Hazard(s): Environmental Release, Rotating Equipment

Safety Equipment Required: Minumum Block Standards

NOTE: There is a K-55 start up check sheet which can be used to assist you in lining up and starting up K-55.

1. Make sure all jobs are complete and all red tags cleared.
2. Make sure that K-55 switchgear is racked in.
3. Make sure that D-56 heaters are on.
4. If the oil is circulating shut down the P-55's and place both P-55's field switches in automatic.
5. Once the oil has been stopped circulating, open the casing drain for approx. 10 minutes to assure ourselves that all the oil has been drained from the compressor. AFTER DRAINING CLOSE THE CASING DRAIN.
6. Line up all the oil lines to the compressor.
7. If the process side of K-55 is pressured up with nitrogen, depressure and pressure back up with process by slowly opening the suction and discharge block valves. Monitor the compressor while opening the valves to insure that we don't role the compressor in the process.
8. Line up all control valves and block valves associated with purification. Make sure that FRC(2052) E-51 feed control valve is in manual and closed.
9. Make sure that PRC(2179) users pressure control valve is in manual and open up to 106% valve output.
10. Open the bypass around the check valve on the D-56 vapor out line to equalize the suction pressure with D-56.
11. Turn on P-57 hydrolic oil pump for the load valve.
12. Bring the load valve position to 0% output. Make sure the permissives on the PICS screen indicates that the valve is actually unloaded and that both modicoms agree. (NOTE OCCASIONALLY HAVE TROUBLE WITH THE LOAD VALVE, THIS MAY TAKE SOME TIME TO PRIME THE PUMP AND GET THE LOAD VALVE TO 0% OUTPUT)

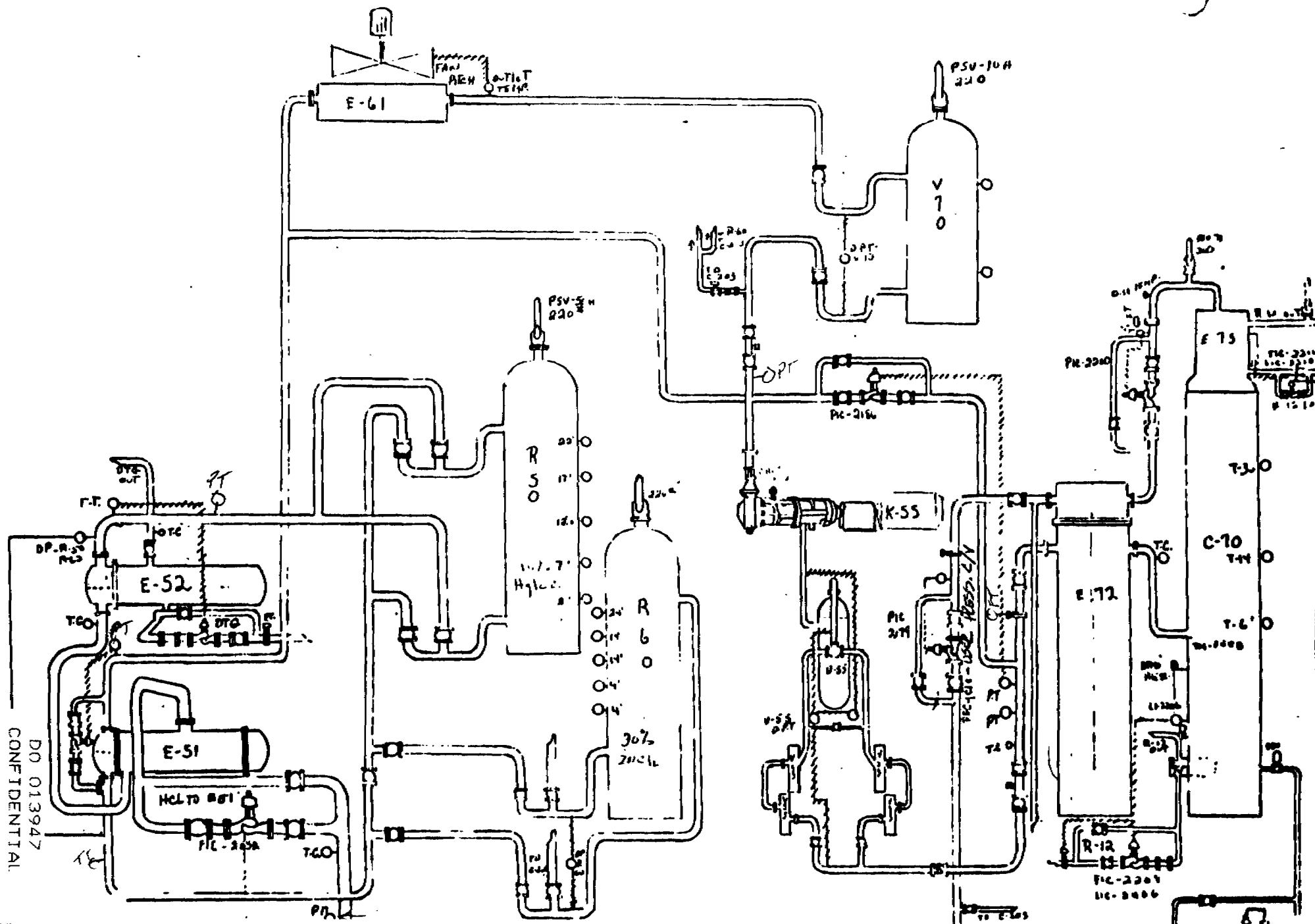
13. Get the suction pressure up to approx 80-100 psig prior to starting K-55. You can do this by opening up E-51 feed control valve.(make sure you close it back prior to start, up).
14. If the suction pressure is to high it may be necessary to depressure to the throx.
15. Have the following control valves positioned as follows prior to start up.

FRC(2052) E-51 feed C/V	manual	closed
TRC(2056) E-52 temp C/V	manual	closed
PRC(2179) Users pres C/V	manual	open
K-55 suction pressure	auto	80-100
load valve	manual	unload
DPR(2146) K-55 brg diff pres C/V	auto	75 psig
TRC(2281) E-60,E-65 out temp C/V	manual	closed
LRC(2273) D-56 level C/V	auto	45%
DPR(2276) D-56 diff press C/V	auto	80 psig
PRC(2200) C-70 ovhd press C/V	auto	200 psig
16. Check the PICS display to verify that the system ready light is on.
17. Start the compressor.
 - A. The main oil pump will start automatically
 - B. Eight seconds later, the modicom will look to see if the oil switches have cleared
 - C. If the oil switches have cleared and the load valve switch shows that K-55 is unloaded, the computer will energize MK-55 starter. The modicom will wait four seconds for the motor to start. If it doesn't start within the four seconds, the startup will be aborted and the entire sequence will have to be repeated.
18. As soon as K-55 starts, Put the load valve on cascade and start to slowly drop the suction pressure setpoint, until you get to 100 psig.(NOTE: OCCASIONALLY WE HAVE TROUBLE WITH THE LOAD VALVE NOT FUNCTIONING PROPERLY, CONTROLLER MAY HAVE TO BE LEFT IN MANUAL AND ADJUSTED BY THE BOARD OPERATOR)
19. As soon as the suction pressure drops to 100 psig start opening FRC(2052) E-51 feed control valve. Bring the flow up to a 4-5 M# hr and place it in automatic. If the suction pressure should be low when bringing K-55 up, it may be necessary to open the feed control valve as soon as K-55 is energized.

20. Start slowly opening up TRC(2281) temperature control valve, monitoring the oil temperature. When the oil temperature turns you can place the control valve in automatic and slowly adjust the oil temp setpoint until you reach 40-45 deg.
21. Start a small freon flow to E-73, monitoring E-73 and C-70 overhead temp.
22. Start to slowly increase C-70 overhead pressure until you reach 220 psig.
23. Slowly start opening TRC(2056) E-52 temp control valve. to about 10% valve output. Place the setpoint to approx 110 deg and put in automatic. Make sure we don't shake up the R-250 system in the process.
24. Continue to raise the load on purification, monitoring C-70 overhead temperatures and purity
25. Place PRC(2179) user's pressure control valve in automatic and start gradually raising the setpoint to 200 psig
26. When C-70 overhead product is good send it to solvents and we can take some to.

GR 6/20/90

K55SU.PRO



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FROM E-51

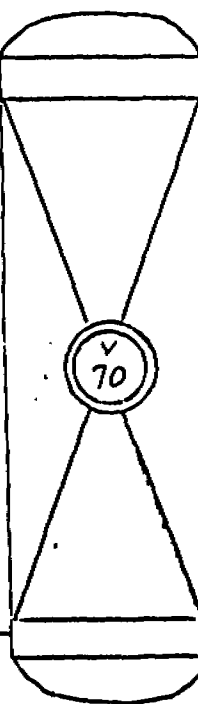
DPT
2076

DPT
2076

PI
2077

PI
2080

TE
2081



TE
2078

MX
1-12

TI
2018

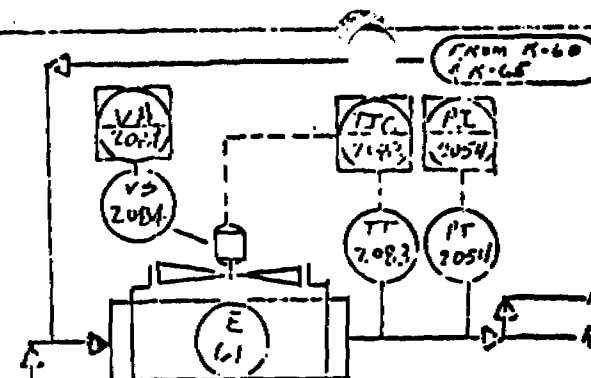
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MX
1-13

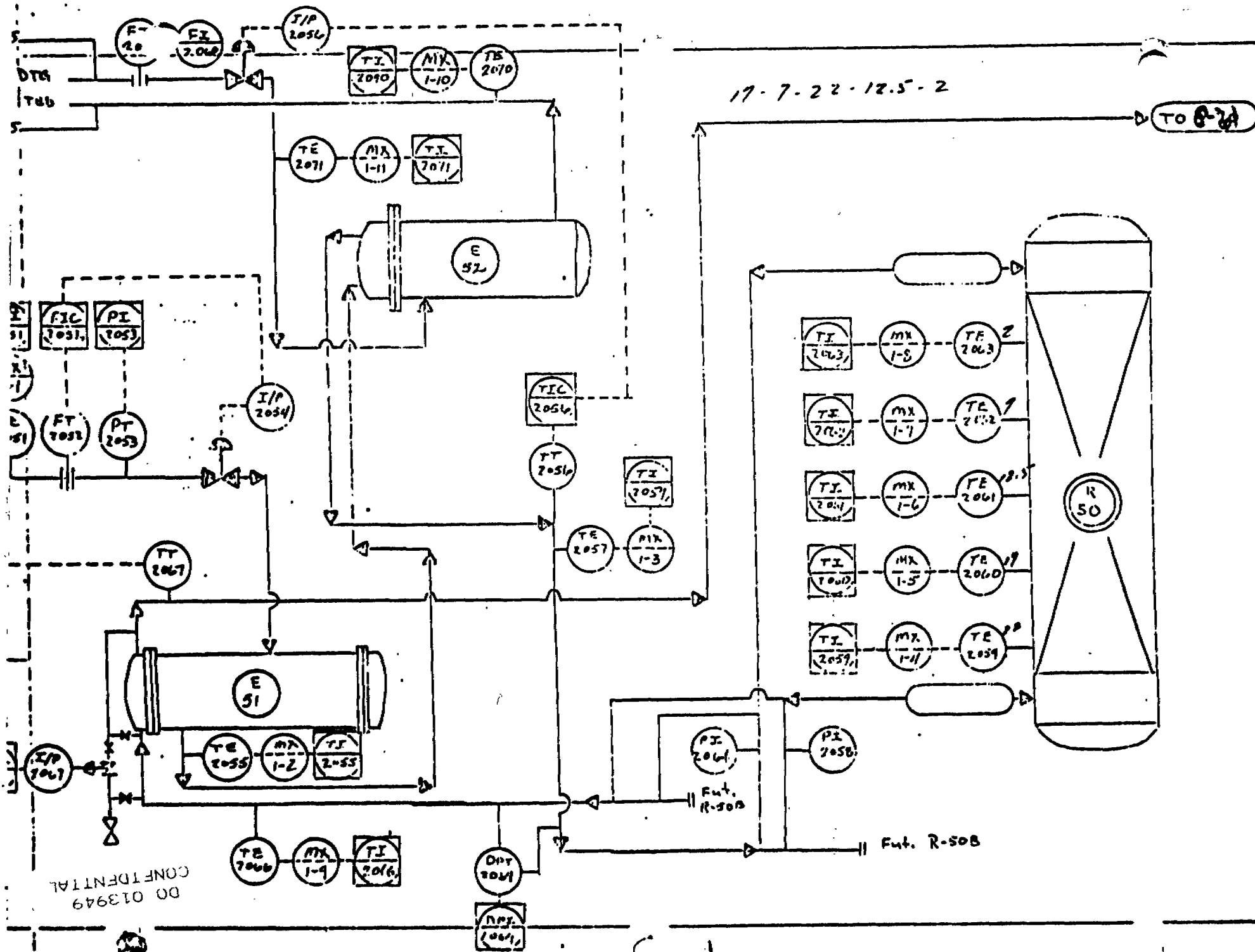
TI
2071

TI
2081

MX
1-14



3-1" 50# valves
1-1" 150#



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SUBJECT

