

June 16, 1993

To: Gerald Wagener and Joe Schell

xc: Rick Wittmann Doyle Haney
Bruce Miles Terry Vavasseur
Julie Clebert

re: Mini-reactive chemical review for new CMP R-22 refrigeration system

Gerald and Joe,

The following is the list questions that came up during our review and responses.

1. Are there any aluminum or copper parts in K-1100 compressor?

No, according to Rick Wittmann, all the wetted parts on the compressor were specified not to be aluminum. Also, there are no pure copper parts. The majority of the compressor is made from low temperature carbon steel.

2. How will you detect if there is a leak from the process into the R-22 refrigeration system?

If there was an HCl or Methyl Chloride leak, it would show up as non-condensables. The other chlorinated organics would cause efficiency losses and any small amounts of water would probably form hydrates in various control loops. To check for leaks, our lab specialist, Terry Vavassuer, will test the R-22 every 6 months. He will perform a titration to check for acidity and shoot a sample in the G.C. to check for chlorinated organics.

3. What is the maximum temperature the R-22 can get up to?

The high discharge temperature trip on K-1100 is set at 150 degrees C.

Sincerely:



John Sacks

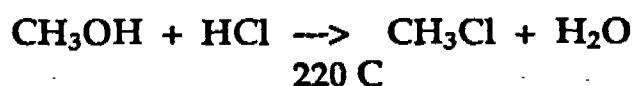
DO 006564

CONFIDENTIAL

HYDROCHLORINATION REACTIONS

VAPOR PHASE REACTION OVER ACTIVATED ALUMINA

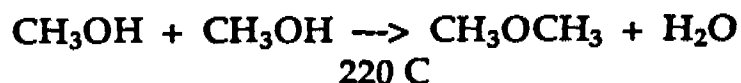
- * 98 % MeOH Conversion
- * 20% XS HCl



(H_r = -11.0 kcal/mol)

SIDE REACTION

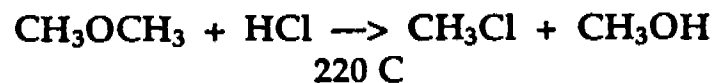
- * Dimethyl ether production



(H_r = -5.9 kcal/mol)

DME CONSUMPTION

- * Cellulose mixture (70% DME, 30% M1)



(H_r = -2.2 kcal/mol)

DO 006565

CONFIDENTIAL

HYDROCHLORINATION SCENARIOS

1. BIS-CHLOROMETHYL ETHER FORMATION FROM DME CARRY OVER:

- * THERMAL CHLORINATION OF DME --> BIS
- * RUN XS HCL TO MINIMIZE DME FORMATION
- * C-210 INSTALLATION HAS UNLOADED C-202
- * ALARMS
 - C-202 MIDSECTION TEMP EXCEEDS 35 C.
 - HI TEMP ALARMS ON PACKED SECTION
 - LOW DENSITY ON SULFURIC ACID
 - SULFURIC MAKE UP LOW FLOW ALARM

2. ALUMINA CATALYST REACTION:

- * REACTION WITH WET AIR DURING VACUUM REMOVAL OF CATALYST
- * RECHARGE PROCEDURES
 - CATALYST IS DUMPED, AND NOT VACUUMED OUT
 - CATALYST IS WATER SOAKED DURING DISPOSAL PROCEDURE
 - PROPER LABELING AND ATTENTION TO WASTE TYPE

3. LOSS OF HOT OIL FLOW THROUGH REACTORS:

- * SPARE PUMP OFF-LINE
- * ALARMS:
 - LOW HOT OIL FLOW
 - HIGH REACTOR TEMPERATURES
- * MODICON REACTOR TRIP : HYDROCHLORINATORS N2 FLOODED AND @ 320 C IN ADIABATIC SECTION

HYDROCHLORINATION SCENARIOS

4. LACK OF QUENCH WATER CAUSING CORROSION AND H₂ EVOLUTION:

- * START UP PROCEDURES ENSURE QUENCH RECIRCULATION
- * ALARMS:
 - LOW WATER FLOW
 - HIGH QUENCH COLUMN TEMPERATURES

5. EXOTHERM FROM RUNAWAY DURING COOLDOWN

- * COOLDOWN PROCEDURES PROVIDE FOR PROPER COOL DOWN MIXTURES AND FLOW RATES
- * TEMPERATURE ALARMS IN CASE OF HOT SPOT

6. TUBE LEAK ON ISOTHERMAL SECTION

- * QUENCH SAMPLES TWICE PER SHIFT - CHECK APPEARANCE
- * NOT REACTIVE WITH CATALYST AND PROCESS CHEMICALS

7. EXCESS CORROSION FROM REACTION

- * ELECTRICAL HEAT TRACING (THERMON) ON REACTOR HEADS AND INLET LINES
- * TANTALUM LINE REACTOR OUTLET LINES
- * ALARMS:
 - HEAT TRACING SYSTEM IDENTIFIES ELECTRICAL AND TEMPERATURE PROBLEMS



JJS
8/92

CONFIDENTIAL
DO 006568

METHYL CHLORIDE FINISHING

PROCESS SUMMARY:

- * METHYL CHLORIDE FROM HYDROCHLORINATION IS DISTILLED AND ALSO USED FOR CROSS EXCHANGE IN HYDROCHLORINATION

METHYL CHLORIDE SYSTEM SCENARIOS

1. TUBE LEAKS

- * CROSS EXCHANGED WITH SIMILAR PROCESS, NO REACTIVITY PROBLEMS
- * POTENTIAL FOR LEAKING METHYL CHLORIDE INTO FREON 22 AT E-211.

2. FLAMMABILITY POTENTIAL

- * SPRINKLER SYSTEM PROTECTS D-1250 AREA AND FINISHING EQUIPMENT IN CASE OF FIRE

3. REACTIVITY WITH ALUMINUM

- * ALUMINUM IS NOT USED IN ANY PROCESS EQUIPMENT, VALVES, FITTINGS, ETC.
- * EMPLOYEES ARE TRAINED ON REACTIVE POTENTIAL

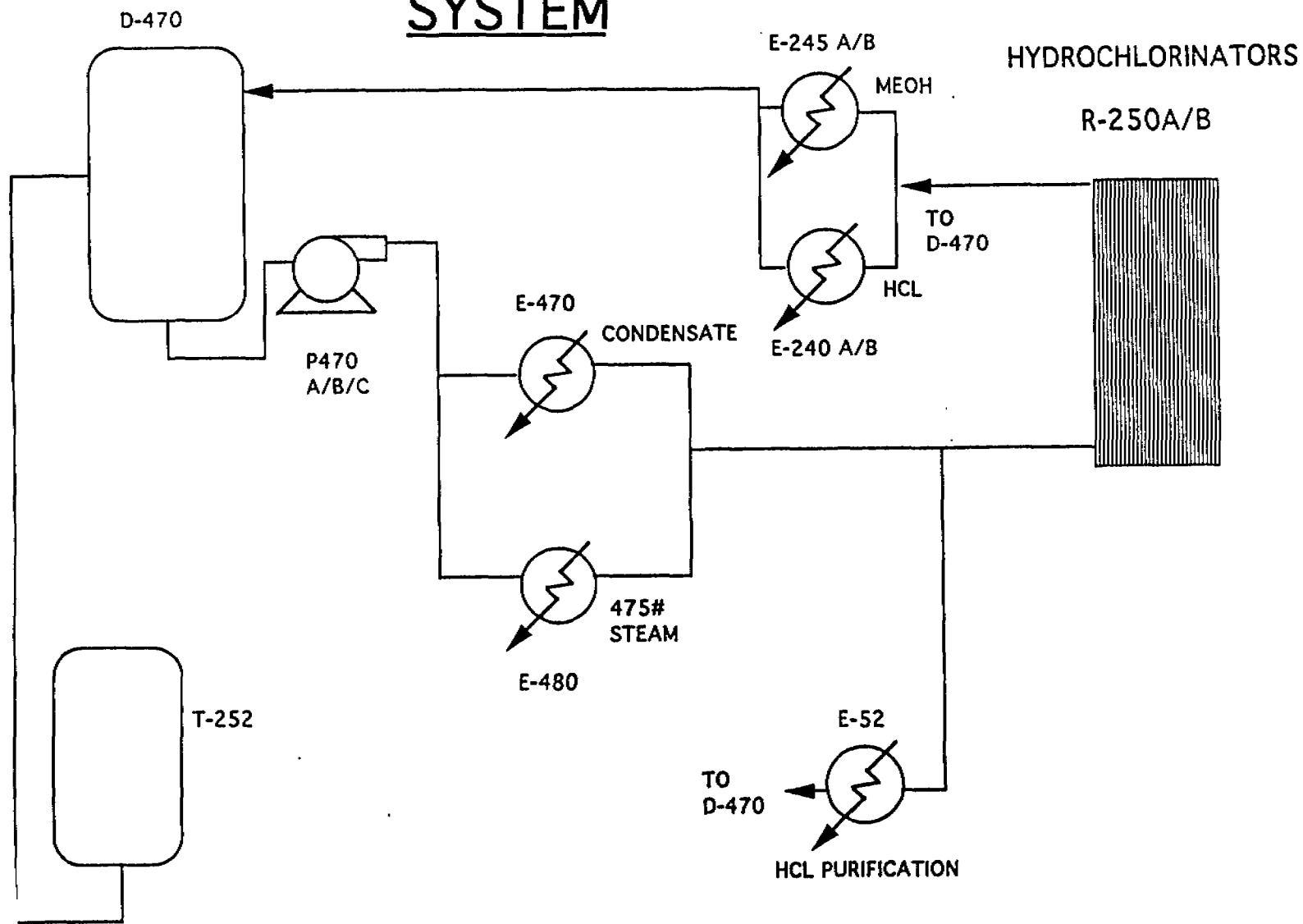
4. METHYL CHLORIDE CAUSTIC FILTERS

- * WATER/CAUSTIC REACTION INCIDENT (MAY 1992)
- * HCL/CAUSTIC REACTION OCCURING AT LOW PPM

CONFIDENTIAL

DO 006569

HOT OIL (SHELL THERMIA C) SYSTEM



CONFIDENTIAL
DO 006570

HOT OIL SYSTEM

PROCESS SUMMARY:

CLOSED LOOP SYSTEM FOR TEMPERATURE CONTROL

- * ISOTHERMAL SECTION OF HYDROCHLORINATORS
- * SUPER HEATS MEOH AND HCL TO HYDRO.
- * TEMPERATURE CONTROL TO HCL PURIFICATION REACTORS
- * E-470/E-480 USED TO COOL OR HEAT HOT OIL

CONFIDENTIAL

DO 006571

HOT OIL SYSTEM SCENARIOS

1. TUBE LEAKS IN HYDRO OR IN PURIFICATION

REACTION OF SHELL THERMIA OIL WITH HCL, MEOH, OR CATALYSTS

- * REACTIVE CHEMICAL TESTS INDICATED NO REACTION
- * OIL SYSTEM DRUM (D-470) PROTECTED BY PSV'S

2. FLAMMABILITY POTENTIAL

AUTO IGNITION TEMPERATURE OF 340 C

- LOSS OF FLOW THROUGH REACTOR MAY OVERHEAT OIL

- * SPARE PUMP AVAILABLE
- * TDC ALARMS FOR HI/LO FLOW
- * FOAM AND SPRINKLER SYSTEMS PROTECT AREA
IN CASE OF FIRE

DO 006572

CONFIDENTIAL

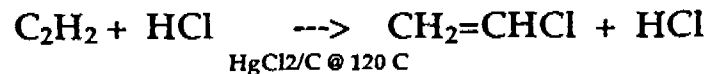
HCL PURIFICATION REACTIONS

PURIFICATION SUMMARY:

- * PURIFY 24,000 LB/HR AHCL FROM VINYL II
- * ACETYLENE TO VINYL CHLORIDE, ALPHA-DI (R-50)
- * ETHYLENE TO ETHYL CHLORIDE (R-60)
- * COMPRESS AND DISTILL OUT HEAVIES

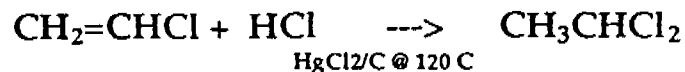
R-50 REACTIONS (ACETYLENE --> VINYL --> ALPHA-DI)

- * 2000 PPM ACETYLENE (100% CONVERSION)
- * 10% MERCURIC CHLORIDE ON ACTIVATED CARBON



(H_r = -27.3 kcal/mol)

- * CONTINUED REACTION (15% OF VINYL)



(H_r = -41.4 kcal/mol)

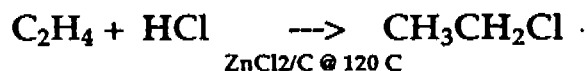
DO 006573

CONFIDENTIAL

HCL PURIFICATION REACTIONS

R-60 REACTIONS (ETHYLENE --> ETHYL CHLORIDE AND VINYL --> ALPHA-DI)

- * 50-60 PPM ETHYLENE (95% CONVERSION)
- * 30% ZINC CHLORIDE ON ACTIVATED CARBON



- * CONTINUED REACTION (97% OF VINYL)



CONFIDENTIAL

DO 006574

HCL PURIFICATION SCENARIOS

1. TUBE LEAK ON E-52 (REACTOR PRE-HEATER)

REACTION OF SHELL THERMIA OIL WITH HCL OR CATALYSTS

- * REACTIVE CHEMICAL TESTS INDICATED NO REACTION

2. TUBE LEAK ON E-73 OR E-74 (FREON EXCHANGERS)

POTENTIAL CONTAMINATIN OF FREON-12 SYSTEM WITH HCL

- * NO REACTIVITY PROBLEMS BETWEEN THESE TWO

3. EXTENSIVE CORROSION DUE TO WATER IN THE SYSTEM

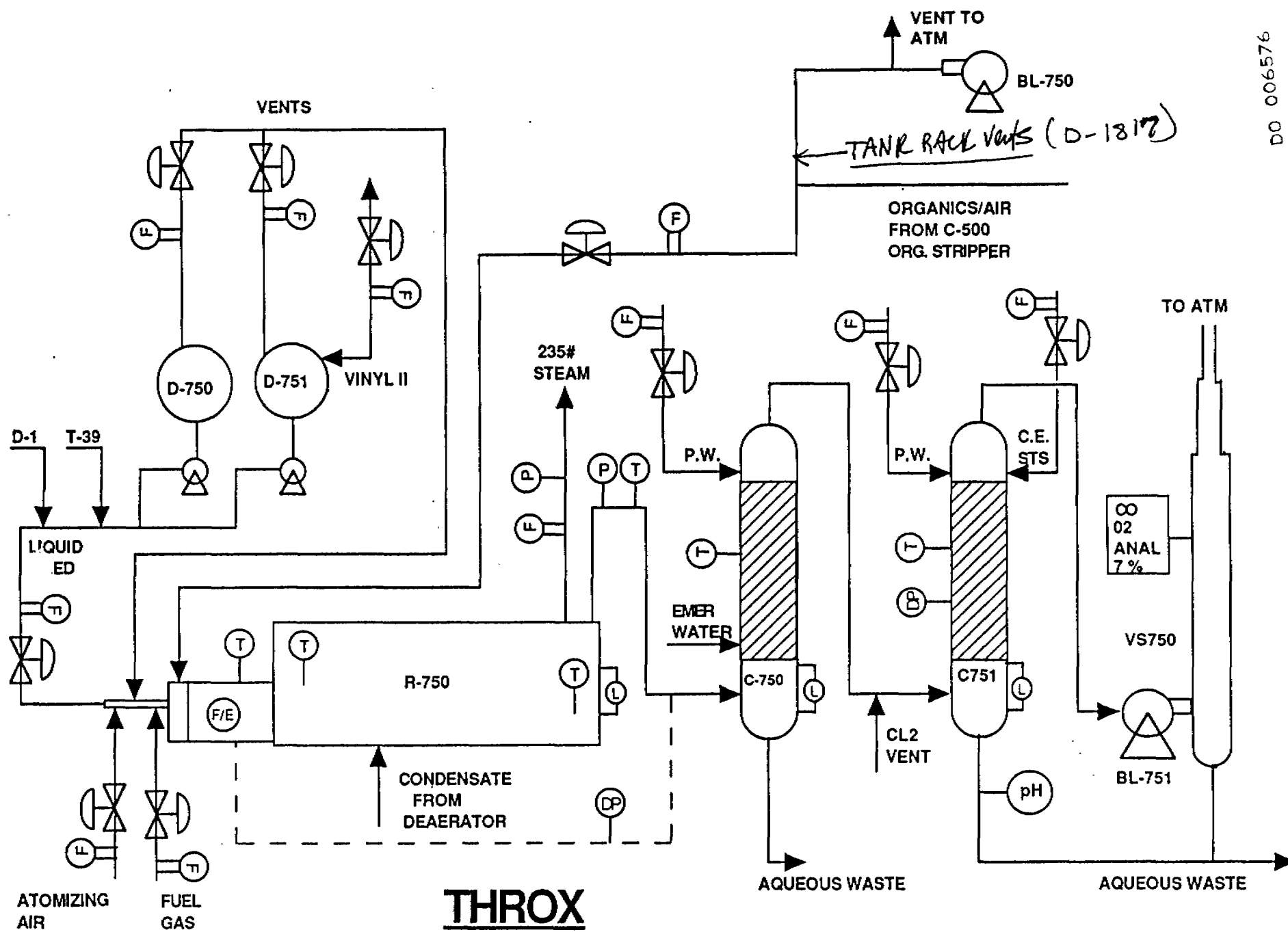
- * HCL SYSTEM PIPING AND VALVES ALWAYS DRIED PROPERLY
- * OIL SAMPLED IN COMPRESSOR TO MONITOR FOR IMPURITIES

4. REACTION BETWEEN HYDROCARBON OIL AND HCL

- * HCL IN COMPRESSOR (K-55) CAN REACT WITH IMPROPER OILS
- * TRAINING ON DANGERS OF WRONG OIL ADDITION
- * OIL PROGRAM ON PDP-11 SPECIFIES CP-1000 SYNTHETIC OIL

CONFIDENTIAL

DO 006575



DO 006576
CONFIDENTIAL

THROX

THROX PROCESS SUMMARY:

- * COMBUSTION REACTION AT 1300 C
- * FUEL GAS AND AIR INCINERATE VENTS FROM PROCESS, LOADING, AND AIR STRIPPER. VENTS ARE CONVERTED TO HCL AND CO2.
- * GENERATES 235# STEAM BY VAPORIZING CONDENSATE
- * HCL IS SCRUBBED IN C-750 (PROCESS WATER)
- * CL2 IS SCRUBBED IN C-751 (CELL EFFLUENT/STS)

DO 006577

CONFIDENTIAL

THROX SCENARIOS

1. PROPYLENE OXIDE REACTION WITH HCL

P.O. IN CELLULOSE LIQUID

- * POTENTIAL VALVING ERROR COULD PUT CELLULOSE LIQUID INTO DRY VENT KNOCK OUT DRUM
- * DOUBLE BLOCK AND BLEED SYSTEM IN PLACE/TRAINING
- * ONLY ONE LIQUID STREAM CAN BE BURNED AT A TIME

2. OXYGEN IN VENT HEADER

- * EXPLOSIVE MIXTURES CAN BE FORMED

PREVENTIVE MEASURE: CLOSED LOOP VENT SYSTEM

3. CHLORINE IN VENT HEADER

CHLORINE MAY REACT WITH ORGANICS

- * SEPARATE NOZZLE IN SIDE OF THROX BURNER TO VENT SOAK TANK AND DEPRESSURE CHLORINE HEADER.
- * STRICT OPERATING PROCEDURES STATING CHLORINE STREAMS ARE NOT TO BE VENTED TO EITHER VENT HEADER
- * PURE CHLORINE IS VENTED TO THE CAUSTIC SCRUBBER, C-751 THROUGH A DEDICATED LINE.

DO 006578

CONFIDENTIAL

THROX SCENARIOS

4. METHANOL IN DRY VENT HEADER

POTENTIAL METHANOL REACTION WITH ANHYDROUS HCL

- * PROCEDURES STATE NO METHANOL TO DRY VENT HEADER
- * HYDROCHLORINATOR MEOH LOOPS HARD PIPED TO WET VENTHEADER

5. EXPLOSION IN THROX

POTENTIAL EXPLOSION DURING START-UP OR SHUTDOWN

- * MODICON TRIP SYSTEM GOVERNED BY BURNER MANAGEMENT

6. CHLORINE RELEASE FROM LOSS OF SODIUM THIOSULFATE FLOW

CHLORINE MAY BE RELEASED IN FRONT DITCH

- * EXCESS OF STS
- * CASCADE CONTROL LOOP MAINTAINS A 9.4 pH IN C-751 BOTTOMS
- * CHLORINE MONITORS THROUGHOUT PLANT

DO 006579
CONFIDENTIAL

WASTE DISPOSAL REACTIVE CHEMICAL CONCERNS

1. WASTE DISPOSAL PROCEDURES DEVELOPED

- * D-750 WASTE/FLY ASH REACTION INCIDENT (JAN 1992)
- * NOW ABSORB WASTE WITH OIL SORB
- * MATERIALS ARE IDENTIFIED BY WASTE CHAR. #
- * MATERIALS ARE STORED IN HAZARDOUS WASTE AREA
- * DURING MIXING PROCESS
SAFETY EQUIPMENT
FILL DRUMS 1/2 WITH LIQUID, THEN OIL SORB
ENV. OPERATIONS PICKS-UP

DO 006580

CONFIDENTIAL

**ANALYTICAL REPORT
REACTIVE CHEMICALS LABORATORY
DOW CONFIDENTIAL INFORMATION**

Report To : R. J. Bordelon	Department: Methanes	Building: 4601
-------------------------------	-------------------------	-------------------

R&D Analytical Labs Dow Chemical USA	Charge Number: 93	Request Number: 92033
Requisition Date: 02/05/92	Preliminary Report: 06/05/92	Final Report: 06/09/92

TITLE:
Compatibility of Calcined Oil Adsorbent with Waste Containing Sulfuric Acid.

Author(s) : Gerald Barrilleaux and Joe Schell
Phone(s) : 6052
Location : 2511

Archival : DB-5723-20B
File 92033.03

Reviewer:

Gerald Barrilleaux

Procedure:

A 2-Drop Mixing Cell Calorimeter was used to determine the heat of mixing of 1 part calcined oil adsorbent and 2 parts C-202 bottoms waste containing 60-80% sulfuric acid at ambient temperature. A 2 ml septum-sealed vial was loaded with 50 mg of calcined oil adsorbent, equilibrated, and then 50 microliters sulfuric acid waste from the Methanes plant was added.

Another heat of mixing test was conducted in which a small, near-adiabatic dewar was used and the temperature change was monitored with a Tegam digital thermometer. The temperature changes were measured for a 1:2 mixture of calcined oil adsorbent and C-202 bottoms containing 60-80% sulfuric acid and also a 1:2 mixture of calcined oil adsorbent and C-202 bottoms diluted 1:1 with water (30-40% sulfuric acid).

To determine compatibility above ambient temperature, 1.1 mg calcined oil adsorbent and 2.1 mg sulfuric acid waste were loaded into a glass capillary chilled in liquid nitrogen, sealed, and analyzed on the DuPont 9900 Thermal Analysis Differential Scanning Calorimeter from 25 degrees C to 200 degrees C at 10 degrees/minute.

Heat of Mixing Results:

The heat of mixing measured by the 2-Drop calorimeter at ambient temperature was -4.9 calories/gram of mixture.

DO 006581

CONFIDENTIAL

Heat of Mixing by Dewar:

C-202 bottoms sample (60-80% sulfuric acid)

Initial temperature = 22.5 degrees C

Maximum temperature after addition of adsorbent = 26 degree C

C-202 bottoms diluted 1:1 with water (30-40% sulfuric acid)

Initial temperature = 25 degrees C

Maximum temperature after addition of adsorbent = 26 degrees C

Differential Scanning Calorimetry Results:

File 92033.03 is a DSC scan of 1.1 mg calcined oil adsorbent + 2.1 mg sulfuric acid waste. There was no thermal activity detected to 200 C.

Conclusions:

The C-202 bottoms waste containing 60-80% sulfuric acid and the bottoms waste diluted 1:1 with water (30-40% sulfuric acid) are compatible with calcined oil adsorbent within test limits.

CONFIDENTIAL

DO 006582

Sample: 92033/R.R. BORDELON/8674/8-4601

Size: 3.2000 mg

Method: GLASS CAPILLARY/AG HOLDER

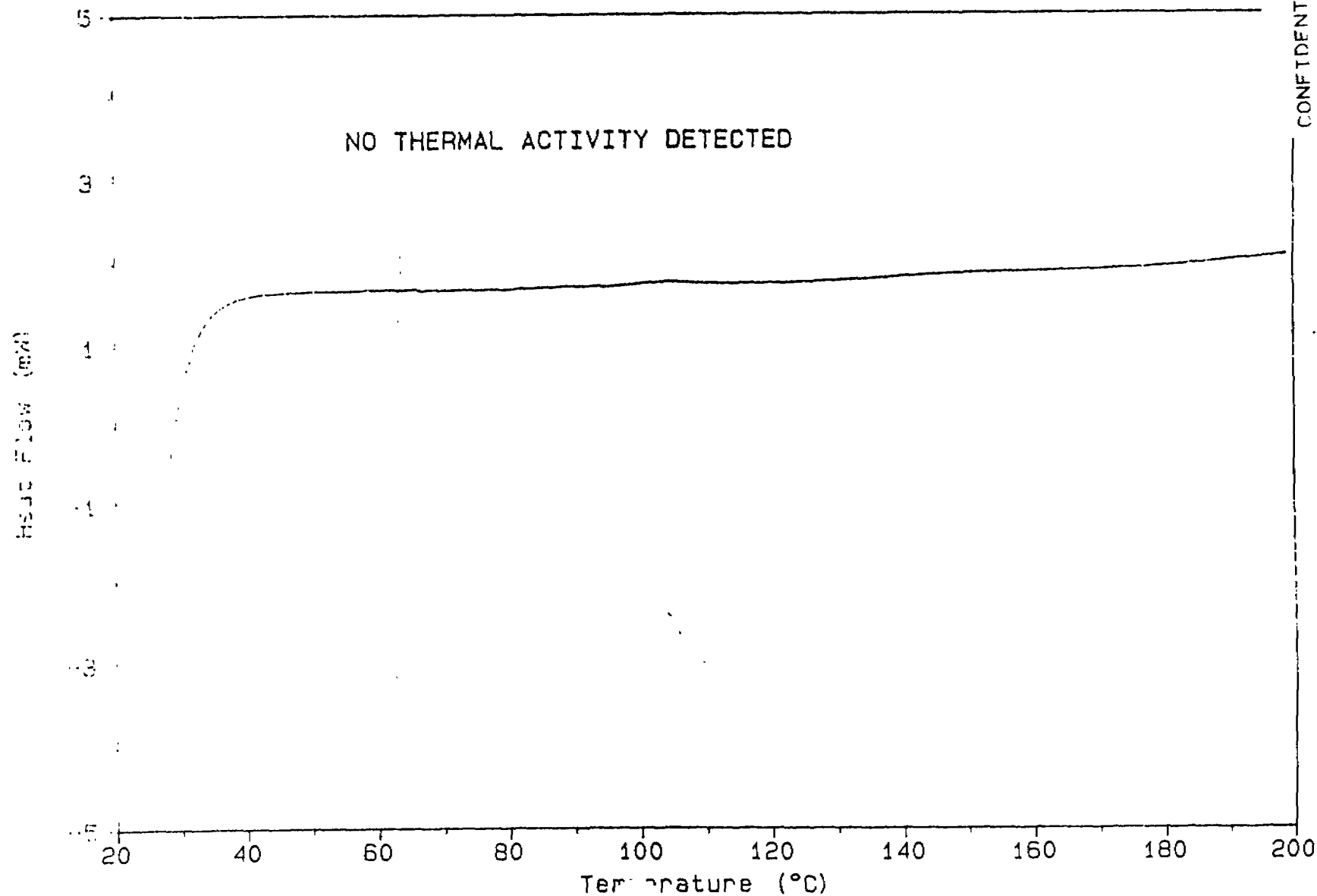
Comment: 1.1 mg Calcined Oil adsorbent + 2.1 mg Sulfuric acid (60% -80%)

DSC

File: 92033.03

Operator: GERALD BARRILLEAUX

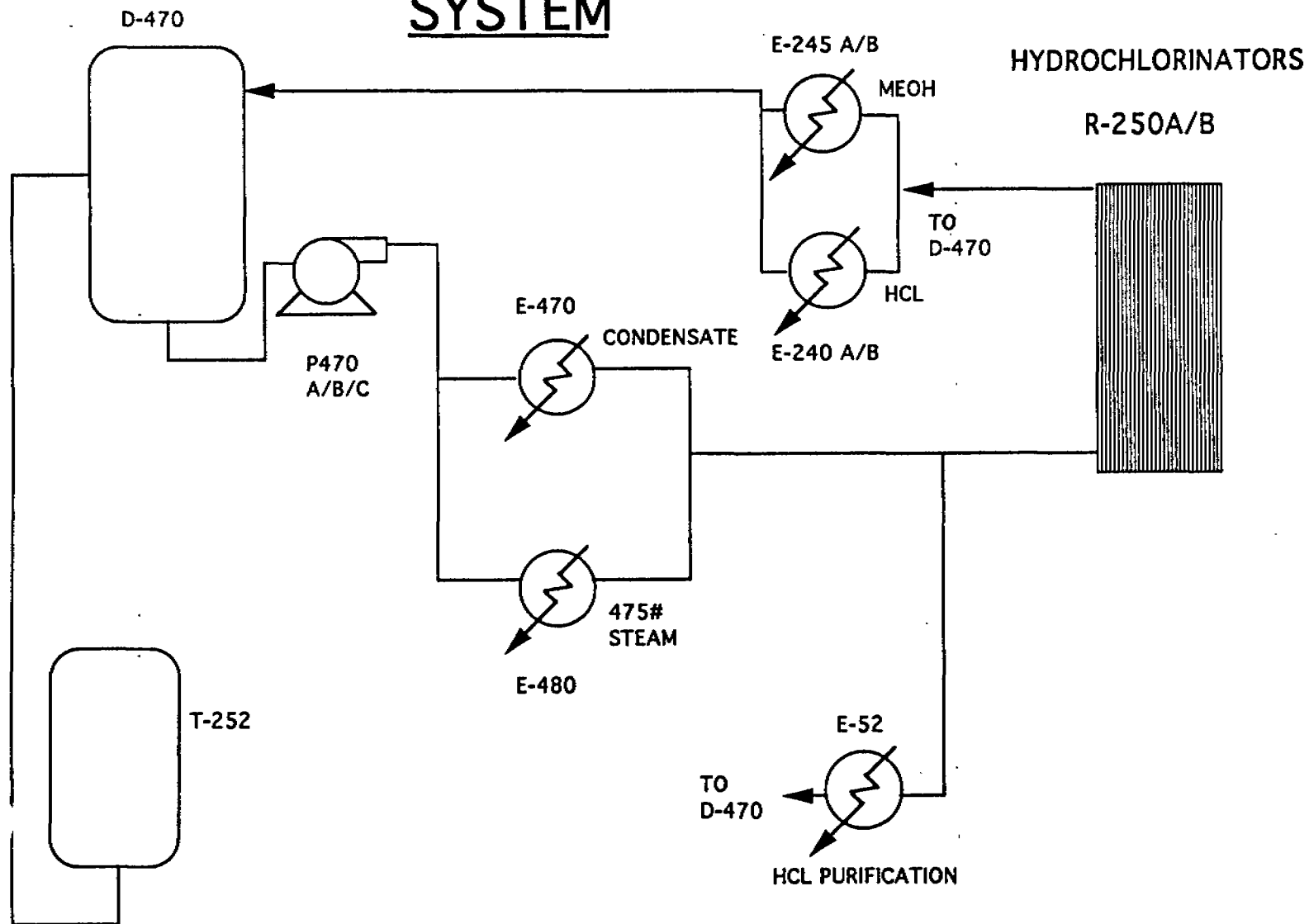
Run Date: 02/13/92 13:40



CONFIDENTIAL

DO 006583

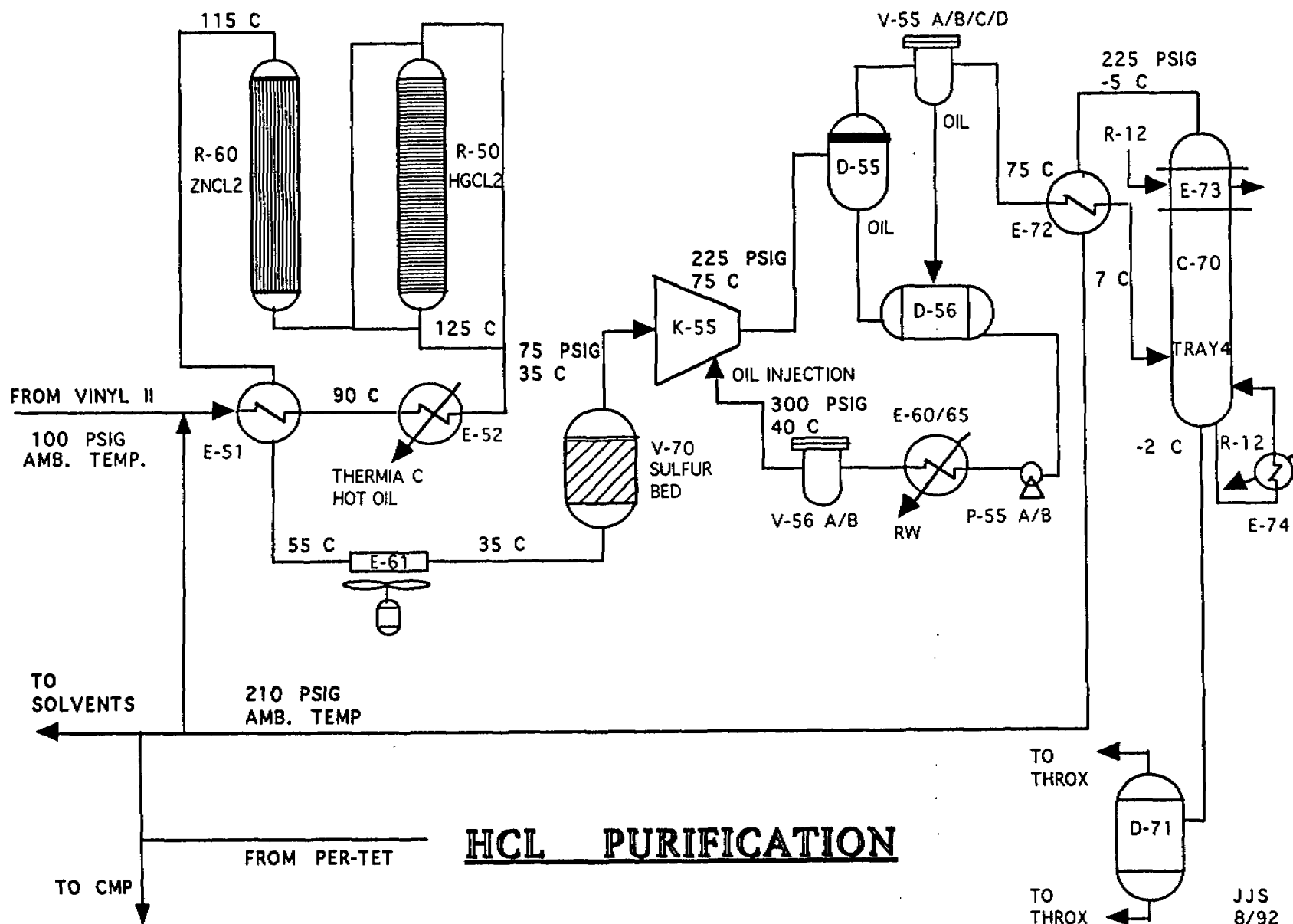
HOT OIL (SHELL THERMIA C) SYSTEM

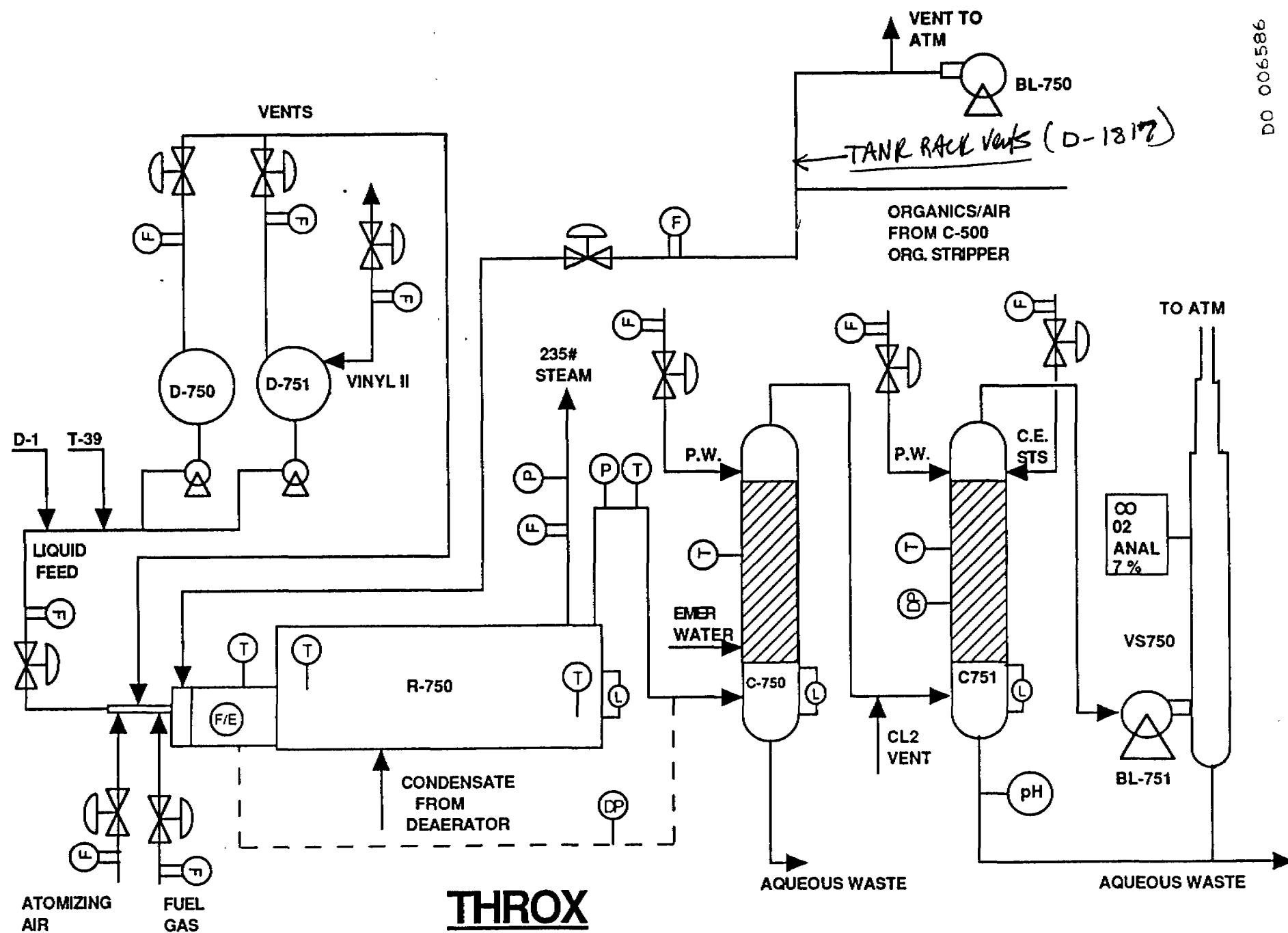


CONFIDENTIAL
DO 006584

CONFIDENTIAL

DO 006585





DO 006586

CONFIDENTIAL

Sample: 92033/R.R. BORDELON/8674/B-4601

Size: 3.2000 mg

Method: GLASS CAPILLARY/AG HOLDER

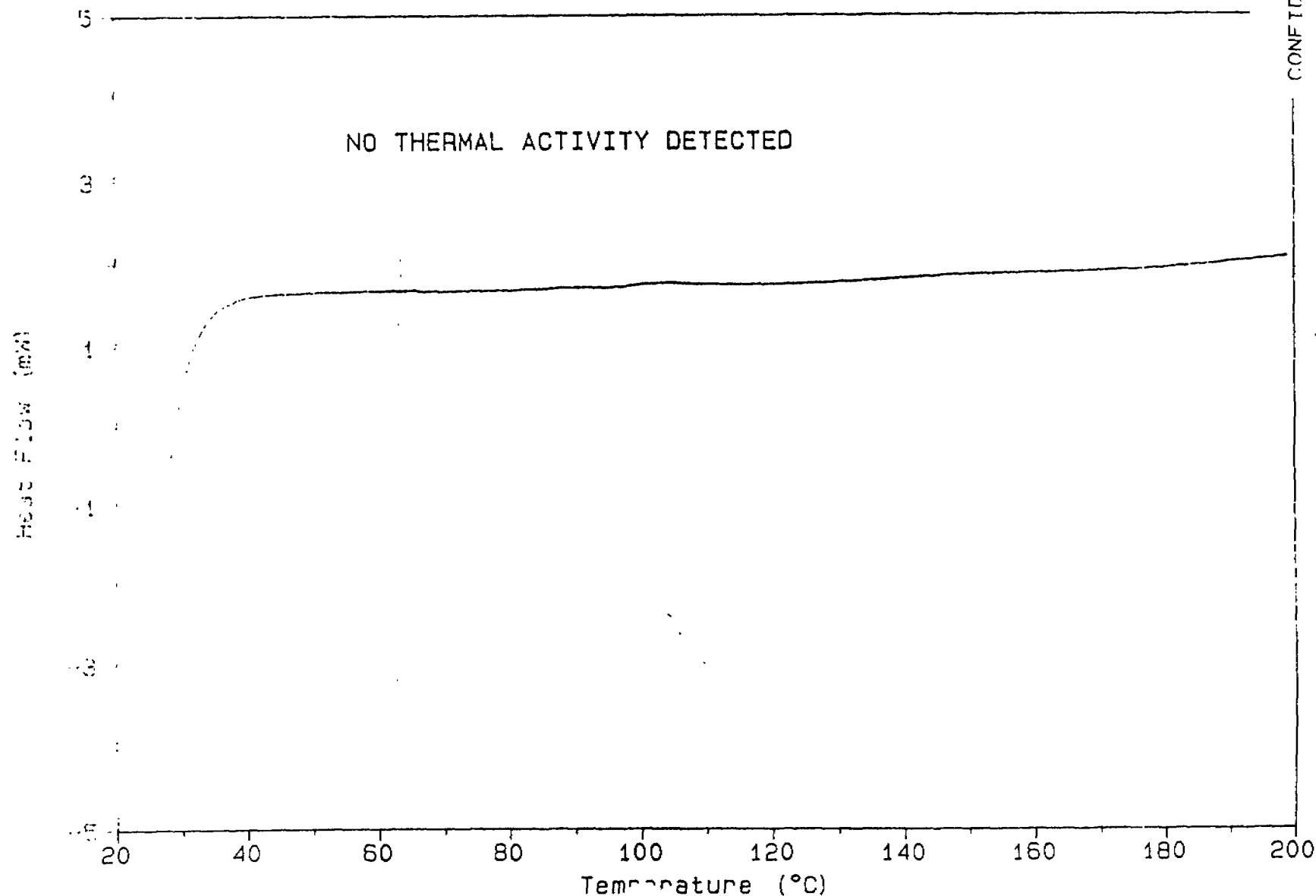
Comment: 1.1 mg Calcined Oil adsorbent + 2.1 mg Sulfuric acid (60% -80%)

DSC

File: 92033.03

Operator: GERALD BARRILLEAUX

Run Date: 02/13/92 13:40

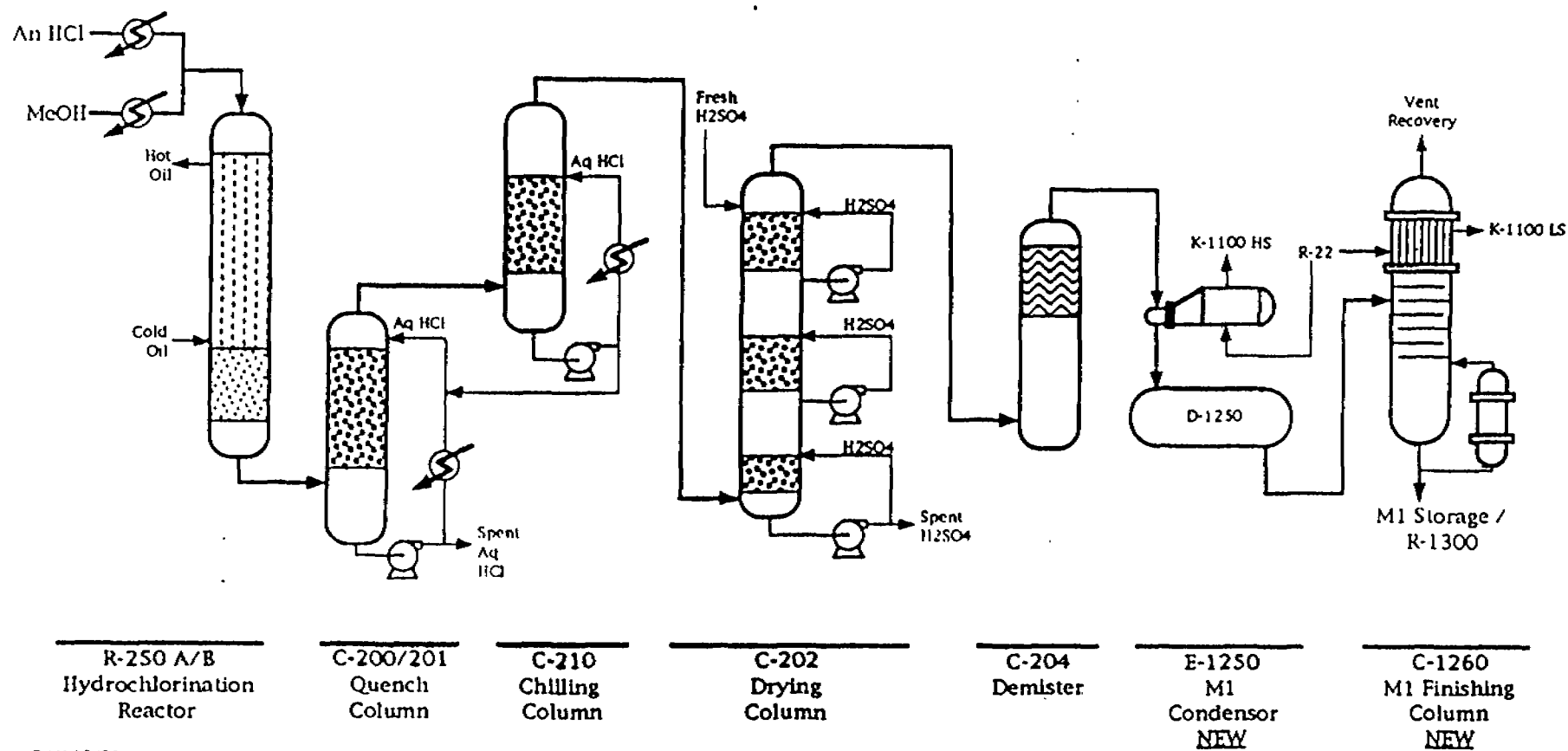


DSC V2.2A DuPc 9900

CONFIDENTIAL

DO 006587

Louisiana Division Chloromethanes Plant - Hydrochlorination System

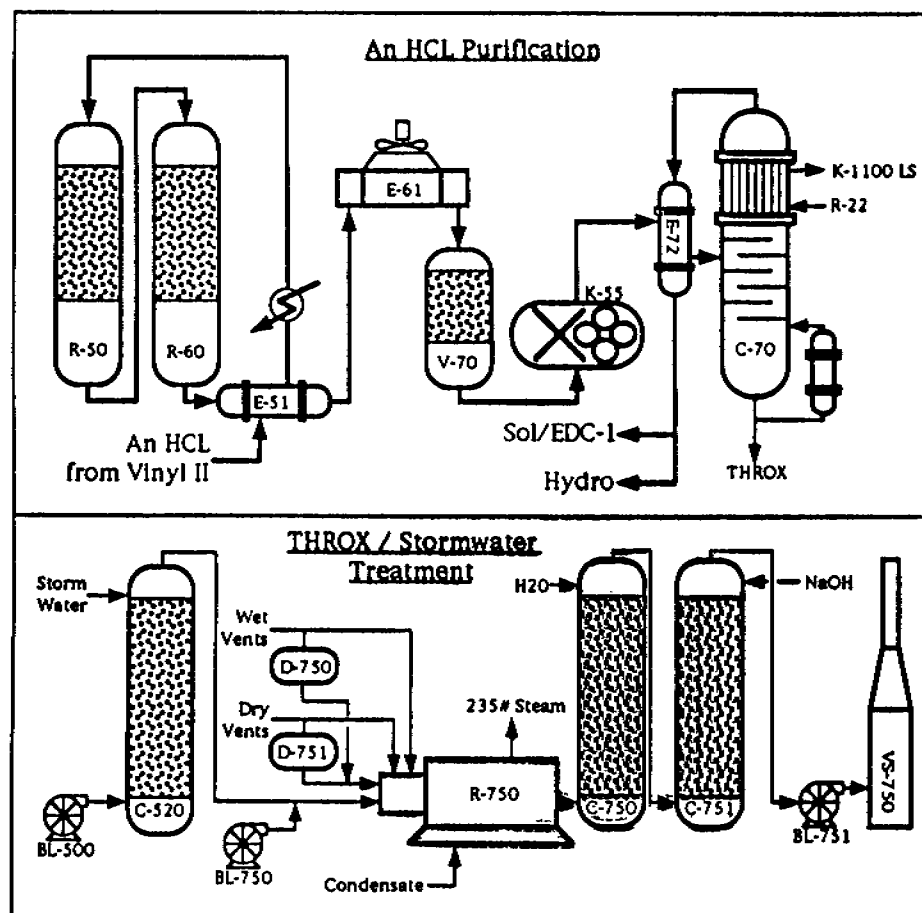


DAH 10/93

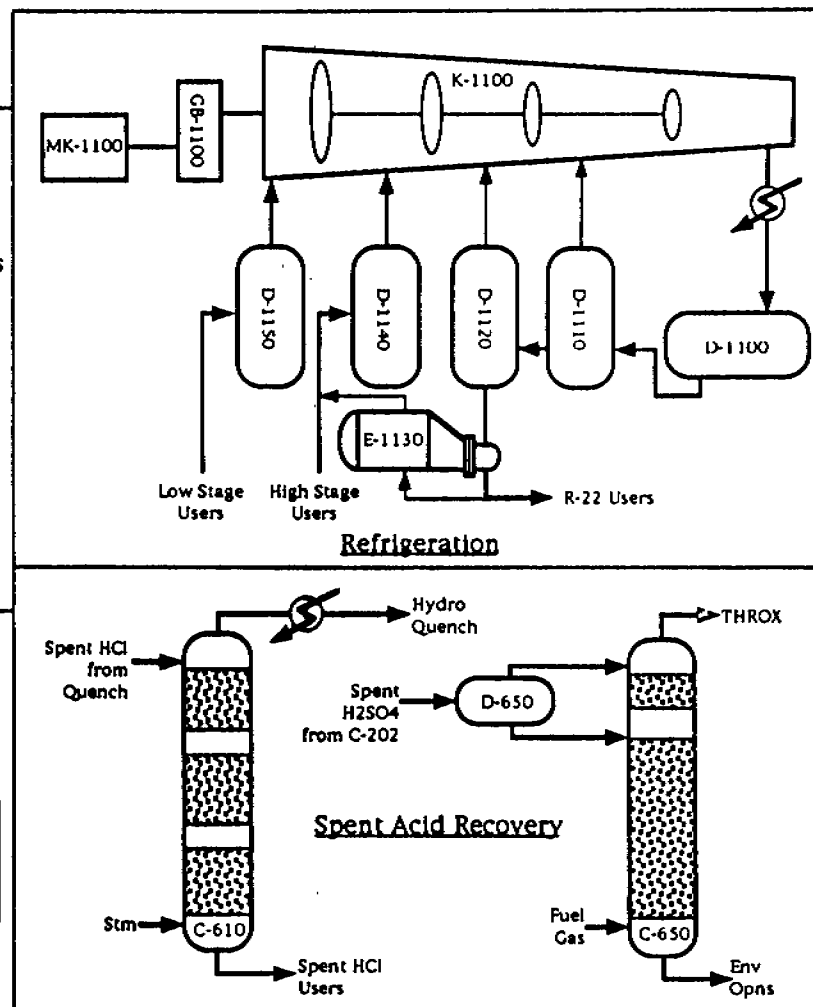
DOW CONFIDENTIAL

CONFIDENTIAL
DO 006588

Louisiana Division Chloromethanes Plant - Utilities & Other



DAH 10/93



DOW CONFIDENTIAL

CONFIDENTIAL

DD FORM 006589

**CHLORINATED METHANES PLANT
RX. CHEM INCIDENTS
SINCE 1992 CONSOLIDATED AUDIT REVIEW**

1. METHYL CHLORIDE CAUSTIC FILTERS (5/92)

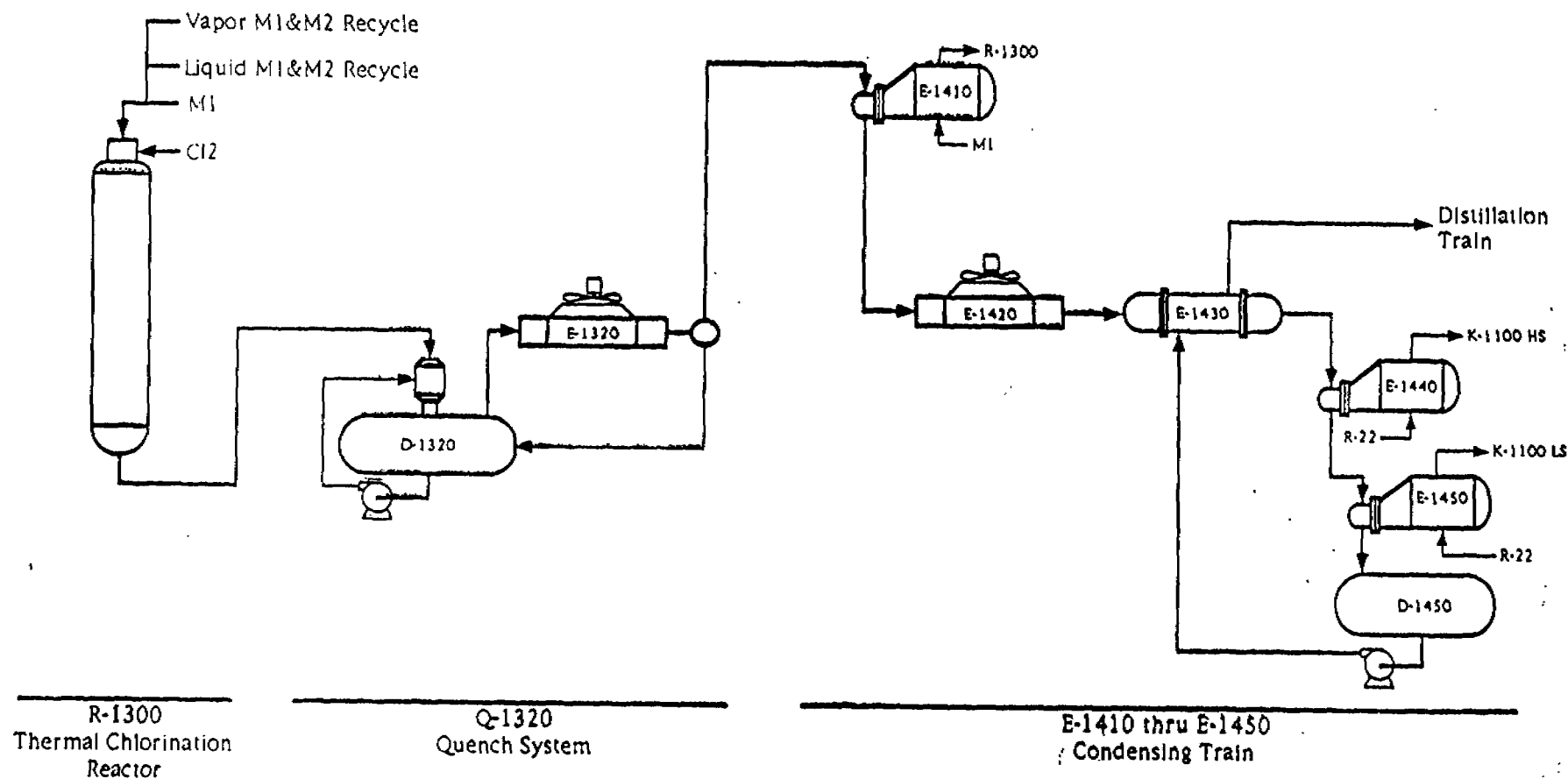
- OPERATOR EXPOSURE TO NAOH/WATER PLUME
- WELL COMMUNICATED
- A MAIN DRIVING FORCE FOR PROCEDURE SYSTEM

2. ALUMINUM BAFFLED TANK TRUCK/M1 (9/94)

- NEW TRANSPORTATION SERVICE
- POOR KNOWLEDGE OF RXN POTENTIAL & MATERIALS OF CONSTRUCTION
- DETAILED PROCEDURES FOR DISPOSAL DEVELOPED

CONFIDENTIAL

Louisiana Division Chloromethanes Plant - Thermal Chlorination / Quench / Condensing System



DOW CONFIDENTIAL

DAH 10/93
CONFIDENTIAL
DO 006591

THERMAL CHLORINATION REACTIONS

REACTION IN THERMAL CHLORINATOR (R-1300)

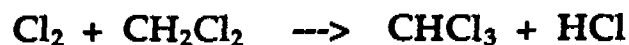
- * 25% Per Pass Conversion, Recycle M2 → M3 production
- * 25% Molar Chlorine Concentration
- * Reaction Temperature averages 455 C

METHYLENE CHLORIDE FORMATION (M2)



(H_r = -25.3 kcal/mol)

CHLOROFORM FORMATION (M3)



(H_r = -23.9 kcal/mol)

CARBON TETRACHLORIDE FORMATION (M4)

- * Byproduct, Sent to Solvents



(H_r = -20.4 kcal/mol)

ASSORTED SATURATED AND UNSATURATED C2'S ARE
ALSO CREATED - TOTAL < 1000 PPM

CONFIDENTIAL

DO 006592

THERMAL CHLORINATION SCENARIOS

1. LIQUID CHLORINE CARRY OVER:

CHLORINE / ORGANIC RATIO EXPLOSIVE POTENTIAL

- * HIGH LEVEL ALARM/TRIP ON Cl_2 KNOCK OUT DRUM (S-1301)
- * SELF-LIMITING ELECTRIC HEAT TRACING ON S-1301
- * HIGH REACTOR INLET TEMPERATURE ALARM/TRIP
- * DEW POINT CALCULATION ALARM (25 C ABOVE DEW POINT)

2. HIGH CHLORINE MOLAR % FLAMMABILITY:

CHLORINE / ORGANIC RATIO EXPLOSIVE POTENTIAL

- * HIGH OUTLET TEMP ALARM/TRIP
- * HIGH MOLAR CHLORINE % FLAMMABILITY ALARM/TRIP

MAXIMUM ALLOWABLE CHLORINE MOLAR CONCENTRATION CALCULATION

$$[\text{Cl}_2]_{\text{FL}} = 33.01 - 0.0672T - 0.03804P + 0.1997[\text{M}_2] - 0.001194 [\text{M}_2]^2$$

WHERE: $[\text{Cl}_2]_{\text{FL}}$ = MAX ALLOWED CHLORINE MOLAR CONC
T = R-300 INLET TEMP, DEG C
P = R-300 INLET PRESSURE, PSIG
[M₂] = M₂ MOLAR CONC IN ORGANIC VAPOR FEED

$$\% \text{ FLAM} = [\text{Cl}_2] / [\text{Cl}_2]_{\text{FL}}$$

WHERE: % FLAM = MOLAR CHLORINE % FLAMMABILITY
[Cl₂] = MOLAR CONC OF CHLORINE IN VAPOR FEED

CONFIDENTIAL

DO 006593

THERMAL CHLORINATION SCENARIOS

3. INLET LINE EXOTHERM

OTHER POTENTIAL CAUSES OF INLET IGNITION

- * HIGH REACTOR INLET LINE TEMP ALARM/TRIP
- * M1 IS PURGED THROUGH THE REACTOR BEFORE START UP TO SWEEP ANY FERRIC CHLORIDE THROUGH THE SYSTEM
- * RUST CAN CAUSE THE REACTION TO BEGIN IN THE INLET LINE
- * CHLORINE SIDE OF THE MIX NOZZLE IS PURGED WITH HCl PRIOR TO STARTUP TO ENSURE NO ORGANICS ARE PRESENT

4. OTHER SHUT DOWN CONDITIONS:

- * MAJOR INSTRUMENT FAILURES
- * DIFFERENTIAL PRESSURE ON CHLORINE HEADER
- * HIGH/HIGH K.O. POT LEVELS

CONFIDENTIAL

DO 006594

CHLORINE SYSTEM

- * ONLY TESTED LEAK SEALANTS ARE USED
- * TITANIUM NOT USED AT CMP
- * FLUOROLUBE IS USED IN DP CELL DIAPHRAGMS
- * GRAPHOIL GASKETS USED
- * CHLORINE HEADER PRESSURE HIGHER TO PREVENT BACK FLOW
- * PIPE SPEC "T" FOR CHLORINE SERVICE IS STRICTLY ADHERED TO
- * VALVES FOR CHLORINE SERVICE ARE PROPERLY PREPARED
- * CHLORINE/IRON FIRE PREVENTED BY SELF LIMITING ELECTRIC HEAT TRACING
- * 8 CHLORINE PROBES ARE LOCATED AROUND CMP

Need to engineer
(purple painted)

CONFIDENTIAL

DO 006595

THERMAL CHLORINATION AND CHLORINE SYSTEM RELATED REACTIVE CHEMICAL REPORTS

<u>TITLE</u>	<u>DETAIL</u>
CRI: TPO-T-68-5	KINETICS OF THERMAL CHLORINATION
CRI: LAD-512	KINETICS
CRI: LAD-1635	KINETICS
CRI: LAD-LR-75.10	BYPRODUCTS OF THERMAL CHLORINATION
CRI: LAD-LR-76.06	BYPRODUCTS
CRI: LAD-LR-75.18	BYPRODUCTS
CRI: TCL-710	FLAMMABILITY
CRI: TCL-818	FLAMMABILITY
INC# 79-0012	CL2 AND TITANIUM
INC# 83-0063	CL2/IRON FIRE DUE TO 400# STEAM TRACING
INC# 88-0005	AMMONIA FLASH FIRES DURING LEAK TEST
INC# 89-0019	OIL IN N2 HOSE THAT PURGED CL2 LINE
INC# 89-0061	CHLORINE/NEVERSEZ REACTION IN FLANGE
RCL-82-9132	METHYL CHLORIDE/ CHLORINE
RCL-86-9357	METHYLENE CHLORIDE SATURATE WITH CL2
RCT-87-0390	M1, M2, AND CHLORINE
RCT-88-0486	GRAPHOIL GTR AND CHLORINE GAS
RCT-88-0794	ALUMINUM RING AND CHLORINE

CONFIDENTIAL
DO 006596

CONDENSING TRAIN

PROCESS SUMMARY:

- * CONDENSE VIA CROSS EXCHANGE WITH R-22, M1, AIR
- * R-22 SYSTEM COMPRESSOR (K-1100)
- * FINAL DESTINATION D-1450, DIST. FEED TANK

CONDENSING TRAIN SCENARIOS

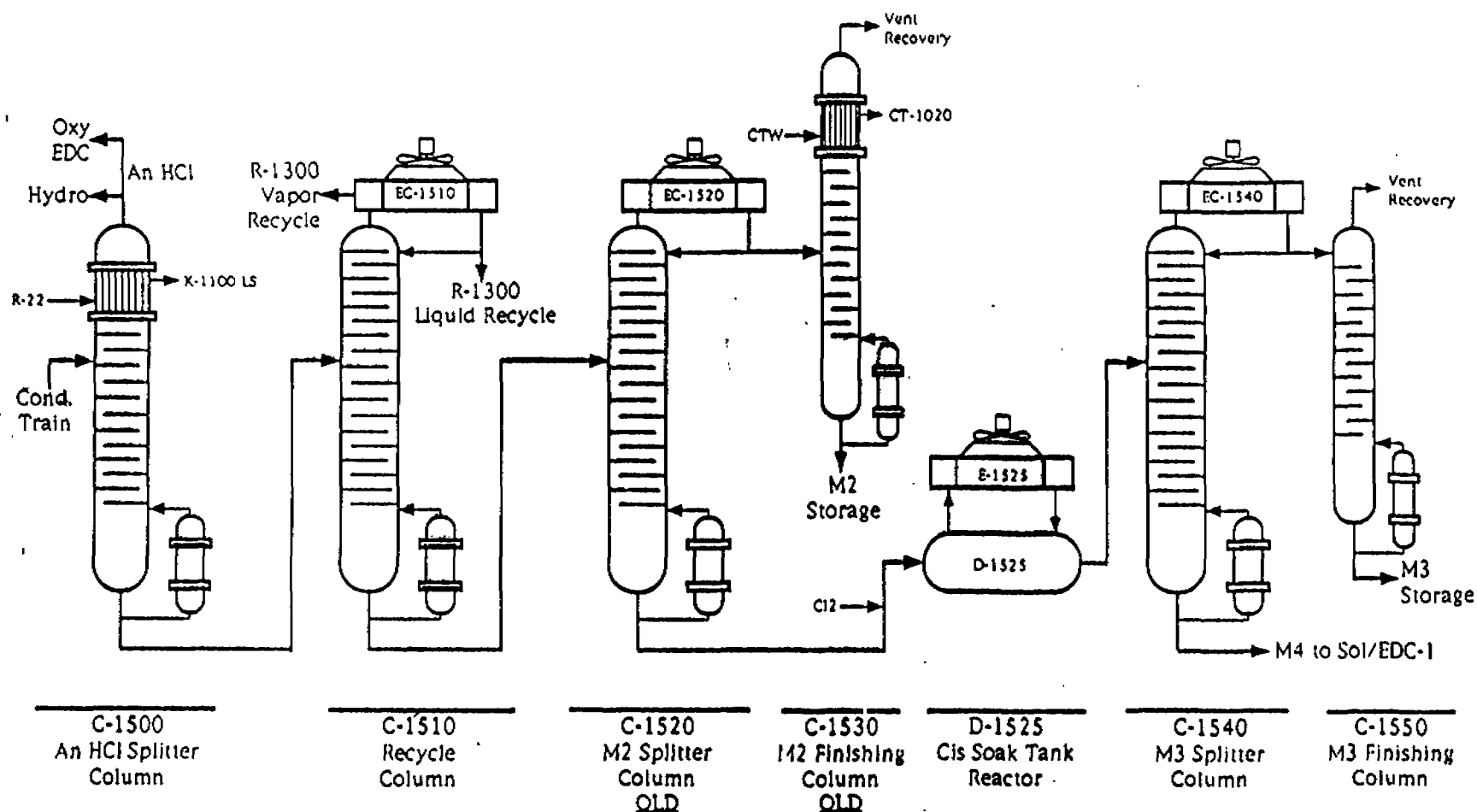
TUBE LEAKS

- * NO REACTION WITH CROSS EXCHANGE MEDIUMS
- * ORGANICS IN FREON SYSTEM WOULD SHOW UP AS INERTS (M1)
OR WOULD CAUSE EFFICIENCY LOSSES/EXCHANGER LEVEL RISE
(M2/M3)
- * ALUMINUM FINS ON AIR COOLERS... SHUTDOWN ON HIGH
INLET AIR TEMPERATURE

CONFIDENTIAL

DO 006597

Louisiana Division Chloromethanes Plant - Distillation Train



DAH 10/93

DOW CONFIDENTIAL

DO 006598

CONFIDENTIAL

DISTILLATION

PROCESS SUMMARY:

- * SPLIT AND RECYCLE HCL (C-1500)
- * RECYCLE M1/M2 MIX (C-1510)
- * SPLIT M2/M3 (C-1520)
- * FINISH M2 (LIGHTS STRIPPER) (C-1530)
- * REACT 1,2-DICHLOROETHYLENE (CIS) VIA
CHLORINATION IN SOAK TANK (D-1525)
- * SEPARATE M3 & CL2 FROM M4 (C-1540)
- * FINISH M3 (CHLORINE STRIPPER) (C-1550)

- * STEAM ON ALL REBOILERS

- * FREON 22, FIN FANS, COOLING TOWER WATER FOR
CONDENSING

CONFIDENTIAL

DO 006599

DISTILLATION SCENARIOS

1. TUBE LEAKS

- * NO REACTION WITH CROSS EXCHANGE MEDIUMS

2. CHLORINE / M2 REACTION IN SOAK TANK

- * CONTROL CL₂ CONCENTRATION AT 200 PPM
- * SAMPLE ONCE PER SHIFT
- * CL₂ PROBE ON SOAK TANK

3. CHLORINE INJECTION PROBLEMS

- * CHLORINE AT 115 PSIG/ DP INDICATION AND ALARM, AUTOMATIC DOUBLE-BLOCK-AND-BLEED TO PREVENT BACKFLOW
- * INJECTION FLOW CONTROLLED AND ALARMED BY MOD5
- * LIQUID CHLORINE PREVENTION VIA ELECTRIC HEAT TRACING

CONFIDENTIAL

DO 006600

DISTILLATION SCENARIOS

4. REBOILER POLYMER FORMATION

- * CMP COMPOUNDS DO NOT POLYMERIZE IN REBOILERS

5. MOLE SIEVE BED EXOTHERMS

- * MOLE SIEVE TYPE AW-300 NOT SUSCEPTIBLE TO DAMAGE FROM HCL
- * BED TEMPERATURES MONITORED AND ALARMED ON MOD V
- * LIQUID FILLED BED WITH CONSTANT SIDE STREAM FEED FLOW
- * REGENERATION BY NITROGEN HEATED BY 475# STEAM
- * MIGRATION PREVENTED BY JOHNSON SCREEN AND STRATIFIED LAYER OF INERT BALLS (DENSTONE 57)

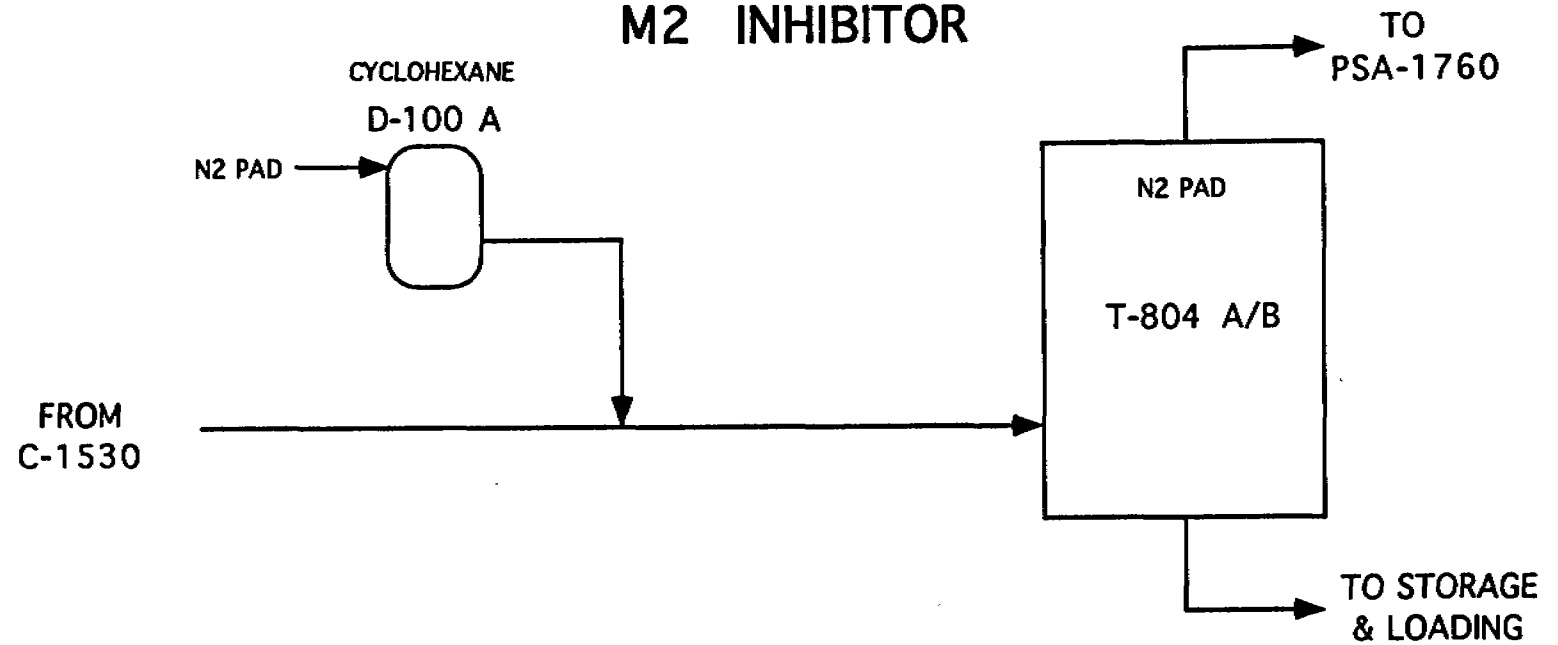
6. FLAMMABLE LEAK TO ATMOSPHERE

- * FIN FAN EXCHANGERS WITH FLAMMABLES HAVE AMBIENT AIR TEMPERATURE MONITORED FOR AUTO SHUTDOWN IN EVENT OF A FIRE
- * FIN FAN MATERIALS ARE COMPATIBLE WITH PROCESS

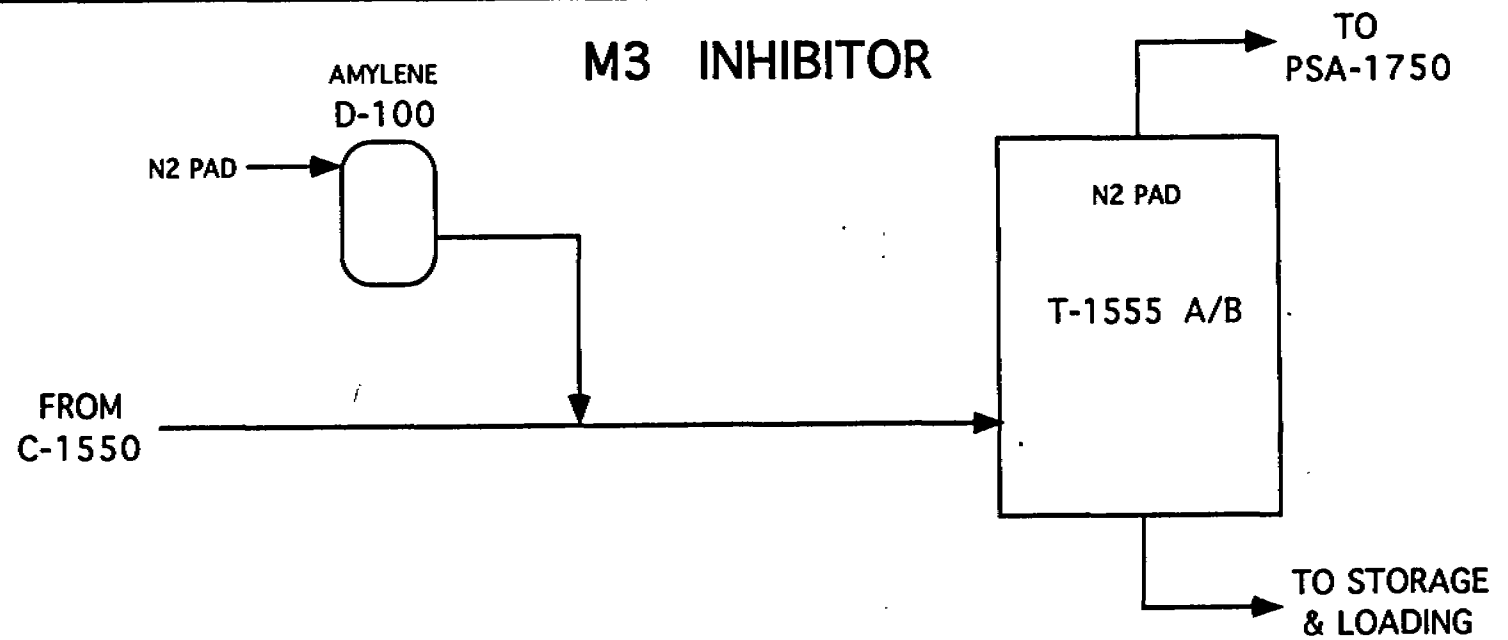
CONFIDENTIAL

DO 006601

M2 INHIBITOR



M3 INHIBITOR



PRODUCT FINISHING REACTIVE CHEMICAL CONCERNS

1. METHYLENE CHLORIDE/ CHLOROFORM INHIBITORS

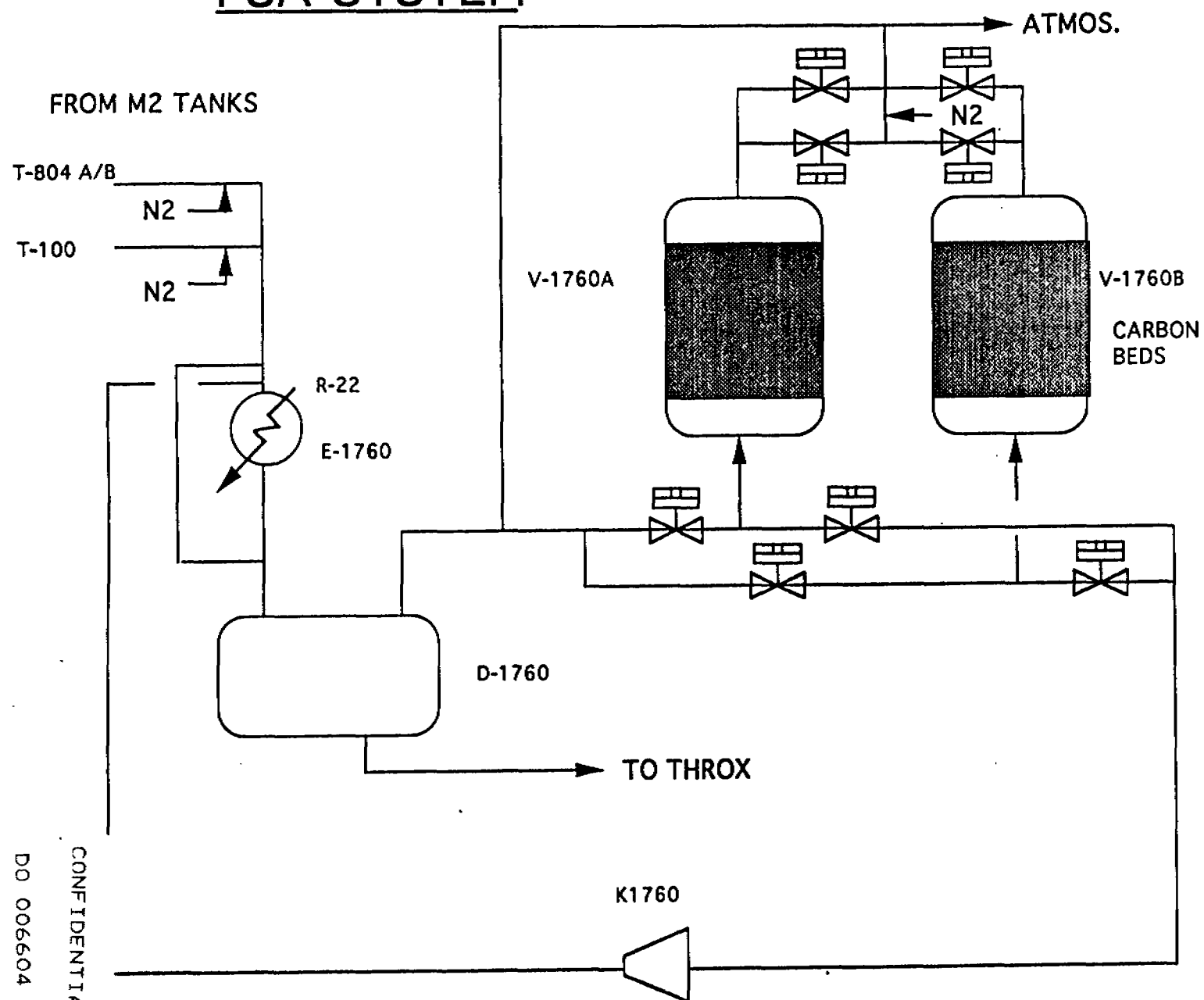
- * **CYCLOHEXANE IN METHYLENE CHLORIDE (300 PPM)
RATIO CONTROLLED BY TDC**
- * **AMYLENE IN CHLOROFORM (15 PPM)
CONCENTRATION CONTROLLED BY MOD5**
- * **FLOW ALARMS**
- * **TANKS ARE SAMPLED TO VERIFY ANTICIPATED
CONCENTRATIONS**
- * **RECENT R&D WORK INDICATES PRODUCT BREAKDOWN
IS FREE A RADICAL RXN IN PRESENCE OF UV LIGHT AND
OXYGEN**

2. CHLOROFORM/CAUSTIC REACTION

- * **LIGHTS STRIPPER USED FOR HCL REMOVAL IN M2,
NO M2 CAUSTIC FILTERS ANYMORE**

CONFIDENTIAL
DO 006603

PSA SYSTEM



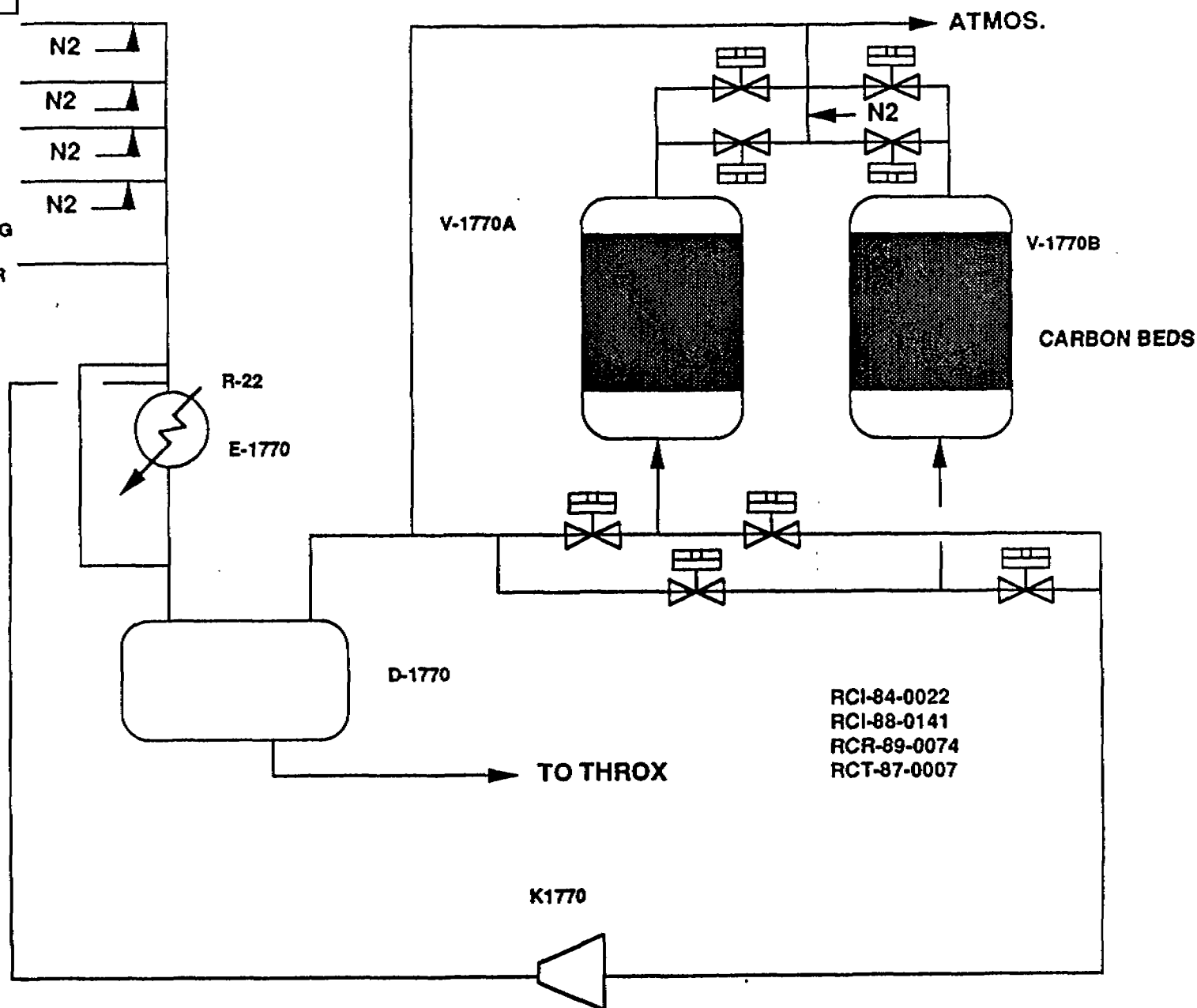
CONFIDENTIAL

DO 006604

MISC. PSA SYSTEM

VENTS

T-251	N2
T-101	N2
T-809	N2
T-808	N2
LOADING VENT HEADER (M2/M3)	



CONFIDENTIAL

DO 006605

PSA SYSTEMS

PROCESS SUMMARY:

- * ABSORB VAPORS FROM ATMOSPHERIC TANKS/LOADING
- * VACUUM OPERATION TO DESORB VAPORS
- * CONDENSE WITH R-22
- * BURN OR REPROCESS PRODUCT
- * PSA-1750 FOR CHLOROFORM TANKS
- * PSA-1760 FOR METHYLENE CHLORIDE TANKS
- * PSA-1770 FOR M4 / MEOH / URETHANE / AEROTHANE TANKS
- * REACTIVE CHEMICAL REVIEW DURING STARTUP IN NOVEMBER 1991

CONFIDENTIAL

DO 006606

PSA SCENARIOS

1. POTENTIAL FIRE IN CARBON BEDS

- * PROCEDURES FOR BED DUMPING
- * BED TEMPERATURES USED TO MONITOR, ALARM AND SHUTDOWN - ON CRITICAL INSTRUMENTS
- * VACUUM BREAK DONE WITH NITROGEN TO PREVENT AIR/CARBON OR AIR/MEOH/CARBON INCIDENT
- * ENTHALPY OF ABSORPTION RESEARCHED AND IS OK (PSA START-UP REVIEW)

2. TUBE LEAK

- * FREON 22 ON SHELL, DOESN'T REACT WITH PRODUCTS

CONFIDENTIAL

DO 006607

PSA RELATED REACTIVE CHEMICAL REPORTS

<u>TITLE</u>	<u>DETAIL</u>
RCI-84-0022	M2 AND MEOH FLASH POINT WORK
RCI-88-0141	M3 AND MEOH
RCR-89-0074	MIXTURE OF RCL'S AND MEOH
RCT-87-0007	METHANOL/CHARCOAL (CARBON)

CONFIDENTIAL

DO 006608

From: LACSDC::MILES 19-JUN-1992 12:00:42.88
To: LARNDG::WAGENER, HANEY, KKELLEY
CC: MILES
Subj: REACTIVE CHEMICAL INCIDENT RESPONSE

Gerald Wagner
Chairman of Reactive Chemical Committed LAD

Gerald,

The following are the Plant responses and dates for follow-up on the findings from the reactive chemical review. Please let me know if you have any questions or comments on the proposed follow-up actions.

Subj: Reactive Chemicals Incident at Methanes Plant

Reactive Chemicals Incident Investigation Conducted on 5-29-92

Incident: Methyl Chloride Caustic Filter Exotherm during
Recharging---5-29-92

Description: A routine operation of recharging the methyl chloride caustic pots was being performed. The operator was dumping a 400 lb hopper of crude flake caustic into the V-800 west filter. Apparently water was still in the vessel and when the caustic was dumped a violent reaction occurred. A 50 ft plume of steam and caustic erupted from the vessel. The hopper was thrown upward, striking and damaging the hydraulic hoist and funnel. The employee received first and second degree burns to the face, lips and neck.

Action Items/Recommendations:

1. Develop a procedure to verify dryness of the filter pots before adding flake caustic. The current procedures do not address this--all that is mentioned is to inspect for caustic and condition of inlet cross.

RESPONSE: The followup was assigned to James Cook and the procedures were ammended on 5/29/92 to look for water and to verify with bleeds on the bottom of the vessels.

2. The reactive chemical hazard potential of adding flake caustic to a filter pot containing water should be clearly described in the written procedures.

RESPONSE: This follow-up was included in item 1 above.

3. The modifications to the common drain header for the 4 filter pots should be expedited. This includes addition of new drain valves. A comment was made that the configuration that currently exists contributes to the problem of water backing-up into the pots.

RESPONSE: The common drain header was eliminated and individual drains were all in service by 6/12/92.

4. Reactive Chemicals training on the hazards of caustic/water reactivity needs to be re-emphasized. The superintendent surveyed several operators after the incident and reported that a lack of knowledge existed in some cases.

CONFIDENTIAL

RESPONSE: Tailgates were held with all five shifts by 6/3/92 to communicate the hazards of the water-caustic reaction and to

DO 006609

block will be reemphasized at the June safety meetings.

5. Sizing of the caustic filter safety relief devices should be re-evaluated. There is a concern that these devices were not sized for caustic/water reactive venting.

RESPONSE: A project has been initiated with engineering and meetings have been held with John Monroe and Belinda Furby to define credible scenarios and to start sizing relief valves. Follow-up assigned to Kevin Kelley. Sizing complete by 6/30 and implementation in a reasonable timeframe depending on the extent of the modifications. When we have a definitive estimate we will communicate it to the reactive chemical Chairman.

6. Verify that the flake caustic which was added to the filter during the incident is indeed sodium hydroxide and also verify that the liquid remaining from the incident is only water/caustic solution.

RESPONSE: Both the caustic flake and residual liquor in the vessel was analyzed by research and found to contain only sodium hydroxide. Completed 6/3/92.

7. A caustic dust problem exists during the caustic dump step of the the recharging operation. Steps should be taken to minimize dust exposure to personnel. Industrial Hygiene personnel should be consulted for their input. One suggestion was to consider installing a remote dumping switch.

RESPONSE: The same engineering project for the safety valve sizing will address this problem also. The engineering should be complete by 6/30/92.

8. Amend procedures to include reading pressure gauge to insure that the pressure is relieved to 1 atm before pulling heads.

RESPONSE: This item was also taken care of in item one above.

9. Communicate this incident to the Chlorinated Hydrocarbons Technology Center and ask Maurice Dobre to pass this information on to other plants that use caustic filters.

RESPONSE: Kevin Kelley communicated the incident to Maurice Dobre. Maurice suggested that we communicate the incident to the other plants when we request information in item 10 below.

10. Check with the Technology Center concerning the best method of adding water to the spent caustic during the washing step to minimize the potential for a reactive chemicals incident.

RESPONSE: The other Plants with caustic filters were communicated with by VAX mail on 6/12/92 to request information on the wash steps that they are using. Follow-up will depend on the types of response. Again we will communicate the findings from the survey to the Reactive Chemicals Chairman and to the Tech Center.

Bruce Miles
2 Production Plant

DO 006610

CONFIDENTIAL

CHLORINATED METHANES PLANT LEAK REPAIR METHODS

1. ENGINEERING DEFINED PROCEDURES ARE FOLLOWED

2. LIST OF ACCEPTED SEALANTS CURRENTLY ON PDP-11

***** PROPOSE USING LACSDC "SAFETY" MENU ***
TO AVOID DOUBLE WORK FOR ENGINEERS & CAT'S**

CONFIDENTIAL

Reactive Chemicals

November 9, 1994

New Superintendent Review

DO 006611

TABLE III. REACTIVITY OF SEALANT WITH PROCESS CHEMICAL (SORTED BY PLANT)

PLANT	PROCESS CHEMICAL	SEALANT	REF. NO.	TEST	REACTIVITY
LHC 3	WATER/STEAM	SERVICE GROUP INC SG-110 SOLID	89272	DSC	NO EXO TO 275 C
LHC 3	WATER/STEAM	SERVICE GROUP INC SG-113	89272	DSC	EXO AT 185 C
LHC 3	WATER/STEAM	SERVICE GROUP INC SG-201	89272	DSC	EXO AT 75 C
LHC 3	WATER/STEAM	SERVICE GROUP INC SG-201HT	89272	DSC	EXO AT 125 C
LHC 3	WATER/STEAM	SERVICE GROUP INC SG-250	89272	DSC	NO EXO TO 325 C
LHC 3	WATER/STEAM	SERVICE GROUP INC SG-302	89272	DSC	NO EXO TO 350 C
LHC 3	WATER/STEAM	SERVICE GROUP INC SG-303	89272	DSC	EXO AT 260 C
LHC 3	WATER/STEAM	SERVICE GROUP INC SG-304	89272	DSC	NO EXO TO 325 C
LHC 3	WATER/STEAM	SERVICE GROUP INC SG-306	89272	DSC	NO EXO TO 290 C
LHC 3	WATER/STEAM	SERVICE GROUP INC SG-312	89272	DSC	NO EXO TO 350 C
LHC 3	WATER/STEAM	SERVICE GROUP INC SGC FIBER	89272	DSC	NO EXO TO 325 C
LHC 3	WATER/STEAM	SERVICE GROUP INC SGK FIBER	89272	DSC	NO EXO TO 325 C
LHC 3	WATER/STEAM	WHITE BAKERSEAL SEALANT	4792-25A	DSC	EXO AT 360 C
METHANES	CARBON TETRACHLORIDE	SAFE SEAL - CHEMOLA TEFLON	94060	HOM	NO EXO AT 22 C
METHANES	CARBON TETRACHLORIDE	SAFE SEAL - CHEMOLA TEFLON	94060	DSC	EXO AT 297 C
METHANES	CARBON TETRACHLORIDE	SAFE SEAL GRAFFPAK (UCAR CARBON CO GRAFOIL)	94060	HOM	NO EXO AT 22 C
METHANES	CARBON TETRACHLORIDE	SAFE SEAL GRAFFPAK (UCAR CARBON CO GRAFOIL)	94060	DSC	EXO AT 325 C
METHANES	CARBON TETRACHLORIDE	SAFE SEAL MULTIPAK (JOHN CRANE 6KB)	94060	HOM	NO EXO AT 22 C
METHANES	CARBON TETRACHLORIDE	SAFE SEAL MULTIPAK (JOHN CRANE 6KB)	94060	DSC	EXO AT 185 C
METHANES	CHLORINE (LIQUID)	SAFE SEAL - CHEMOLA TEFLON	94060	ARC	EXO AT 8 C
METHANES	CHLOROFORM	SAFE SEAL - CHEMOLA TEFLON	94060	HOM	NO EXO AT 22 C
METHANES	CHLOROFORM	SAFE SEAL - CHEMOLA TEFLON	94060	DSC	EXO AT 310 C
METHANES	CHLOROFORM	SAFE SEAL GRAFFPAK (UCAR CARBON CO GRAFOIL)	94060	HOM	NO EXO AT 22 C
METHANES	CHLOROFORM	SAFE SEAL GRAFFPAK (UCAR CARBON CO GRAFOIL)	94060	DSC	EXO AT 200 C
METHANES	CHLOROFORM	SAFE SEAL MULTIPAK (JOHN CRANE 6KB)	94060	HOM	NO EXO AT 22 C
METHANES	CHLOROFORM	SAFE SEAL MULTIPAK (JOHN CRANE 6KB)	94060	DSC	EXO AT 224 C
METHANES	CHLOROFORM	STEAM & PROCESS SP-CM	85133D	DTA	NO EXO TO 250 C
METHANES	CHLOROFORM	TEAM LEAK REPAIRS SEALANT DB-2	RCL 82-039	DTA	NO EXO TO 250 C
METHANES	CP-1000 OIL SATURATED WITH HCL	TEAM LEAK REPAIRS SEALANT #6	92288	DSC	NO EXO TO 200 C
METHANES	DIMETHYL ETHER	TEAM LEAK REPAIRS SEALANT DB-2	RCL 82-043	DTA	NO EXO TO 200 C
METHANES	DOWTHERM G	STEAM & PROCESS SP-109	RCL 1458	DTA	NO EXO TO 290 C
METHANES	FREON 12	STEAM & PROCESS SP-2007	RCL 82-037	DTA	NO EXO TO 100 C
METHANES	HCl (15%) + METHYL CHLORIDE (85%)	STEAM & PROCESS SP-1011	RCL 1145	DTA	NO EXO TO 350 C
METHANES	HCl (15%) + METHYL CHLORIDE (85%)	STEAM & PROCESS SP-103	RCL 1147	DTA	EXO AT 145 C
METHANES	HCl, M1, M2, M3, M4 (T-851)	STEAM & PROCESS SP-2600	RCL 82-014	DTA	NO EXO TO 500 C
METHANES	HCl, M1, M2, M3, M4 (T-851)	STEAM & PROCESS SP-CM	RCL 1400	DTA	NO EXO TO 300 C
METHANES	HCl, M1, M2, M3, M4 (K-350 SUCTION)	STEAM & PROCESS SP-2000	RCL 82-119	DTA	NO EXO TO 200 C
METHANES	HYDROGEN CHLORIDE	SAFE SEAL - CHEMOLA TEFLON	94060	HOM	SL. EXO AT 22 C
METHANES	HYDROGEN CHLORIDE	SAFE SEAL - CHEMOLA TEFLON	94060	DSC	NO EXO TO 450 C
METHANES	HYDROGEN CHLORIDE	SAFE SEAL GRAFFPAK (UCAR CARBON CO GRAFOIL)	94060	HOM	SL. EXO AT 22 C
METHANES	HYDROGEN CHLORIDE	SAFE SEAL GRAFFPAK (UCAR CARBON CO GRAFOIL)	94060	DSC	EXO AT 360 C
METHANES	HYDROGEN CHLORIDE	SAFE SEAL MULTIPAK (JOHN CRANE 6KB)	94060	HOM	EXO AT 22 C

Dow Confidential

DO 006612

CONFIDENTIAL

TABLE III. REACTIVITY OF SEALANT WITH PROCESS CHEMICAL (SORTED BY PLANT)

PLANT	PROCESS CHEMICAL	SEALANT	REF. NO.	TEST	REACTIVITY
METHANES	HYDROGEN CHLORIDE	SAFE SEAL MULTIPAK (JOHN CRANE 6KB)	94060	DSC	NO EXO TO 325 C
METHANES	HYDROGEN CHLORIDE (ANHYDROUS)	STEAM & PROCESS SP-CM	85133F	DTA	NO EXO TO 250 C
METHANES	HYDROGEN CHLORIDE (ANHYDROUS)	TEAM LEAK REPAIRS SEALANT DB-2	RCL 82-042	DTA	NO EXO TO 200 C
METHANES	M1, M2, M3, M4, + HCl	STEAM & PROCESS SP-325	93093	DSC	NO EXO TO 300 C
METHANES	M1, M2, M3, M4, + HCl	STEAM & PROCESS SP-325	93093	HOM	NO EXO AT 22 C
METHANES	METHANES E-259 VENT (HCl,M1,M2,M3)	SILASTIC 732-RTV SILICONE RUBBER	RCL 83-092	DTA	NO EXO TO 200 C
METHANES	METHANES R-300 OUTLET (M1,M2,M3,M4,HCl)	STEAM & PROCESS SP-2600	RCL 82-045	DTA	NO EXO TO 310 C
METHANES	METHANOL	STEAM & PROCESS SP-1015	85173A	DTA	NO EXO TO 225 C
METHANES	METHANOL	TEAM LEAK REPAIRS SEALANT DB-2	RCL 82-041	DTA	NO EXO TO 175 C
METHANES	METHYL CHLORIDE	755 STICK SEALANT	91126	DSC	NO EXO TO 175 C
METHANES	METHYL CHLORIDE	SAFE SEAL - CHEMOLA TEFLON	94060	HOM	NO EXO AT 22 C
METHANES	METHYL CHLORIDE	SAFE SEAL - CHEMOLA TEFLON	94060	DSC	EXO AT 375 C
METHANES	METHYL CHLORIDE	SAFE SEAL GRAFFPAK (UCAR CARBON CO GRAFOIL)	94060	HOM	SL. EXO AT 22 C
METHANES	METHYL CHLORIDE	SAFE SEAL GRAFFPAK (UCAR CARBON CO GRAFOIL)	94060	DSC	NO EXO TO 250 C
METHANES	METHYL CHLORIDE	SAFE SEAL MULTIPAK (JOHN CRANE 6KB)	94060	HOM	SL. EXO AT 22 C
METHANES	METHYL CHLORIDE	SAFE SEAL MULTIPAK (JOHN CRANE 6KB)	94060	DSC	NO EXO TO 250 C
METHANES	METHYL CHLORIDE	STEAM & PROCESS SP-1360	RCL 1578	DTA	NO EXO TO 140 C
METHANES	METHYL CHLORIDE	STEAM & PROCESS SP-2007	84E156	DTA	NO EXO TO 150 C
METHANES	METHYL CHLORIDE	STEAM & PROCESS SP-2026	85132A	DTA	NO EXO TO 200 C
METHANES	METHYL CHLORIDE	STEAM & PROCESS SP-CM	85133B	DTA	NO EXO TO 250 C
METHANES	METHYL CHLORIDE	TEAM LEAK REPAIRS SEALANT DB-2	RCL 82-040	DTA	NO EXO TO 190 C
METHANES	METHYLENE CHLORIDE	SAFE SEAL - CHEMOLA TEFLON	94060	HOM	NO EXO AT 22 C
METHANES	METHYLENE CHLORIDE	SAFE SEAL - CHEMOLA TEFLON	94060	DSC	EXO AT 228 C
METHANES	METHYLENE CHLORIDE	SAFE SEAL GRAFFPAK (UCAR CARBON CO GRAFOIL)	94060	HOM	NO EXO AT 22 C
METHANES	METHYLENE CHLORIDE	SAFE SEAL GRAFFPAK (UCAR CARBON CO GRAFOIL)	94060	DSC	EXO AT 335 C
METHANES	METHYLENE CHLORIDE	SAFE SEAL MULTIPAK (JOHN CRANE 6KB)	94060	HOM	NO EXO AT 22 C
METHANES	METHYLENE CHLORIDE	SAFE SEAL MULTIPAK (JOHN CRANE 6KB)	94060	DSC	EXO AT 120 C
METHANES	METHYLENE CHLORIDE	STEAM & PROCESS SP-103	RCL 1584	DTA	NO EXO TO 150 C
METHANES	METHYLENE CHLORIDE	STEAM & PROCESS SP-1300	RCL 1582	DTA	NO EXO TO 150 C
METHANES	METHYLENE CHLORIDE	STEAM & PROCESS SP-1360	RCL 1577	DTA	NO EXO TO 150 C
METHANES	METHYLENE CHLORIDE	STEAM & PROCESS SP-2026	85132B	DTA	NO EXO TO 200 C
METHANES	METHYLENE CHLORIDE	STEAM & PROCESS SP-CM	85133C	DTA	NO EXO TO 250 C
METHANES	METHYLENE CHLORIDE	TEAM LEAK REPAIRS SEALANT DB-2	RCL 82-038	DTA	NO EXO TO 200 C
METHANES	SHELL THERMIA C OIL WITH DISSOLVED HCL	ULTRAMETAL LIQUID METAL (CURED)	93028	DSC	NO EXO TO 250 C
METHANES	SHELL THERMIA OIL C	STEAM & PROCESS SP-1011	90400	DSC	NO EXO TO 250 C
METHANES	SHELL THERMIA OIL C	STEAM & PROCESS SP-109	90400	DSC	NO EXO TO 250 C
METHANES	SODIUM HYDROXIDE (50%)	STEAM & PROCESS SP-1011	RCL 1146	DTA	NO EXO TO 295 C
METHANES	SULFURIC ACID	TEAM LEAK REPAIRS SEALANT DB-2	RCL 82-044	DTA	EXO AT 45 C
METHANES	VINYL CHLORIDE	STEAM & PROCESS SP-429	93179	DSC	EXO AT 114 C
METHANES	WATER/STEAM	STEAM & PROCESS SP-1011	90037	DSC	NO EXO TO 300 C
METHANES	WATER/STEAM	STEAM & PROCESS SP-2511	86060A	DTA	NO EXO TO 275 C
METHANES	WATER/STEAM	TEAM LEAK REPAIRS SEALANT #1	RCL 83-017	DTA	NO EXO TO 150 C

DO 006613

Dow Confidential

CONFIDENTIAL

**CHLORINATED METHANES PLANT
RAW MATERIAL I.D.**

<u>MATERIAL</u>	<u>I.D. PROCESS</u>
MEOH	G.C.
AMYLENE INHIBITOR	G.C.
CYCLOHEXANE	G.C.
SODIUM THIOSULFATE	IODINE COLOR TEST
OILS/GREASES	LABEL
FLAKE CAUSTIC	LABEL
LIQUID NITROGEN	C.O.A. ON INVOICE
H ₂ SO ₄	DENSITY
LAB GASES	CYLINDER LABELS
CATALYST	C.O.A.
MOLE SIEVE	LABEL

CONFIDENTIAL

DO 006614

CHLORINATED METHANES PLANT CRITICAL INSTRUMENT PROGRAM

1. THERMALCHLORINATION:

REACTION RUNAWAY PREVENTION:

**MOD V - TRIPLE REDUNDANCY ELIMINATING MANY
CRITICAL INSTRUMENT CHECKS**

2. HYDROCHLORINATION:

DME CARRYOVER

**QUENCH COLUMN O/H TEMPERATURES
SULFURIC COLUMN TEMPERATURES**

3. DISTILLATION:

PRE-START UP AUDITS

NO CRITICAL INSTRUMENTS IDENTIFIED

4. PSA BED TEMPERATURES:

PREVENT BED EXOTHERM DUE TO OXYGENATES

CONFIDENTIAL

DO 006615

CHLORINATED METHANES PLANT TRAINING PROGRAM

- * YEARLY TRAINING ON REACTIVE CHEMICALS**
- * IPT SYSTEM IN PLACE**
- * PROCEDURE SYSTEM:
ALL PROCEDURES DEFINE SPECIAL CONCERNS**
- * COMPATABILITY CHART IN CONTROL ROOM**
- * TRAINING AND COMMUNICATION ON DIVISION
INCIDENTS**

CONFIDENTIAL

DO 006616