# Interoffice Communication

To Distribution

From P. F. Fetizanan

Date December 15, 1982

Subject Carbon Tetrachloride ($CCl_4$) Injection System Class "A" Design--VCM Modernization Project--Revised Issue

Attached is the revised $CCl_4$ Injection System Class "A" Process Design incorporating plant and Engineering Center comments. This design will maintain an adequate $CCl_4$ level in the system after the oxy retrofit to obtain required cracking depth.

By copy of this design, we are requesting CED to prepare a revised project schedule and cost estimate by December 23 based on July 1, 1982 startup. In addition we would like CED to check if Conoco has a surplus pressure vessel that may be used as $CCl_4$ storage tank instead of the new T-465 specified in the design.

Please direct your comments or questions regarding this package either to Jeff McCrary at extension 4868 or myself at 5435, both in Ponca City.

P. F. Fetizanan/GJF

P. F. Fetizanan
Senior Process Engineer
Chemicals Division
Process Engineering Department

pjc
Enc
CC:
GJF:JGC:RB:DLD:PLF:RMO:MLA:JAD
JRH:CCP:SRD:GHG:DSH:GCB:PTM

CCR 000016723

TABLE OF CONTENTS

CCl4 INJECTION SYSTEM

VCM MODERNIZATION PROJECT

WESTLAKE, LOUISIANA

# DESIGN BASIS

## $CCl_4$ INJECTION SYSTEM

## VCM MODERNIZATION PROJECT

## WESTLAKE, LOUISIANA

The fundamental points of the design basis for carbon tetrachloride storage capacity and injection rate are as follows:

1. The $CCl_4$ injection system is sized to provide 3,000 ppm by weight $CCl_4$ in the cracking furnace vaporizer feed.

2. Fifty percent (50%) of the recycle EDC stream shall bypass the light ends column C-102.

3. The oxychlorination area shall generate 28 pounds per hour $CCl_4$. This is equivalent to a $CCl_4$ concentration of 400 ppm by weight in the oxy EDC product.

4. No other section or unit in the VCM plant shall generate or consume $CCl_4$ in any amount.

5. The EDC stream at the light ends column (C-102) bottoms shall retain 40 percent of the $CCl_4$ present in the light ends column feed; the remainder of the $CCl_4$ shall go overhead in the light ends stream.

6. The VCM plant shall operate at the rate of 2.1 MM pounds of VCM per day, with 55 percent cracking depth in the furnaces, at steady state conditions.

7. Storage capacity shall be provided for one week length, or 1/2 (one-half) truckload, whichever is greater.

JKM-lkm
9/30/82

DISCUSSION

$CCl_4$ INJECTION SYSTEM

VCM MODERNIZATION PROJECT

WESTLAKE, LOUISIANA

The VCM Plant modernization is expected to result in significantly lower production of $CCl_4$ as a by-product in oxychlorination EDC production. $CCl_4$ is known to be a VCM cracking promoter, and there is substantial evidence that VCM production capacity may be reduced after the modernization if the drop in $CCl_4$ production is not compensated for. Therefore, this design is provided as a precautionary measure to maintain acceptable $CCl_4$ levels in the cracking furnace feed.

This design allows the $CCl_4$ level in the cracking furnace vaporizer feed to be controlled and maintained at levels up to 3,000 ppm by weight in both the modernization and the expansion cases. Due to process changes specified in the expansion, the modernization is the limiting case for $CCl_4$ injection requirements.

The process design provides for a $CCl_4$ storage tank, T-465. Pressure in the tank is maintained at 40 psig with nitrogen gas using self-contained pressure regulators PCV-469 and PCV-470. This scheme eliminates the need for injection pumps and minimizes nitrogen usage and $CCl_4$ loss. $CCl_4$ is injected into the cracking furnace vaporizer feed at the suction of pumps P-451A and P-451B. The $CCl_4$ flow rate is controlled by the self-contained flow regulator FCV-429, which is capable of a 10:1 turndown ratio. Board-mounted level alarms LAH-430 and LAL-430 are provided to alert operators to liquid level problems in the $CCl_4$ storage tank T-465.

A hose connection is provided for filling T-465 by truck. $CCl_4$ injection must be suspended while loading takes place. The following procedure will allow safe filling of T-465:

1. Tie in the truck to the fill line 2-HX-2501-N-A2-1 hose connection.
2. Close the block valve in line 1-IN-2507-N-A2-1 downstream of PCV-469.
3. Close the block valve in line 1-HX-2502-N-A2-1.
4. Open the block valve in line 1½-HX-2504-N-A2-1 to vent the tank.
5. Open the block valve in fill line 2-HX-2501-N-A2-1.
6. Begin pumping $CCl_4$ into T-465.
7. After filling the tank, shut off the pump.
8. Connect nitrogen supply to fill line 2-HX-2501-N-A2-1 at the $N_2$ purge connection.

9. Open the block valve at $N_2$ purge connection and the block valve on the line 2-HX-2501-N-A2-1 leading to the truck connection to clean out truck line. The block valve leading to T-465 should be closed.

10. Close the block valve leading to the truck and open the block valve leading to T-465 to clean out the fill line 2-HX-2501-N-A2-1.

11. After purging line with $N_2$, close block valves in filling 2-HX-2501-N-A2-1, disconnect truck hose and nitrogen supply, and replace blinds on the hose connections.

12. Close the block valve in vent line 1½-HX-2504-N-A2-1.

13. Open the block valve in line 1-IN-2507-N-A2-1.

14. After pressure builds to 40 psig in T-465, open the block valve in process line 1-HX-2502-N-A2-1.

The entire tank filling procedure is estimated to take less than one hour. This temporary cutoff of $CCl_4$ should not significantly impact other plant processes.

In addition to check valves, automatic on-off valves are provided in both the process line (valve XV-471) and nitrogen outlet/vent line (valve XV-472) to prevent backflow during tank filling.

This design will affect the fugitive emissions from the VCM Plant by the addition of approximately 23 block valves in liquid VOC service and 14 block valves in vapor VOC service.

EQUIPMENT LIST

$CCl_4$ INJECTION SYSTEM

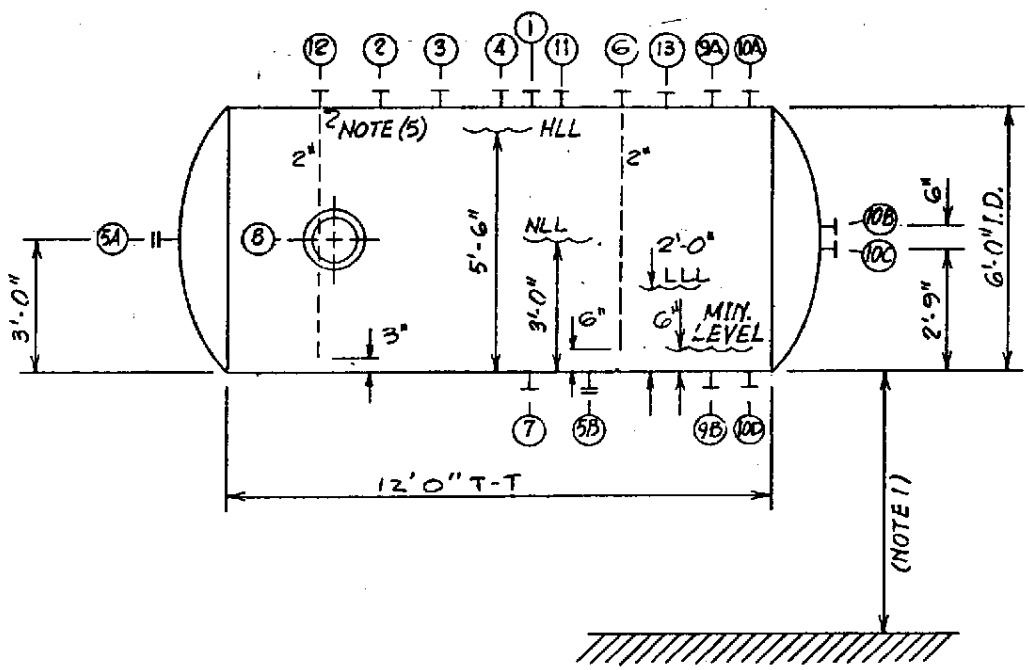
VCM MODERNIZATION PROJECT

WESTLAKE, LOUISIANA

| Item No. | Service |
|---|---|
| T-465 | $CCl_4$ Storage Tank |

JKM-lkm
9/30/82

CCR 000016729




| NOZZLE SCHEDULE | | | | |
|---|---|---|---|---|
| MARK NO. | NO. REQ. | SIZE | TYPE | SERVICE |
| 1 | 1 | 1½ | FLG | NITROGEN SUPPLY AND OUTLET |
| 2 | 1 | 1½ | FLG | UTILITY CONNECTION |
| 3 | 1 | 3 | FLG | RELIEF VALVE |
| 4 | 1 | 1½ | FLG | VENT/STEAMOUT |
| 5 | 2 | 2 | FLG | SPARES |
| 6 | 1 | 2 | FLG | $CCl_4$ OUTLET |
| 7 | 1 | 2 | FLG | DRAIN |
| 8 | 1 | 20 | FLG | MANWAY WITH DAVIT |
| 9 | 2 | 1½ | FLG | LOW/HIGH LEVEL ALARMS |
| 10 | 4 | 1½ | FLG | LEVEL GAUGE |
| 11 | 1 | 2 | FLG | VENT |
| 12 | 1 | 2 | FLG | FILL LINE |
| 13 | 1 | 1½ | FLG | PRESSURE SWITCH CONNECTION |
| 14 | | | | |
| 15 | | | | |
| 16 | | | | |
| 17 | | | | |
| 18 | | | | |
| 19 | | | | |
| 20 | | | | |

| ISU | DATE | DESCRIPTION | BY | CKD | APD |
|---|---|---|---|---|---|
| 1 | 9-16-82 | CLASS "A" DESIGN | MAC | [illegible] | RH |

| DESIGN DATA | |
|---|---|
| OPERATING TEMPERATURE, °F | 75 |
| DESIGN TEMPERATURE, ● | 310 |
| OPERATING PRESSURE, psig | 40 |
| DESIGN PRESSURE, psig | 75 |
| INSULATION : | |
| FIRE | ( ) |
| HEAT CONSERVATION | ( ) |
| NONE | ( x ) |
| CORROSION ALLOWANCE | 0.125 |
| MATERIAL OF CONSTRUCTION | CS |

**NOTES**

(1) Elevation shall be minimum required for piping and personnel access.
(2) Liquid density = 98 Pounds/Cu Ft
(3) Heads are to be 2:1 elliptical.
(4) ASME Code Division VIII.
(5) FOUR (4) - 1/8" HOLES IN DIP PIPE TO PREVENT SIPHONING.

**CONOCO INC.**
ENGINEERING CENTER
PONCA CITY, OKLAHOMA

T-465
$CCl_4$ STORAGE TANK
$CCl_4$ INJECTION SYSTEM
VCM MODERNIZATION PROJECT
WESTLAKE, LOUISIANA

| APPD : P. Johnsman | SHT. NO. | UNIT | AREA |
|---|---|---|---|
| DATE : 9/28/82 | | | |

NO. SD-2400-45-18-B | ISSUE 1

INSTRUMENT LIST

$CCl_4$ INJECTION SYSTEM

VCM MODERNIZATION PROJECT

WESTLAKE, LOUISIANA

| Item No. | Service | Location |
|---|---|---|
| **Flow Instruments** | | |
| FI-428 | T-465 $CCl_4$ | Local |
| FCV-429 | T-465 $CCl_4$ | Local |
| FO-430 | T-465 $N_2$ | Local |
| **Level Instruments** | | |
| LG-429A and B | T-465 $CCl_4$ | Local |
| LAH-430 | T-465 $CCl_4$ | Board |
| LAL-430 | T-465 $CCl_4$ | Board |
| **Pressure Instruments** | | |
| PCV-469 | T-465 $N_2$ | Local |
| PCV-470 | T-465 $N_2$ and $CCl_4$ | Local |
| PS-471 | T-465 $N_2$ and $CCl_4$ | Local |
| PS-472 | T-465 $N_2$ and $CCl_4$ | Local |
| **Pressure Gauges** | | |
| PG-4049 | PCV-469 Discharge | Local |
| PG-4050 | PCV-429 Discharge | Local |
| **Pressure Relief Valve** | | |
| PSV-472 | T-465 Relief | Local |
| **Rupture Disc** | | |
| PSE-472 | T-465 Relief | Local |
| **On-Off Control Valves** | | |
| XV-471 | T-465 $CCl_4$ | Local |
| XV-472 | T-465 $N_2$ and $CCl_4$ | Local |

JKM-pjc

Conoco Inc.
Engineering Center
Ponca City, Oklahoma

# Flow Instruments

**SPECIFICATION SHEET**
PROJECT NO. _____
A.F.E. NO. _____
REQ. NO. _____
DATE 9-13-82 APP'D BY _____
MADE BY JKM

PLANT LC VCM PROJECT CCl4 INJECTION SYSTEM VCM MODERNIZATION PROJECT

| | | | | | | |
|---|---|---|---|---|---|---|
| GENERAL | 1 | TAG NO. | FI-428 (1) | | | |
| | 2 | SERVICE | CCl4 LIQUID | | | |
| | 3 | | | | | |
| | 4 | INSTRUMENT TYPE | FLOW INDICATOR | | | |
| | 5 | LOCATION | LOCAL | | | |
| | 6 | | | | | |
| ELEMENT | 7 | TYPE | ROTAMETER | | | |
| | 8 | LOCATION | 1-HX-2502-N-A21 | | | |
| | 9 | LINE SIZE, IN. / SCHEDULE | 1 / 80 | | | |
| | 10 | BORE, IN. | | | | |
| | 11 | RANGE, IN. $H_2O$ | | | | |
| | 12 | METER FACTOR | | | | |
| | 13 | MATERIAL | | | | |
| | 14 | TRANSMITTER: PNEU OR ELECT. | NONE | | | |
| | 15 | | | | | |
| VALVE | 16 | TYPE | | | | |
| | 17 | | | | | |
| | 18 | LOCATION | | | | |
| | 19 | MATERIAL: BODY / TRIM | | | | |
| | 20 | SIZE: BODY / PORT | | | | |
| | 21 | NUMBER OF PORTS | | | | |
| | 22 | PLUG FORM | | | | |
| | 23 | ΔP: MIN. / NORM. / MAX. | | | | |
| | 24 | CALC. CV — NORMAL FLOW / MAX. FLOW | | | | |
| | 25 | VALVE CV — FULL OPEN | | | | |
| | 26 | FAILURE POSITION | | | | |
| | 27 | MAX. SHUT-OFF ΔP, PSIG | | | | |
| | 28 | DESIGN PRESSURE | | | | |
| | 29 | | | | | |
| ~~VALVE~~ SERVICE CONDITIONS | 30 | FLUID (NOTE LIQ/VAP) | CCl4 LIQUID | | | |
| | 31 | TEMP, °F: NORM. / MAX. | 75 / 100 | | | |
| | 32 | PRESSURE, PSIG | 40 | | | |
| | 33 | °API (MW) | | | | |
| | 34 | SP GR AT STD. CONC. | 1.567 | | | |
| | 35 | SP GR AT T&P | | | | |
| | 36 | VAPOR PRESS. AT T, PSI A | 2.6 | | | |
| | 37 | CP/CV AT T&P / COMPRESSIBILITY | | | | |
| | 38 | VISCOSITY AT T&P | 0.885 cp | | | |
| | 39 | % LIQ., IN / OUT | 100 / 100 | | | |
| | 40 | RATE: NORMAL GPM | .15 | | | |
| | 41 | RATE: GPM MAX. / MIN. | .27 / .027 | | | |
| NOTES | 42 | | | | | |
| | 43 | NOTE: METAL ARMORED | | | | |
| | 44 | | | | | |
| | 45 | | | | | |
| | 46 | | | | | |
| | 47 | | | | | |
| | 48 | | | | | |
| | 49 | | | | | |
| | 50 | | | | | |
| | 51 | | | | | |

CCR 000016731

(X) INDICATES MANUFACTURER TO GIVE INFORMATION IN HIS QUOTATION.

SPEC NO. _____ REV. _____
SHEET _____ OF _____

4-571-S

CONOCO

Engineering Center
Ponca City, Oklahoma

**Specification Sheet**

SPECIFICATION SHEET
PROJECT NO.
A.F.E. NO.
REQ. NO.
DATE 8-25-82 APP'D BY BJJ
MADE BY SKM

PLANT LC VCM PROJECT $CCl_4$ INSECTION SYSTEM VCM MODERNIZATION PROJECT

ITEM NO.
SERVICE FCV-429

INSTRUMENT TYPE: SELF CONTAINED FLOW REGULATOR

SERVICE: $CCl_4$ LIQUID

LINE NO: 1-HX-2502-N-A2-1

FLOW RATE, lb/hr (GPM):

| | | |
|---|---|---|
| MAX | 213.4 | (.27) |
| NORMAL | 120.0 | (.15) |
| MIN | 21.3 | (.03) |

TEMPERATURE, °F:

| | |
|---|---|
| MAX | 100 |
| NORMAL | 75 |
| MIN | 75 |

INLET PRESSURE, PSIG:

| | |
|---|---|
| NORMAL | 40 |
| MAX | 55 |

MAX ALLOWABLE ΔP, PSI: 10

BODY MATERIAL: S.S.

LIQUID S.G.: 1.567

VISCOSITY, cp: 0.885

VAPOR PRESSURE, PSIA: 2.6

MANUFACTURER: KATES (1)

MODEL: MFA 1-1 (1)

NOTES:

(1) OR COMPANY APPROVED EQUAL.

(2) VENDOR TO FURNISH MAX ΔP AT MAX FLOW.

CCR 000016732

SPEC NO. REV.
SHEET OF

4-441-S

4-81

CONOCO

Conoco Inc.
Engineering Center
Ponca City, Oklahoma

**Orifice Plates & Flanges**
**Including Data for Bore Calculation**

SPECIFICATION SHEET
PROJECT NO. _____
A.F.E. NO. _____
DATE 9-13-82 INQ. NO. _____
MADE BY JKM REQ. NO. _____
APP'D. BY PM P.O. NO. _____

PLANT LC VCM PROJECT CCl4 INJECTION SYSTEM VCM MODERNIZATION PROJECT

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | GENERAL SPECIFICATION | | | | | | |
| 2 | ORIFICE PLATES | | | 9 | ORIFICE FLANGES | | |
| 3 | MAKE TO AGA-ASME STANDARD | | OTHER | 10 | RATING & FACING | 150# RF | |
| 4 | PLATE MATERIAL: | 316S.S. X | OTHER | 11 | TYPE: | WELD NECK | OTHER |
| 5 | RTJ RING MAT'L & TYPE | | | 12 | MAT'L: | STEEL CS | OTHER |
| 6 | BORE MAXIMUM RATE | | NEAREST 1/8" | 13 | TAP SIZE | 1/2" NPT | OTHER |
| 7 | STAMP TO ISA STANDARD | | OTHER | 14 | FLANGES BY | | |
| 8 | | | | 15 | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 16 | TAG NO. | FO-430 (1) | | | | | |
| 17 | LINE NO. | | | | | | |
| 18 | | 1IN-2507-N-A2-1 | | | | | |
| 19 | SERVICE CONDITIONS | | | | | | |
| 20 | FLUID | $N_2$ GAS | | | | | |
| 21 | FLOW UNITS | SCFM | | | | | |
| 22 | MAXIMUM FLOW | 100 | | | | | |
| 23 | NORMAL FLOW | 0.13 | | | | | |
| 24 | FLOW. PRESSURE-PSIG | 125 | | | | | |
| 25 | FLOW. TEMPERATURE °F | 75 | | | | | |
| 26 | S. G. @ 60°F & PSIA | | | | | | |
| 27 | S. G. @ F. T. & PSIA | | | | | | |
| 28 | SUPERCOMP. FACTOR @ O. P. | | | | | | |
| 29 | VAPOR GAS MOL WT | 28.02 | | | | | |
| 30 | VISCOSITY, CP @ F. T. | 0.0177 | | | | | |
| 31 | STEAM QUALITY, % | | | | | | |
| 32 | STEAM SUPERHEAT °F | | | | | | |
| 33 | | | | | | | |
| 34 | | | | | | | |
| 35 | | | | | | | |
| 36 | | | | | | | |
| 37 | | | | | | | |
| 38 | | | | | | | |
| 39 | | | | | | | |
| 40 | | | | | | | |
| 41 | | | | | | | |
| 42 | MEASURING STATION DATA | | | | | | |
| 43 | ACTUAL ORIFICE I. D., INS. | 0.20 | | | | | |
| 44 | LINE FLANGE I. D., INS. | 1 | | | | | |
| 45 | SEAL S. G. @ 60°F | | | | | | |
| 46 | MANOMETER TYPE | | | | | | |
| 47 | DIFF. RANGE INS $H_2O$ DRY | | | | | | |
| 48 | STATIC RANGE, PSIA | | | | | | |
| 49 | CHART OR SCALE RANGE | | | | | | |
| 50 | CHART MULTIPLIER | | | | | | |
| 51 | | | | | | | |
| 52 | | | | | | | |
| 53 | | | | | | | |
| 54 | | | | | | | |
| 55 | | | | | | | |
| 56 | | | | | | | |
| 57 | | | | | | CCR 000016733 | |
| 58 | | | | | | | |
| 59 | | | | | | | |

NOTES:
(1) FO-430 TO LIMIT $N_2$ FLOW TO 100SCFM IN 1-IN-2507-N-A2-1 IN CASE OF CONTROL VALVE FAILURE.
(2) THREADED CONNECTIONS.

INSTRUMENT SOCIETY OF AMERICA
SHEET ____ OF ____ REV ____

4-444

Conoco Inc.
Engineering Center
Ponca City, Oklahoma

**Gauge Glasses & Cocks**

SPECIFICATION SHEET
PROJECT NO. _____
A.F.E. NO. _____
DATE 9-13-82 INQ. NO. _____
MADE BY JKM REQ. NO. _____
APP'D. BY PGF P.O. NO. _____

PLANT LC VCM PROJECT CC14 INJECTION SYSTEM-VCM MODERNIZATION PROJECT

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | GAUGE GLASSES | | | | | | 31 | GAUGE COCKS | | | |
| 2 | SUPPLY | GAUGES & COCKS | | GAUGES ONLY | | | 32 | SUPPLY | | COCKS ONLY | |
| 3 | | NO NIPPLES REQUIRED | | | | | 33 | TYPE | OFFSET | ANGLE | |
| 4 | TYPE | TRANSPARENT | TUBULAR | REFLEX X | | | 34 | CONNECTIONS-NPT | | | |
| 5 | CONNECTIONS | 1/2" | 3/4" | " | | | 35 | | VESSEL | GAUGE | GAUGES |
| 6 | | TOP & BOTTOM | SIDE X | BACK | | | 36 | | MALE | FEMALE | FEMALE |
| 7 | | WELDING PAD | OTHER | | | | 37 | | 1/2" | 1/2" | 1/2" |
| 8 | MATERIAL | STEEL CS | OTHER | | | | 38 | | 3/4" | 3/4" | 3/4" |
| 9 | MINIMUM RATING | 75 | PSIG @ | 100 | °F | | 39 | | OTHER | | |
| 10 | | | | | | | 40 | | | BODY | TRIM |
| 11 | | | | | | | 41 | MAT'L | | | |
| 12 | | | | | | | 42 | MINIMUM RATING | | PSIG @ | °F |
| 13 | | | | | | | 43 | CONSTRUCTION: | PLAIN | | QUICK |
| 14 | | | | | | | 44 | | CLOSING | | CLOSING |
| 15 | | | | | | | 45 | | HANDWHEEL | | LEVEL HANDLE |
| 16 | | | | | | | 46 | VESSEL CONN. | PLAIN UNION | | SOLID SHANK |
| 17 | | | | | | | 47 | | SPHERICAL UNION | | OTHER |
| 18 | ACCESSORIES | | | | | | 48 | | | | |
| 19 | ILLUMINATORS: | | | | | | 49 | GAUGE CONN. | PLAIN UNION | | PLAIN |
| 20 | MICA SHIELDS: | | | | | | 50 | | SPHERICAL UNION | | OTHER |
| 21 | HEATING-COOLING CHAMBERS | | | | | | 51 | | | | |
| 22 | INTERNAL | | EXTERNAL | | | | 52 | BONNET | SCREWED | UNION | BOLTED |
| 23 | NON-FROSTING TYPE: | | | | | | 53 | SCREW | INSIDE | OUTSIDE | |
| 24 | CALIBRATED SCALE | | | | | | 54 | RENEWABLE SEAT | | YES | NO |
| 25 | SUPPORT PLATES: | | | | | | 55 | BALL CHECKS | | YES | NO |
| 26 | GUARD RODS: | | | | | | 56 | PACKING | | MFR STD | OTHER |
| 27 | OTHER | | | | | | 57 | | | | |
| 28 | | | | | | | 58 | MFR MODEL NO. | | | |
| 29 | | | | | | | 59 | | | | |
| 30 | | | | | | | 60 | | | | |

| 61 | TAG NO. | REV. | QUAN. | NO. OF SECT. | VISIBLE LENGTH | Q CPLGS | MFR. MOD. NO. | PSIG OPER. PRESS | °F OPER. TEMP. | SERVICE | ACCES-SORIES | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 62 | | | | | | | | | | | | |
| 63 | LG429 | A | 1 | 1 | 40 7/8" | | | 40 | 75 | T-465 CC14 | | |
| 64 | LG427 | B | 1 | 1 | 40 3/8" | | | 40 | 75 | T-465 CC14 | | |
| 65 | | | | | | | | | | | | |
| 66 | | | | | | | | | | | | |
| 67 | | | | | | | | | | | | |
| 68 | | | | | | | | | | | | |
| 69 | | | | | | | | | | | | |
| 70 | | | | | | | | | | | | |
| 71 | | | | | | | | | | | | |
| 72 | | | | | | | | | | | | |
| 73 | | | | | | | | | | | | |
| 74 | | | | | | | | | | | | |
| 75 | | | | | | | | | | | | |
| 76 | | | | | | | | | | | | |
| 77 | | | | | | | | | | | | |
| 78 | | | | | | | | | | | | |
| 79 | | | | | | | | | | | | |
| 80 | | | | | | | | | | | | |

NOTES

CCR 000016734

INSTRUMENT SOCIETY OF AMERICA

SHEET _____ OF _____ REV _____

4-446-S

Conoco Inc.
Engineering Center
Ponca City, Oklahoma

# Liquid Level Instruments

**SPECIFICATION SHEET**
PROJECT NO. _____
A.F.E. NO. _____
REQ. NO. _____
DATE 8-25-82 APP'D BY _____
MADE BY SKM

PLANT LC VCM PROJECT CCl4 INJECTION SYSTEM VCM MODERNIZATION PROJECT

| | | | | | |
|---|---|---|---|---|---|
| GENERAL | 1 | TAG NO. | LAH-430 | LAL-430 | |
| | 2 | SERVICE | T-465 CCl4 | T-465 CCl4 | |
| | 3 | | | | |
| | 4 | INSTRUMENT TYPE | HIGH LEVEL ALARM (2) | LOW LEVEL ALARM (3) | |
| | 5 | LOCATION | BOARD | BOARD | |
| | 6 | | | | |
| ELEMENT | 7 | ELEMENT TYPE | DP CELL | DP CELL (1) | |
| | 8 | LOCATION | T-465 | | |
| | 9 | RANGE, INCHES | 72 | | |
| | 10 | INTERFACE | N2/CCl4 LIQUID | | |
| | 11 | UPPER DENSITY, LB/CU. FT. | 0.3 | | |
| | 12 | LOWER DENSITY, LB/CU. FT. | 97.8 | | |
| | 13 | TEMPERATURE, °F | 75 | | |
| | 14 | PRESSURE, PSIG | 3-8 | | |
| | 15 | TRANSMITTER: PNEU OR ELECT. | PNEUMATIC (1) | | |
| | 16 | | | | |
| VALVE | 17 | TYPE | | | |
| | 18 | | | | |
| | 19 | LOCATION | | | |
| | 20 | MATERIAL: BODY / TRIM | | | |
| | 21 | SIZE: BODY / PORT | | | |
| | 22 | NUMBER OF PORTS | | | |
| | 23 | PLUG FORM | | | |
| | 24 | ΔP: MIN. / NORMAL / MAX. | | | |
| | 25 | CALC CV — NORMAL FLOW / MAX. FLOW | | | |
| | 26 | VALVE CV — FULL OPEN | | | |
| | 27 | FAILURE POSITION | | | |
| | 28 | MAX. SHUT OFF ΔP | | | |
| | 29 | DESIGN PRESSURE | | | |
| | 30 | | | | |
| VALVE SERVICE CONDITIONS | 31 | FLUID (NOTE: LIQ/VAP) | | | |
| | 32 | TEMP. °F: NORM. / MAX. | | | |
| | 33 | PRESSURE, PSIG | | | |
| | 34 | °API (MW) | | | |
| | 35 | SP GR AT STD. COND. | | | |
| | 36 | SP GR AT T&P | | | |
| | 37 | VAPOR PRESSURE AT T, PSI | | | |
| | 38 | WEIGHT % VAPOR IN-OUT | | | |
| | 39 | VISCOSITY AT T&P | | | |
| | 40 | % LIQ.. IN / OUT | | | |
| | 41 | RATE, NORMAL | | | |
| | 42 | RATE: MAX. / MIN. | | | |
| | 43 | | | | |

NOTES

44 (1) USE SAME LOCAL TRANSMITTER FOR BOTH LEVEL ALARMS
45 LAH-430 & LAL-431. TRANSMITTER TO PROVIDE
46 ELECTRICAL OUTPUT.
47 (2) LAH-430 SETPOINT TO BE 6" FROM T-465 TOP
48 (3) LAL-430 SETPOINT TO BE 2' FROM T-465 BOTTOM
49
50 CCR 000016735
51

(X) INDICATES MANUFACTURER TO GIVE INFORMATION IN HIS QUOTATION.

SPEC NO. _____ REV. _____
SHEET _____ OF _____

4-574-S

conoco

Engineering Center
Ponca City, Oklahoma

**Specification Sheet**

SPECIFICATION SHEET
PROJECT NO. _____
A.F.E. NO. _____
REQ. NO. _____
DATE 9-13-82 APP'D BY RBJ
MADE BY SKM

PLANT LC VCM PROJECT CCIW INJECTION SYSTEM VCM MODERNIZATION PROJECT

ITEM NO.
SERVICE PCV-469

INSTRUMENT TYPE: SELF CONTAINED PRESSURE REGULATOR
EQUIPMENT NO: T-465
LINE NO: 1-IN-2507-N-A2-1
FLUID: $N_2$ GAS
FLOW RATE, lb/hr (SCFM)

| | | |
|---|---|---|
| MIN | 0 | (0) |
| NORMAL | 0.6 | (0.13) |
| MAX | 1.0 | (0.23) |

TEMPERATURE, °F:

| | |
|---|---|
| MIN | 75 |
| NORMAL | 75 |
| MAX | 150 |

INLET PRESSURE, PSIG:

| | |
|---|---|
| MIN | 90 |
| NORMAL | 125 |
| MAX | 200 |

OUTLET PRESSURE, PSIG: 40
TYPE: PRESSURE REDUCING
MANUFACTURER: FISHER (1)
MODEL: 95H (1)
SIZE, in: ½
SEAT MATERIAL: VITON
FAILURE POSITION: CLOSED
BODY MATERIAL: C.S.
TRIM: #11 (416 S.S.)

NOTE:
(1) OR COMPANY APPROVED EQUAL.
(2) NO NEOPRENE.

CCR 000016736

SPEC NO. _____ REV. _____
SHEET _____ OF _____

4-441-S

CONOCO

Engineering Center
Ponca City, Oklahoma

**Specification Sheet**

SPECIFICATION SHEET
PROJECT NO.
A.F.E. NO.
REQ. NO.
DATE 9-13-82 APP'D BY PGH
MADE BY JKM

PLANT LC VCM PROJECT CCl4 INJECTION SYSTEM VCM MODERNIZATION PROJECT

ITEM NO.
SERVICE PCV-470

INSTRUMENT TYPE: SELF CONTAINED PRESSURE REGULATOR
EQUIPMENT NO: T-465
LINE NO: 1½-IN-2503-N-A2-1
FLUID: $N_2$ GAS + $CCl_4$ VAPOR
FLOW RATE, lb/hr (SCFM):

| | | |
|---|---|---|
| MIN | 0 | (0) |
| NORMAL | 0 | (0) |
| MAX | 71.7 | (15.6) |

TEMPERATURE, °F:

| | |
|---|---|
| MIN | 75 |
| NORMAL | 75 |
| MAX | 150 |

RELIEF PRESSURE SETTING: 45 PSIG
OUTLET PRESSURE, PSIG: 10

TYPE: BACK PRESSURE
MANUFACTURER: FISHER (1)
MODEL: 98 L (1)
SIZE, in: ½
SEAT MATERIAL: VITON
FAILURE POSITION: CLOSED
BODY MATERIAL: C.S.
INLET PRESSURE, PSIG:

| | |
|---|---|
| NORMAL | 40 |
| MAX | 55 |

TRIM: #12 (416 S.S.)

NOTE:
(1) OR COMPANY APPROVED EQUAL.
(2) NO NEOPRENE.

CCR 000016737

SPEC NO. REV.
SHEET OF

4-441-S

4-81

CONOCO

Conoco Inc.
Engineering Center
Ponca City, Oklahoma

**Pressure Instruments**

**SPECIFICATION SHEET**
PROJECT NO. _____
A.F.E. NO. _____
REQ. NO. _____
DATE 12-8-82 APP'D BY PGJ
MADE BY JKM

PLANT LC VCM PROJECT CCl4 INJECTION SYSTEM VCM MODERNIZATION PROJECT

| | | | | |
|---|---|---|---|---|
| GENERAL | 1 | TAG NO. | PS-471 (1)(3) | PS-472 (2)(3) |
| | 2 | SERVICE | T-465 CCl4 | T-465 CCl4 |
| | 3 | | | |
| | 4 | INSTRUMENT TYPE | PRESSURE SWITCH | PRESSURE SWITCH |
| | 5 | LOCATION | LOCAL | LOCAL |
| | 6 | | | |
| ELEMENT | 7 | TYPE | DIAPHRAGM | DIAPHRAGM |
| | 8 | | | |
| | 9 | LOCATION | T-465 | T-465 |
| | 10 | TEMPERATURE, °F | 75 | 75 |
| | 11 | PRESSURE TRIP POINT, PSIG | 30 | 10 |
| | 12 | MATERIAL | 316 SS | 316 SS |
| | 13 | TRANSMITTER: PNEU OR ELECT. | — | — |
| | 14 | RANGE, PSIG | 0 - 50 | 0 - 50 |
| | 15 | | | |
| VALVE | 16 | TYPE | | |
| | 17 | LOCATION | | |
| | 18 | MATERIAL: BODY / TRIM | | |
| | 19 | SIZE: BODY / PORT | | |
| | 20 | NUMBER OF PORTS | | |
| | 21 | PLUG FORM | | |
| | 22 | ΔP: MIN. / NORM / MAX | | |
| | 23 | CALC CV — NORMAL FLOW / MAX. FLOW | | |
| | 24 | VALVE CV — FULL OPEN | | |
| | 25 | FAILURE POSITION | | |
| | 26 | MAX. SHUT OFF ΔP | | |
| | 27 | DESIGN PRESSURE | | |
| | 28 | | | |
| VALVE SERVICE CONDITIONS | 29 | FLUID (NOTE: LIQ./VAP.) | | |
| | 30 | TEMP. °F: NORM / MAX | | |
| | 31 | PRESSURE, PSIG | | |
| | 32 | °API (MW) | | |
| | 33 | SP GR AT STD. COND. | | |
| | 34 | SP GR AT T&P | | |
| | 35 | VAPOR PRESSURE AT T, PSI | | |
| | 36 | WEIGHT % VAPOR, IN-OUT | | |
| | 37 | VISCOSITY AT T&P | | |
| | 38 | % LIQ., IN / OUT | | |
| | 39 | RATE: NORMAL | | |
| | 40 | RATE: MAX. / MIN | | |
| | 41 | | | |
| NOTES | 42 | (1) PS-471 ACTUATES AUTOMATIC ON-OFF VALVE XV-471. | | |
| | 43 | (2) PS-472 ACTUATES AUTOMATIC ON-OFF VALVE XV-472. | | |
| | 44 | (3) EACH TO BE EQUIPPED WITH A DIAPHRAGM SEAL. | | |
| | 45 | | | |
| | 46 | | | |
| | 47 | | | |
| | 48 | | | |
| | 49 | | | |
| | 50 | | | |
| | 51 | | | |

CCR 000016738

(X) INDICATES MANUFACTURER TO GIVE INFORMATION IN HIS QUOTATION.

SPEC NO. _____ REV. _____
SHEET _____ OF _____

4-450-S

conoco

Engineering Center
Ponca City, Oklahoma

**Pressure Gages**

**SPECIFICATION SHEET**
PROJECT NO. _____
A.F.E. NO. _____
REQ. NO. _____
DATE 9-13-82 APP'D BY [illegible]
MADE BY SKM

PLANT LC VCM PROJECT CCl4 INJECTION SYSTEM - VCM MODERNIZATION PROJECT

| TAG NO. | REV. | QUANT. | RANGE TUBE | RANGE DIAL | OPER. PRESS. | TEMPERATURE NORM. | TEMPERATURE MAX. | SERVICE | ACCESSORIES | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| PG-4049 | | 1 | | 0-60 | 40 | 75 | 150 | T-465 N2+CCl4 | | |
| PG-4050 | | 1 | | 0-60 | 40 | 75 | 100 | T-465 OUTLET CCl4 LIQUID | | |

NOTES: TO BE EQUIPPED WITH DIAPHRAGM SEAL.

CCR 000016739

QUOTATION WILL NOT BE CONSIDERED IF MANUFACTURER DOES NOT COMPLETE FORM BY FURNISHING INFORMATION FOR BLANK SPACES.

SPEC NO. _____ REV. _____
SHEET _____ OF _____

4-447-3

Conoco Inc.
Engineering Center
Ponca City, Oklahoma

**Pressure Relief Valves**

SPECIFICATION SHEET
PROJECT NO. _____
A.F.E. NO. _____
REQ. NO. _____
DATE 8-25-82 APP'D BY PSJ
MADE BY JKM

PLANT LCVCM PROJECT EC14 INJECTION SYSTEM VCM MODERNIZATION PROJECT

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| GENERAL | 1 | ITEM NO. & TAG | | | PSV-472 | | | | |
| | 2 | RELIEVES EQUIPMENT NO. | | | T-465 | | | | |
| | 3 | VALVE LOCATION | | | VESSEL | | | | |
| | 4 | MANUFACTURER | | | CONSOLIDATED(1) | | | | |
| | 5 | MODEL NO. | | | 1903 LC | | | | |
| SERVICE CONDITIONS | 6 | FLUID | | | EC14 | | | | |
| | 7 | STATE | | | VAPOR | | | | |
| | 8 | REQUIRED CAPACITY AND UNITS | | | 29,400 lb/hr | | | | |
| | 9 | MOL. WT | SP. GR. | | 153.8 | | | | |
| | 10 | VISCOSITY AT RELIEVING TEMP. | | | .0156 cp | | | | |
| | 11 | COMPRESSIBILITY FACTOR | | | 1 | | | | |
| | 12 | DESIGN PRESS. OF EQUIPMENT | | | 75 PSIG | | | | |
| | 13 | PRESS (PSIG) | OPER. | SET | 40 | 75 | | | |
| | 14 | TEMP (°F) | OPER. | RELIEVING | 175 | 310 | | | |
| | 15 | CONSTANT BACK PRESSURE, PSIG | | | 3 | | | | |
| | 16 | VARIABLE BACK PRESSURE, PSIG | | | | | | | |
| | 17 | DIFFERENTIAL SET PRESSURE | | | .72 | | | | |
| | 18 | ALLOWABLE OVERPRESSURE % | | | 21 | | | | |
| | 19 | BLOW DOWN % | | | 10 | | | | |
| BASIS OF SELECTION | 20 | CODE REQUIREMENT | | | | | | | |
| | 21 | FIRE — EXPOSED AREA ($ft^2$) | | | 320 | | | | |
| | 22 | FIRE — ENVIRONMENT FACTOR, F | | | 1.0 | | | | |
| | 23 | OTHER BASIS | | | | | | | |
| | 24 | | | | | | | | |
| DESIGN DETAILS | 25 | DESIGN TYPE | | | CONVENTIONAL | | | | |
| | 26 | SEAT TYPE | | | | | | | |
| | 27 | BONNET (OPEN OR CLOSED) | | | CLOSED | | | | |
| | 28 | INLET SIZE, RATING, FACING | | | 3" 150# RF | | | | |
| | 29 | OUTLET SIZE, RATING, FACING | | | 4" 150# RF | | | | |
| | 30 | CALCULATED AREA ($in^2$) | | | 2.40 (2) | | | | |
| | 31 | ORIFICE LETTER | ACTUAL AREA ($in^2$) | | L | 2.853 | | | |
| MATERIALS | 32 | BODY | BONNET | | C.S. | C.S. | | | |
| | 33 | SEAT & DISK | | | S.S. | | | | |
| | 34 | GUIDE & RING | | | S.S. | | | | |
| | 35 | SPRING | | | C.S. | | | | |
| | 36 | BELLOWS | | | — | | | | |
| ACCESSORIES | 37 | LIFTING LEVER (PLAIN OR PACKED) | | | — | | | | |
| | 38 | GAG | | | NO | | | | |
| | 39 | CODE STAMP | | | NO | | | | |
| | 40 | CAP (SCREWED OR BOLTED) | | | SCREWED | | | | |
| | 41 | OTHER | | | | | | | |

NOTES

42 MANUFACTURER SHALL VERIFY SELECTION OF ORIFICE SIZE AND MATERIALS.
43 VALVES SHALL MEET DIMENSION REQUIREMENTS OF API RP-526.
44 VALVES SHALL MEET TEST REQUIREMENTS OF API RP-527.
45 SEE BACK OF SPECIFICATION SHEET FOR LINE DEFINITIONS.
46
47 (1) OR FARRIS EQUIVALENT.
48 (2) RELIEF VALVE CAPACITY IS DERATED BY FACTOR OF 0.80 DUE TO
49 RUPTURE DISC.
50 (3) MAXIMUM INLET PIPING LENGTH 3 FT.
51

CCR 000016740

(X) INDICATES MANUFACTURER TO GIVE INFORMATION IN HIS QUOTATION.

SPEC NO. _____ REV. _____
SHEET _____ OF _____

4-436-S

RUPTURE DISC SPECIFICATION

$CCl_4$ INJECTION SYSTEM

VCM MODERNIZATION PROJECT

WESTLAKE, LOUISIANA

| | |
|---|---|
| Tag No. | PSE-472 |
| Relieves Equipment No. | T-465 |
| Fluid | $CCl_4$ |
| Basis for Sizing | Fire |
| Relieving Rate, Lbs/Hr | 29,400 |
| Molecular Weight | 153.8 |
| Operating Pressure, psig | 40 |
| Set Pressure, psig | 75 |
| Operating Temperature, °F | 75 |
| Relieving Temperature, °F | 310 |
| Mated With | PSV-472 |
| Manufacturer | BS&B |
| Model | SRB-7RS |
| Line Size, In | 3 |
| PSE Size, In | 3 |
| Manufacturing Range, % | 10 |
| Disc Material | Nickel |
| Flange Material In | SS |
| Flange Material Out | SS |
| Flange Rating and Facing, Lbs RF | 150 |
| Type | Scored Reverse Buckling |
| Tap in Holddown Flange, in NPT | 1/4 |
| Excess Flow Valve | SS |
| Pressure Gauge | SS (100 psi) |

(1) Each rupture disc shall be the insert type with pretorqued safety head.

JKM-lkm
9/30/82

CONOCO

Conoco Inc.
Engineering Center
Ponca City, Oklahoma

**Control Valves**
AUTOMATIC ON-OFF VALVES

SPECIFICATION SHEET
PROJECT NO. _____
A.F.E. NO. _____
DATE 2-8-82 INQ. NO. _____
MADE BY SKM REQ. NO. _____
APP'D BY RM P.O. NO. _____

PLANT LCVCM PROJECT CCl4 INJECTION SYSTEM VCM MODERNIZATION PROJECT

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| GENERAL | 1 | TAG NO. | | | XV-471 (1) | | XV-472 (2) | | | |
| | 2 | SERVICE | | | T-465 | | T-465 | | | |
| | 3 | | | | | | | | | |
| | 4 | LINE NO. | | | 1-HX-2502-N-A2-1 | | 1½-HX-2503-N-A2-1 | | | |
| | 5 | LINE SIZE/SCHED. NO. | | | 1 / 80 | | 1½ / 80 | | | |
| PROCESS DATA AND SIZING | 6 | FLUID | | | CCl4 LIQUID | | N2+CCl4 VAPOR | | | |
| | 7 | TEMP. NORMAL, °F MAX. °F | | | 75 | 100 | 75 | 100 | | |
| | 8 | PRESS. NORMAL PSIG MAX. PSIG | | | 30 | 45 | 10 | 10 | | |
| | 9 | Δ P MIN. RATE | NOR. RATE | MAX. RATE | | | | | | |
| | 10 | MAX. SHUTOFF Δ P PSIG | | | 30 | | 7 | | | |
| | 11 | RATE MIN | CV | | | | | | | |
| | 12 | RATE NOR. | CV | | | | | | | |
| | 13 | RATE MAX. | CV | | | | | | | |
| | 14 | OPER. SP. GR. | MOL. WT. | | | | | | | |
| | 15 | OPER. VISC. | % FLASH | | | | | | | |
| | 16 | % SUPERHEAT | % SOLID | | | | | | | |
| | 17 | VAPOR PRESS. | CRIT. PRESS | | | | | | | |
| | 18 | VALVE CV MAX. | Δ P (ALLOW) | | | | | | | |
| NOTE 1 | 19 | PRED. SND. LEV. | RATE | | | | | | | |
| NOTE 1 | 20 | MAX. ALLOW. SND. | RATE | | | | | | | |
| | 21 | | | | | | | | | |
| BODY | 22 | MFR | MODEL | | | | | | | |
| | 23 | TYPE OF BODY | | | FULL PORT BALL VALVE | | FULL PORT BALL VALVE | | | |
| | 24 | BODY | GUIDING | | | | | | | |
| | 25 | PORT SIZE | NO. OF PORTS | | FULL PORT | | FULL PORT | | | |
| | 26 | END CONN & RATING | | | 150# R.F. | | 150# R.F. | | | |
| | 27 | BODY MATERIAL | | | C.S. | | C.S. | | | |
| | 28 | PACKAGING MATERIAL | | | | | | | | |
| | 29 | BONNET TYPE | | | | | | | | |
| | 30 | TRIM FORM | | | | | | | | |
| | 31 | TRIM MATERIAL SEAT/PLUG | | | | | | | | |
| | 32 | STEM/SHAFT MTL. | | | | | | | | |
| NOTE 2 | 33 | REQUIRED SEAT TIGHTNESS | | | | | | | | |
| | 34 | | | | | | | | | |
| ACTUATOR | 35 | MFR | MODEL | | | | | | | |
| | 36 | TYPE | SIZE | | | | | | | |
| | 37 | CLOSE AT | OPEN AT | | | | | | | |
| | 38 | FLOW ACTION TO OPEN/CLOSE | | | | | | | | |
| | 39 | FAIL POSITION | | | | | | | | |
| | 40 | HANDWHEEL (SIDE/TOP) | | | | | | | | |
| POSI-TIONER | 41 | MFR | MODEL NO. | | | | | | | |
| | 42 | INPUT SIGNAL | OUTPUT SIGNAL | | | | | | | |
| | 43 | AIR SUPPLY PRESS. MAX. | | | | | | | | |
| | 44 | FILTER REGULATOR | | | | | | | | |
| | 45 | GAGES | BYPASS | | | | | | | |
| | 46 | | | | | | | | | |
| OPTIONS | 47 | | | | | | | | | |
| | 48 | | | | | | | | | |
| | 49 | | | | | | | | | |

CCR 000016742

NOTES: 1. SOUND LEVEL IN DBA MEASURED 3 FT. FROM CONNECTED PIPING.
2. ANSI B16.104 (CURRENT ISSUE) LEAKAGE SPECIFICATIONS

(1) ACTUATED BY PS-471. VALVE TO CLOSE AT PRESSURE 30 PSIG OR LOWER.

(2) ACTUATED BY PS-472. VALVE TO CLOSE AT PRESSURE 10 PSIG OR LOWER.

(X) INDICATES MANUFACTURER TO GIVE INFORMATION IN HIS QUOTATION.

SPEC. NO. _____ REV. _____
SHEET _____ OF _____

PROCESS PIPING SCHEDULE
PROCESS ENGINEERING DEPARTMENT

Date 9-13-82 Made By JKM
Project CC14 INJECTION SYSTEM
Plant VCM MODERNIZATION PROJECT

| Line Designation | Service From | Service To | V L | Flow Rate Lb/Hr (Hot BPSD) | Normal °F | Normal PSIG | At T and P Lb/CF (Sp Gr) | At T and P Visc Cp | Press Drop PSI/100' | Velocity Ft/Sec | UPSET COND. * °F | UPSET COND. * PSIG | CODE DESIGN °F | CODE DESIGN PSIG | HYDRO TEST PRES PSIG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2-HX-2501-N-AZ-1 | LOADING | T-465 | L | 78,300 (2) | 75 | 25 | (1.567) | 0.91 | 13.3 | 10.2 | 300 | 50 | 300 | 50 | |
| 1-HX-2502-N-AZ-1 | T-465 | 8-HE-4501-N-AZ-1 | L | 213.4 | 75 | 40 | (1.567) | 0.91 | 0.003 | 0.1 | 300 | 50 | 300 | 50 | |
| 1½-HX-2503-N-AZ-1 | 1-IN-2507-N-AZ-1 | SPEC BREAK | V | 241.9 (3) | 75 | 45 | 0.3016 | 0.0178 | 0.2 | 19.4 | 300 | 50 | 300 | 50 | |
| 1½-XH-2503-N-R37-3 | SPEC BREAK | WET VENT HEADER | V | 241.9 (3) | 75 | 45 | 0.3016 | 0.0178 | 0.2 | 19.4 | 300 | 50 | 300 | 50 | |
| 1½-HX-2504-N-AZ-1 | T-465 | 1½-HX-2503-N-AZ-1 | V | — | — | — | — | — | — | — | 300 | 50 | 300 | 50 | |
| 3-HX-2505-N-AZ-1 | T-465 | PSV-472 | V | 29,400 (1) | 310 | 75 | 1.96 | 0.0142 | 10.7 | 84.9 | 300 | 50 | 310 | 75 | |
| 4-HX-2506-N-AZ-1 | PSV-472 | ATM | V | 29,400 (1) | 310 | 75 | 1.96 | 0.0142 | 2.4 | 47.7 | 300 | 50 | 310 | 75 | |
| 1-IN-2507-N-AZ-1 | $N_2$ SUPPLY HEADER | T-465 | V | 0.6 | 75 | 40 | 0.276 | 0.0178 | 0.0002 | 0.1 | 150 (1) | 200 (2) | 150 | 200 | |

* STEAMOUT IS AT 50 PSIG AND 300°F

(1) RELIEF VALVE DESIGN CONDITIONS,
(2) TANK FILLING CONDITIONS.
(3) MAXIMUM $N_2$ T+P.

CCR 000016743

UTILITY SUMMARY

$CCl_4$ INJECTION SYSTEM

VCM MODERNIZATION PROJECT

WESTLAKE, LOUISIANA

| | Lbs/Yr | SCFM |
|---|---|---|
| Nitrogen (125 psig, Ambient) | 4,470 | 0.13 |
| $CCl_4$(1) | 1,638,900 | - |

(1) This estimate is based on maintaining 3,000 ppm by weight $CCl_4$ in EDC furnace feed and other assumptions as itemized in the design basis. $CCl_4$ requirements for other desired concentrations are:

| ppm $CCl_4$ in Furnace Feed | $CCl_4$ Injection Rate, Lbs/Yr |
|---|---|
| 500 | 169,000 |
| 1,000 | 460,800 |
| 1,500 | 752,600 |
| 2,000 | 1,044,500 |

JKM-lkm
9/30/82

# WORK LIST(1)

## $CCl_4$ INJECTION SYSTEM

## VCM MODERNIZATION PROJECT

## WESTLAKE, LOUISIANA

1. Tie in new line 1-HX-2502-N-A2-1 to existing line 8-HE-4501-N-A2-1 immediately upstream of existing pumps P-451A and P-451B. Make the tie in upstream of the line split going to the pumps.

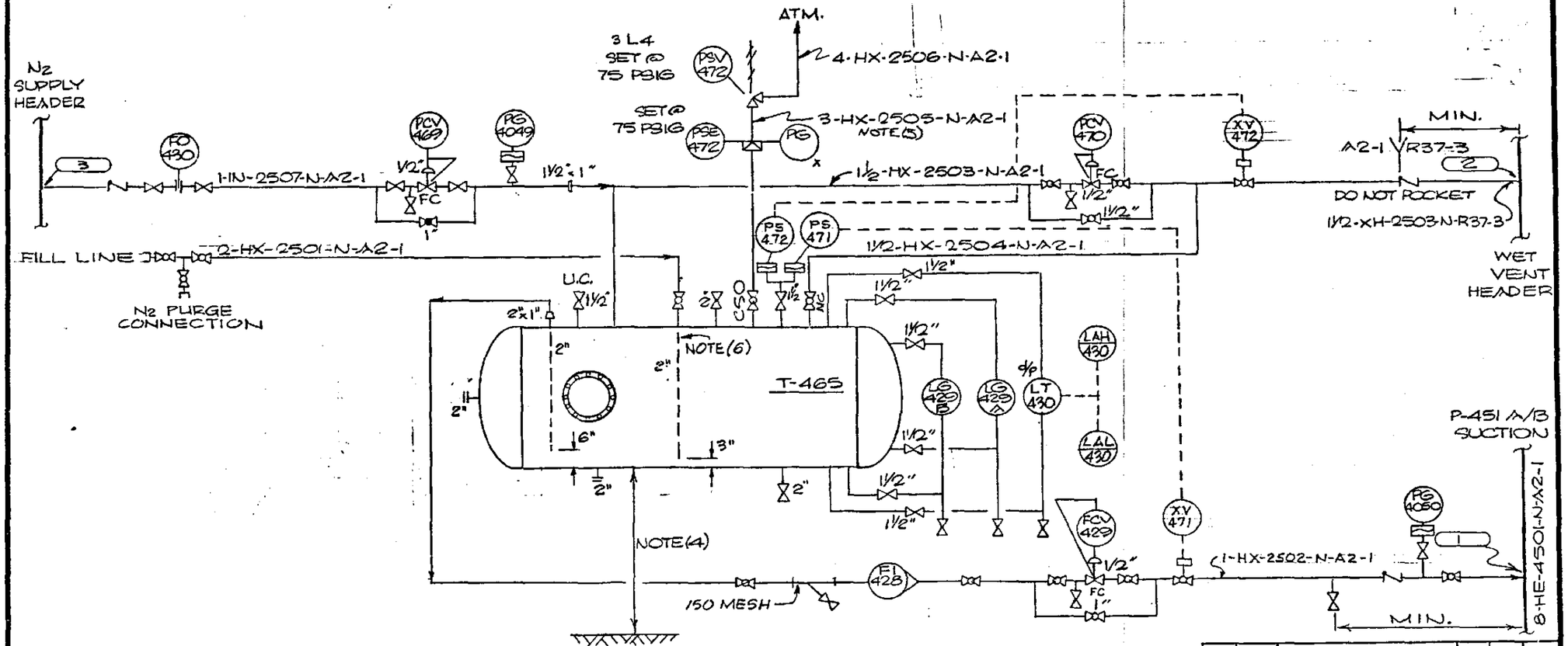
2. Tie in new line 1½-XH-2503-N-R37-3 to the existing wet vent header.

3. Tie in new line 1-IN-2507-N-A2-1 to the existing nitrogen supply header.

(1) All items are to be field located.

JKM-em
12/3/82

T-465
CCl4 STORAGE TANK
6'-0" ø x 12'-0" T-T
2961 GALS.
C.S.




LEGEND:

——— NEW
——— EXISTING
⬭ WORKLIST ITEM

* REFER TO DWGS. E-T9701-3A AND E-T9701-3B OF VCM MODERNIZATION PROJECT FOR ADDITIONAL LEGENDS.

NOTES:

1. ALL DRAIN & INSTRUMENT VALVES ARE 3/4" UNLESS OTHERWISE NOTED.
2. VALVES ARE LINE SIZE UNLESS OTHERWISE NOTED.
3. ALL OPEN-ENDED VALVES ARE TO BE EITHER PLUGGED OR BLINDED.
4. MINIMUM LENGTH REQUIRED FOR PIPING & PERSONNEL ACCESS.
5. MAXIMUM LENGTH 3 FT.
6. FOUR (4) - 1/8" HOLES IN DIP PIPE TO PREVENT SIPHONING.

| ISU | DATE | DESCRIPTION | BY | CKD | APD |
|---|---|---|---|---|---|
| 2 | 9-30-82 | CLASS "A" DESIGN | RJ | SKM | RH |
| 1 | 9-19-82 | FOR REVIEW | RJ | TRH | |

CONOCO INC.
ENGINEERING CENTER
PONCA CITY, OKLAHOMA

P & I DIAGRAM
CCl4 INJECTION SYSTEM
VCM MODERNIZATION PROJECT
WESTLAKE, LA.

| APPD: C. [illegible] DATE: 5/27/82 | SHT. NO. | UNIT | AREA |
|---|---|---|---|
| NO. SD 2400-42-135-C | | | ISSUE 1 |

BRUNING 40-21 52296
4-282-S (9-81)

CCR 000016746