CONOCO

Interoffice Communication

To M. L. Ashby

From V. M. Fisher

Date December 2, 1983

Subject Incinerator Bypass Reduction
Design No. 194-900-983-VMF
FINAL ISSUE

That's what we paid - 2 projects RB

Let's prepare an AFE after estimate

This attached class "A" design provides for installing new pressure transmitters for the Direct Chlorination Vent Header and Wet Vent Header bypass controllers (PRC-901 and PRC-902) on the HCl Absorbers, C-901 and C-901B. These new pressure transmitters should reduce the incinerator bypasses to the atmosphere by allowing the maximum pressure in the absorbers before bypassing. Also included are provisions for installing Annubar Flow Sensors in the Wet Vent and the Direct Chlorination headers. Adding these flow sensors will allow monitoring the vent flow, which currently cannot be done.

The HCl Absorbers, having 3 psig design pressures, limit the operating pressure of the incinerator units. To protect both HCl Absorbers from overpressing the Wet Vent Header and Direct Chlorination Header bypass control valves (PCV-902 and PCV-901) open whenever the pressure in either header reaches 80" H_2O. However, the existing pressure transmitters for the controllers of these bypass valves are located upstream of where both headers split to each incinerator train. At this location, the pressure readings are not indicative of the actual pressure on the absorbers. The new transmitters should permit higher operating pressures (without exceeding the design pressures) before bypassing because the actual absorber pressures will control the bypass valves.

With the new pressure transmitters, a different set point for the bypass controllers is required. The Combustion Air Blowers (BL-901 and BL-901B), having a maximum discharge pressure of 79" H_2O, also limit the operating pressure of the incinerator units. To avoid "dead-heading" the blowers and to provide overpressuring protection for the absorbers, the bypass control valves will open when absorber's pressure is 52" H_2O.

One change from the review design is the installation of new pressure transmitters on the absorbers rather than the relocation of the existing transmitters. The existing transmitters will remain to provide pressure indications for the Wet Vent and Direct Chlorination Vent headers. Keeping these indications will be advantageous to operators as well as provide information needed for optimizing the incinerator's operations.

This design is part of an overall plan to reduce incinerator bypasses. The overall plan will be outlined in a future letter.

This project is included in the 1983 Capital Budget as two projects in "Miscellaneous Projects Under $15,000". By copy of the final design to J. R. Holcomb, separate definitive cost estimates are requested for the pressure transmitters and flow sensors for each train.

If there are any questions or comments, please contact me.

Virgil M. Fisher
Process Engineer

Approved D. L. Davis
D. L. Davis, Sr. Process Eng.

br
cc: RAC-JWW-RB-MLA(4)-MCM-JRH(4)-SRA-PLF-DLD-SJR-PE
PFF - Ponca City

CCR 000018479

DISCUSSION

The National Enforcement Investigation Center (an EPA division) final report, evaluating their January 1981 VCM Plant inspection, concluded that incinerator bypasses contributed to the plant's excess vinyl chloride emissions. Although these bypasses were not classified as EPA violations, factors causing these bypasses were identified to determine how the number of bypasses can be reduced.

The VCM Plant has experienced 62 incinerator bypasses from January 1981 to September 1983. The bypass causes can be grouped into the following five categories.

Causes	Number	%
Power Failures	1	2
Mechanical Failures	9	14
Flame Outs	22	35
High Vent Pressures	27	44
Combustion Air Blower High Amperage Shutdown	3	5
Total	62	100

Both mechanical and power failures are uncontrollable.

Flame out bypasses occur when the incinerator firebox flame scanners lose sight of the flame. Sudden vent surges or high vent volumes produce two conditions which usually cause flame outs:

1) Incomplete combustion, resulting in black smoke in the firebox, blocking the scanners' view of the flame.

2) The firebox flame being momentarily blown out, causing the scanners to register an extinguished flame.

To limit these flame out bypasses, restriction orifices can be placed in the lines having sudden vent surges. During the May 1982 turnaround, a restriction orifice was placed in the vent line of the Flake Caustic Dryers, S-207 A&B, to reduce the vinyl surges during purging and recharging of the vessels.

High pressure bypasses occur at the Wet Vent Header Knockout Vessel, T-501, and the Direct Chlorination Vent Header Knockout Vessel, S-500. Whenever either vent header exceeds 80" H_2O, the bypass control valves open directing the vents to the atmosphere via C-500.

The pressure transmitters (PT-901 and PT-902) relaying pressure indications to the Direct Chlorination Vent Header and Wet Vent Header bypass controllers (PRC-901 and PRC-902), are upstream of the vent header's split to the primary and secondary incinerator trains. The bypass controllers pressure transmitters are approximately 80 feet from both incinerator trains' entrances, so the actual pressure at the absorbers is lower. Pressure drops are taken through

the line and equipment (i.e. the Flame Arrestors, S-911 and S-911B; the Incinerator Fireboxes, I-901 and I-901B; and the Waste Heat Boilers, H-902 and H-902B). Installing new pressure transmitters on the absorbers should allow higher vent and operating pressures without bypassing and exceeding the absorbers' design pressure.

An automatic shutdown of the Combustion Air Blowers (BL-901 or BL-901B) will result in vent bypasses. These shutdowns or "trips" happen whenever the blowers' motor require more than 292 amps. This will occur whenever the backpressure on the blowers either exceeds the design rating (i.e. 79" H_2O) or is too low. When designing the Incinerator units, the blowers were sized for the maximum pressure drop through each train. To compensate for the lower static pressure, the blower's output capacity and power requirement increase sometimes reaching the shutdown point.

Before modernizing the Oxychlorination Unit, a butterfly valve on the blower's discharge line was kept half closed increasing the system pressure drop and maintaining a reasonable operating range on the inlet damper system. After starting up the modernized Oxychlorination Unit, there has not been a need to keep the butterfly valve partially closed. The budget design, (Reference: "Incinerator Bypass Reduction" June 1, 1982 by M. J. Allen) specified installing a differential pressure controller on the discharge lines of the blowers. These controllers were to maintain a 1.2" H_2O pressure drop through the butterfly valves during the operation of either blower. Instead another alternative, installing a variable frequency controller on the blowers' motors, is being examined. Variable frequency controllers would convert the existing fixed speed motors to controlled adjustable speed machines.

The variable frequency controllers alternative should result in a 28% annual energy savings. This is based on the blowers' present electrical operating cost versus the predicted electrical operating cost with the variable speed controllers. (The variable speed controllers provide a horsepower savings with flow reduction.) Adapting the existing motors will cost approximately $62,000. This is $52,200 over the $9800 in the 1983 Capital Budget for installing the differential pressure controllers. A preliminary economic analysis of this alternative showed a 41% "incremental" rate of return for the additional $52,200 outlay.

Provisions for installing these adjustable frequency controllers are not addressed in this particular design, but will be addressed in a future design.

DESIGN BASIS

The HCl Absorbers (C-901 and C-901B) limit the operating pressures of both the primary and secondary incinerator trains, both having design pressures of 3 psig or 83.1" H_2O. To allow operating at higher vent pressures without bypassing and exceeding the absorbers' design pressures, new pressure transmitters (PT-1 and PT-1B) for the Wet Vent Header pressure controller (PIC-902), and Direct Chlorination Vent pressure controller (PIC-901) will be installed on the absorbers.

In adding the new pressure transmitters, the effects on the Combustion Air Blowers (BL-901 and BL-901B) must be considered. These blowers have a maximum discharge pressure of 79" H_2O which limits the operating pressure range of both incinerator units. If the operating pressure in the firebox reaches 67" H_2O the blowers will "dead-head" causing a motor overload and a subsequent shutdown. This is assuming that a 12" H_2O pressure drop is taken through the air fence and air plenum as specified in the incinerator design. To avoid shutting down the blowers and to provide overpressuring protection for the absorbers, whenever the pressure at PT-1 or PT-1B exceeds 52" H_2O the Wet Vent and Direct Chlorination Vent bypass valves (PCV-902 and PCV-901) will open. (Note: the calculated setpoint of 52" H_2O is based on the maximum firebox operating pressure, 67" H_2O minus the designed pressure drop across the waste heat boiler, 15" H_2O.) Since the response speed of the bypass control loops with the new transmitters and the actual pressure drops across equipment in the incinerator trains are not known, a set pressure lower than 52" H_2O should be used initially. With experience, an optimum set point will be chosen.

Another important consideration in adding the new pressure transmitters is the possibility of blowing the rupture disks on T-501 and S-500 was examined. The rupture disk on S-500 (RD-901) is set for 11 psi while the rupture disk on T-501 (RD-902) is set for 15 psi. Pressure drop calculations show that for the incinerator trains at design rates (i.e., Direct Chlorination Vent rate of 65,000 SCFH and Wet Vent rate of 47,080 SCFH), the maximum pressure drop through the equipment and lines between the knockout vessels, and the relocated pressure transmitters should be 103" H_2O maximum.

Equipment	P, "H_2O
Flame Arrestor (S-911 and S-911B)	6
Incinerator (I-901 and I-901B)	12 - 40
Waste Heat Boiler (H-902 and H-902B)	15
Piping From S-911 to T-501	6
Piping From S-911 to S-500	29
Piping From I-901 to S-911	7
Total	75(min) - 103(max)

Therefore, when a bypass occurs the maximum pressure at the knockout drums should be approximately 6 psig (52 + 103" H_2O), which is below the rupture disks set pressures.

Since the new pressure transmitters on both absorbers will be relaying signals to the existing Wet Vent Header pressure controller and Direct Chlorination Vent Header pressure controller, a high signal selector module will be added to both controllers.

In addition to the new pressure transmitters, Annubar Flow Sensors will be installed in the Wet Vent header and the Direct Chlorination Vent header. These annubars will be inserted near the existing pressure transmitters (PT-901 and PT-902). Installing these annubars will allow the monitoring of vent flows, which cannot be measured now. To size these annubars the following rates were used.

Direct Chlorination Vent	90,000 SCFH
Wet Vent	56,000 SCFH

The existing vent header pressure transmitters will remain to provide pressure indications for the Direct Chlorination Vent header and the Wet vent header.

ENVIRONMENTAL IMPACT STATEMENT

This project should reduce the number of incinerator bypasses due to high vent pressures.

ENERGY IMPACT STATEMENT

This project will have no effect on the plant's energy consumption. The energy checklist is not applicable to this project, and therefore was not completed.

SAFETY & HEALTH IMPACT STATEMENT

This project will have no effect on plant safety. The safety checklist was completed and included with the Review Issue.

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WORK LIST

Refer to Drawing No. VCM-194-1

1) Connect high signal selector module, HS-902, with the existing pressure controller for the Wet Vent header, PIC-902.

2) Connect high signal selector module, HS-901, with the existing pressure controller for the Direct Chlorination Vent header, PIC-901.

3) Disconnect input from Direct Chlorination Vent header pressure transmitter, (PT-901) to Direct Chlorination Vent Header pressure controller, (PIC-901).

4) Disconnect input from Wet Vent Header pressure transmitter (PT-902) to Wet Vent Header pressure controller (PIC-902).

5) Install 2" flanged coupling on Wet Vent Header. See manufacturer's instructions with FE-2 specification sheet. Locate the coupling so that once the annubar is installed it is 3 pipe diameters (30") downstream of 90° elbow and 7 pipe diameters (70") upstream of the existing Wet Vent Header pressure transmitter (PT-902).

6) Install Annubar Flow Sensor, FE-2 on the Wet Vent Header at 2" flanged coupling mentioned in step 5. Refer to the manufacturer's installation instructions with FE-2 specification sheet.

7) Install DP transmitter, FT-2 and connect to Annubar Flow Sensor.

8) Install flow recorder, FR-2, in the incinerator control room.

9) Run electrical connections from DP transmitter, FT-2, to flow recorder, FR-2.

10) Install Annubar Flow Sensor, FE-1, on the Direct Chlorination Vent header line upstream of the branch off to the primary and secondary incinerator trains. Locate Annubar 3 pipe diameters (24") downstream of 90° elbow and 7 pipe diameters (56") upstream of Direct Chlorination Header pressure transmitter (PT-901). Refer to the manufacturer's installation instructions with FE-1 specification sheet.

11) Install DP transmitter, FT-1 and connect to Annubar Flow Sensor.

12) Install flow recorder, FR-1, in the incinerator control room.

13) Run electrical connections from DP transmitter, FT-1, to flow recorder FR-1.

Steps 14, 15 and 16 are for the primary incinerator train, however, these steps should be duplicated for the secondary incinerator train.

14) Install new pressure transmitter PT-1 on the HCl Absorber, C-901. Refer to Drawing No. VCM-194-2. Insert the pressure transmitter in the vacant 2" 150# nozzle located to the north of TE-908 and the existing 0-60" H_2O pressure gauge. Run electrical connections from PT-1 to the high signal selector modules HS-902 and HS-901 on both the Wet vent header pressure controller, PIC-902, and the Direct Chlorination vent header pressure controller, PIC-901, respectively. Install a 2" plug valve with a 2" x ½" reducing flange and 3/4" bleed valve upstream of PT-1. Use specification Q40-1 (Kynar) pipe upstream of PT-1.

15) Install pressure recorder, PR-1, in the incinerator control room.

16) Connect input from PT-1 to PR-1.

17) Remove existing pressure gauge for S-500 from 2" valve and install pressure gauge, PG-1, with diaphragm seal and ¼ meter valve, upstream of Direct Chlorination Bypass valve.

18) Install pressure gauge for T-501, PG-2, with diaphragm seal and ¼" meter valve on existing 2" valve upstream of Wet Vent Bypass valve.

CONOCO

Engineering Center
Ponca City, Oklahoma

Specification Sheet

SPECIFICATION SHEET
PROJECT NO. 194-900-983-VMF
A.F.E. NO. _____
REQ. NO. _____
DATE 9/1/83 APP'D BY _____
MADE BY VMF

PLANT LCVCM PLANT PROJECT INCINERATOR BY-PASS REDUCTION

ITEM NO. FE-1
SERVICE ANNUBAR FLOW ELEMENT FOR DIRECT CHLORINATION HEADER

TYPE : ETL 75 - ANNUBAR FLO-TAP MODEL
LINE SIZE AND SCHEDULE : 8" SCH 40
LINE MATERIAL : CARBON STEEL
ANNUBAR MATERIAL OF CONSTRUCTION : 316 SS ELEMENT AND SCREWED

CALCULATION DATA

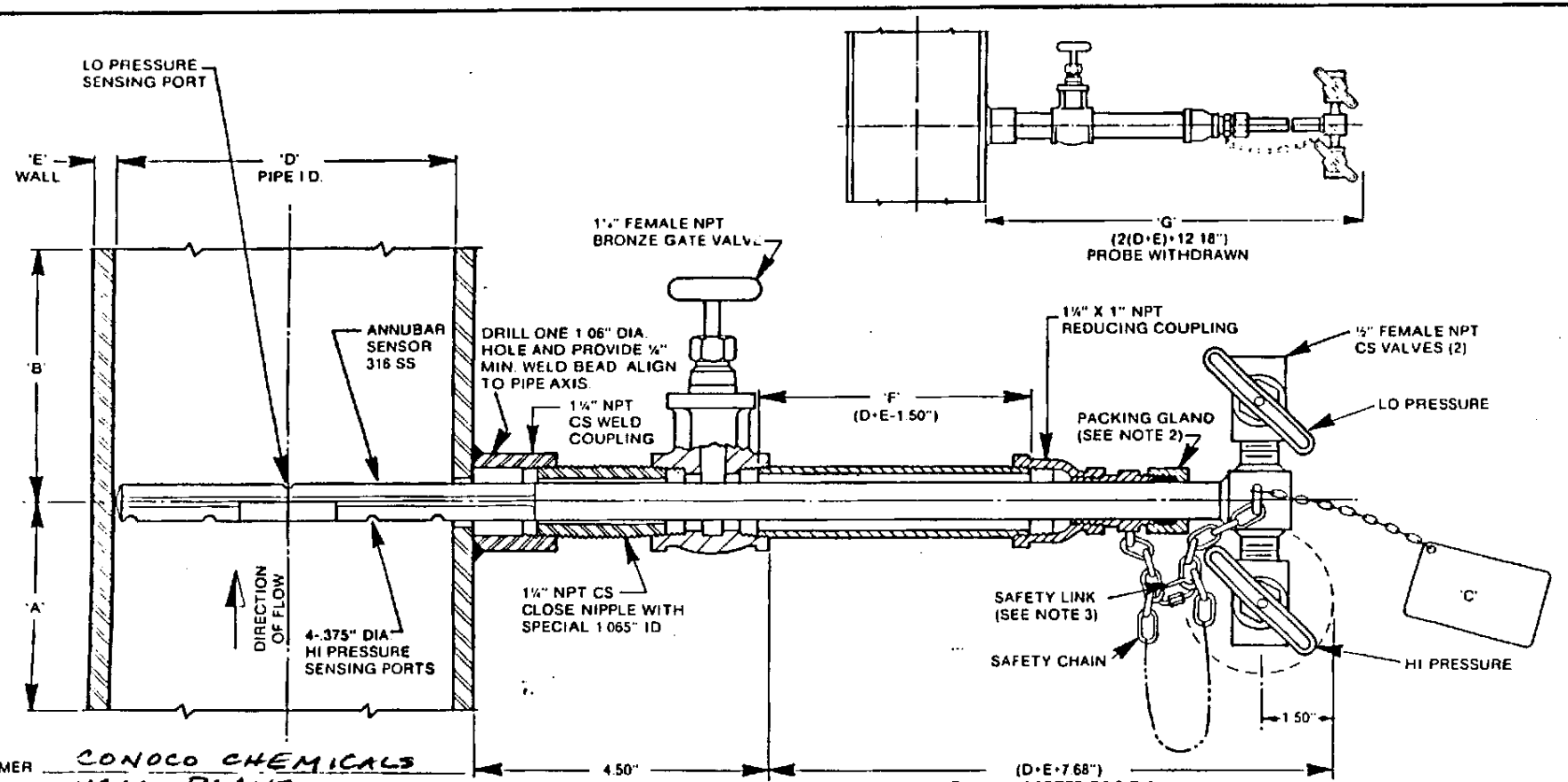
APPLICATION : DIRECT CHLORINATION HEADER
FLUID : CHLORINATED HYDROCARBONS, CO, CO_2, H_2, N_2, CH_4
FLOW RATE : 1,500 SCFM (MAX) 198 SCFM (MIN)
PRESSURE : 45" H_2O (NORMAL) 75" H_2O (MAX)
TEMP °F : 60 °F (NORMAL) 147°F (MAX)
METER TYPE : D/P CELL
BARO PRESS : 14.7 PSIA
DENSITY : MOLECULAR WT: 30.54 ; 0.09 LB/FT3 @OPERATING T&P
K FACTOR : C_p/C_v = 1.35
D/P RANGE : 2" H_2O

NOTES : SEE ATTACHMENTS

SPEC NO. _____ REV. _____
SHEET 1 OF 7

4-441-S
4-81

CCR 000018487



CUSTOMER CONOCO CHEMICALS
LOCATION VCM PLANT
PROJECT ..... TAG NO. FE-1
OPERATING TEMPERATURE, SPECIFY 60°F
FLOW MEDIUM, SPECIFY CHLORINATED HYDROCARBONS, CO, CO_2, H_2, N_2, CH_4
PIPE I.D. – 'D' 8"
WALL – 'E' .....
DIMENSIONS CALCULATED 'F' – CAGE NIPPLE ASSY. .....
BY DIETERICH STANDARD 'G' – OVERALL PROBE WITHDRAWN .....

1) MAXIMUM PRESSURE RATING FOR STANDARD "FLO-TAP" IS 70 PSIG.
2) STANDARD PACKING GLAND IS RATED TO 450°F MAX.
3) CAUTION: SAFETY LINK MUST BE INSTALLED TO MINIMIZE CHAIN SLACK FOLLOWING PROBE INSERTION.
4) NOMINAL INSERTION FORCE 50-60 LB. AT RATED PRESSURE

'A'– 7 OR MORE PIPE DIAMETERS ARE RECOMMENDED FOR UPSTREAM SIDE AFTER VALVES, ELBOWS, ETC.
'B'–3 TO 4 PIPE DIAMETERS ARE RECOMMENDED FOR DOWNSTREAM SIDE.
'C'–PERMANENT RUSTPROOF METAL TAGS SHOWING MIN., NORM. & MAX. DESIGNED FLOWS, METER READINGS FOR DESIGNED FLOW, TAG NO., LINE SIZE, SERIAL NO. & METERED FLUID.

Dieterich Standard Corporation • Subsidiary of DOVER Corporation
Box 9000 • Boulder, Colorado 80306 USA

ANNUBAR MODEL FTL 75

APPROVAL		LATEST REVISION	
By JHaCraft	Date 3-7-8	Letter	Date
Drawn by D.C.Crain	Checked by P Coleman	Date Drawn 8 MAR 78	Scale NTS

C-1200

CCR 000018488

ANNUBAR Flow Sensors

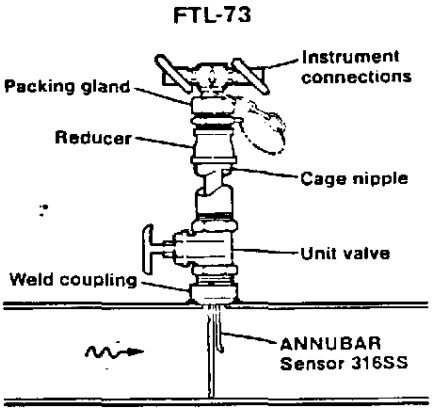
Flo-Tap ANNUBAR • Installation & Operating Instructions

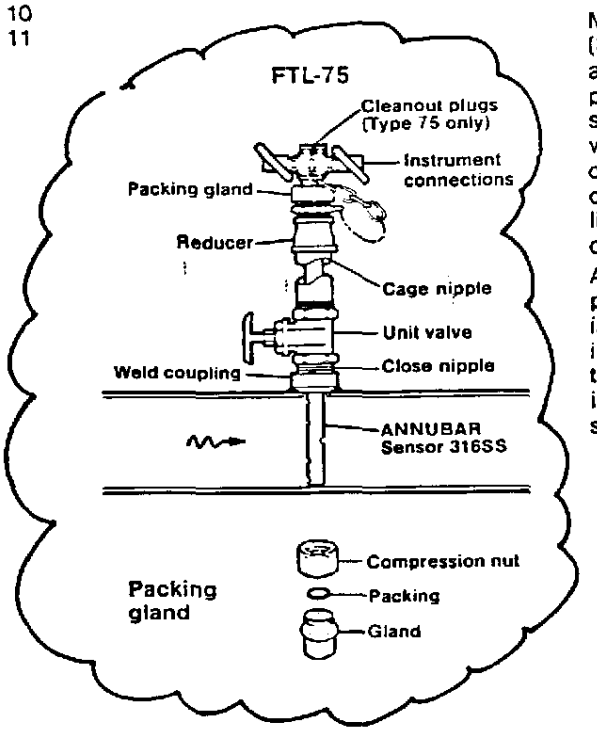
Dieterich Standard Corp • Subsidiary of DOVER Corporation

FE-1
DIRECT CHLORINATION VENT
ANNUBAR

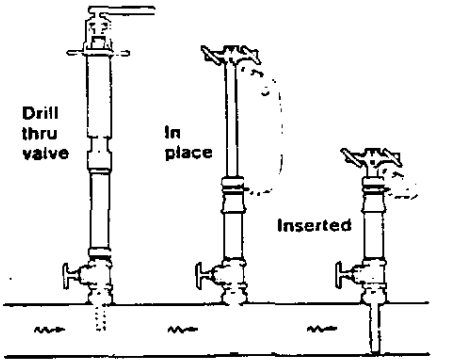
Contents

FTL-73 and FTL-75





FTL-73 and FTL-75: for lines to 70 psig



Models FTL-73 and FTL-75 Flo-Taps (Submittal Drawings E-201 and E-202) are designed for installation under pressure in lines where the static pressure does not exceed 70 psig and where the temperature does not exceed 800°F. Maximum temperature during the "hot-tapping" process is limited to the rating of the drilling machine (250°F for Mueller D-5).

All items required for installation are provided except for drilling and welding facilities. These instructions are intended for **installation without system shutdown in weldable pipe.** For installation in other types of pipe, consult the factory.

CCR 000018489

Equipment required

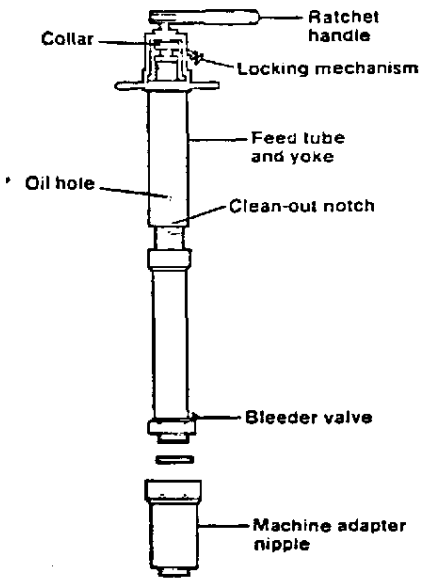
Installation procedure
FTL-73 and FTL-75

Equipment required

1. Welding equipment
2. Pressure (hot-tap) drilling machine, Mueller D-5 or equivalent.
3. 1-1/16" drill bit, Mueller 33530.
4. Drill holder, Mueller 33555.
5. Adapter nipple, Mueller 36195.

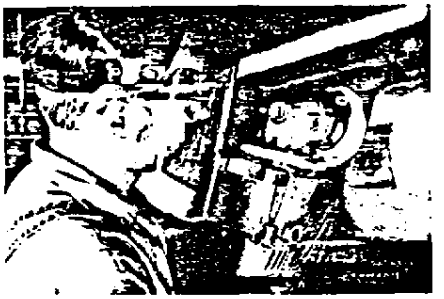
(Items 2 thru 5 are available from Mueller Co., Decatur, Illinois. In most cases, the public service company in your city is available to do the "hot-tapping" job, or the equipment may be rented or purchased locally.)

Pressure drill machine and tooling



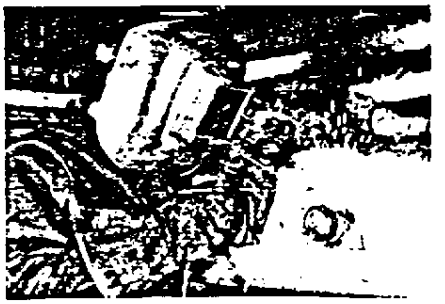
1. Verify that the line pressure and temperature are within the rated limits of the Flo-Tap ANNUBAR. (70 psig static pressure maximum, 800° F maximum temperature with asbestos packing). Temperature is limited during installation to maximum rating of drilling machine.

2. Grind off paint or other coatings from the pipe in the area where the Flo-Tap is to be installed. (Except for steam applications, Flo-Tap may be installed at any angle around the pipe. Consult Catalog E-100 for recommended minimum straight pipe lengths for best accuracy, and E-79 for further information on location for liquid and gas installation.)



3. Tack weld the 1-1/4" weld coupling (supplied with the Flo-Tap) to the pipe. The coupling must be aligned perpendicular to the pipe axis and square to its plane.

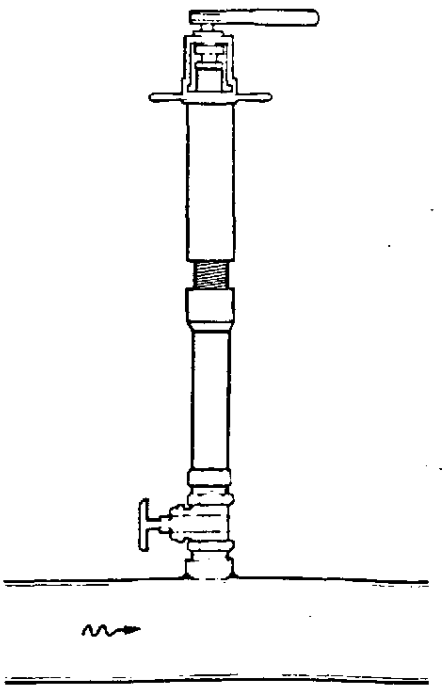
4. Complete welding.



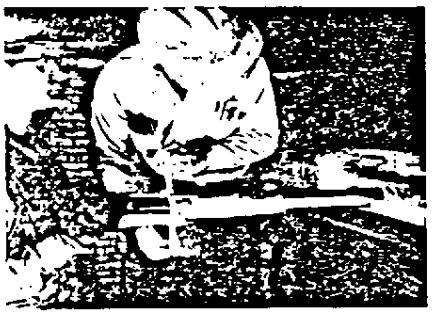
5. Install the close nipple (supplied with Flo-Tap) into the weld coupling. (The close nipple is specially machined to 1.065" ID for ANNUBAR guide support.)

6. Install the Flo-Tap unit isolating valve on the close nipple. Verify that the valve is in the fully open position.

7. Install drill bit and adapter into the pressure drilling machine. Then attach the machine to the Flo-Tap unit isolating valve.



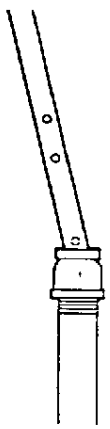
8. Drill through the pipe wall in accordance with the instructions supplied with the drilling machine.



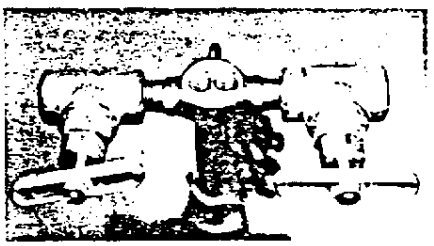
9. Withdraw the drill bit through the Flo-Tap unit isolating valve. Close the unit valve and remove the drilling machine. Check for leakage at valve and connections.

10. Install the Flo-Tap cage nipple (supplied with the Flo-Tap) by threading it into the unit isolating valve. Then install the **1-1/2" x 1" reducer** (supplied with Flo-Tap) on the cage nipple.

11. Insert Flo-Tap ANNUBAR into the cage nipple and tighten the stuffing box nut into the reducer. Hand tighten the compression nut.

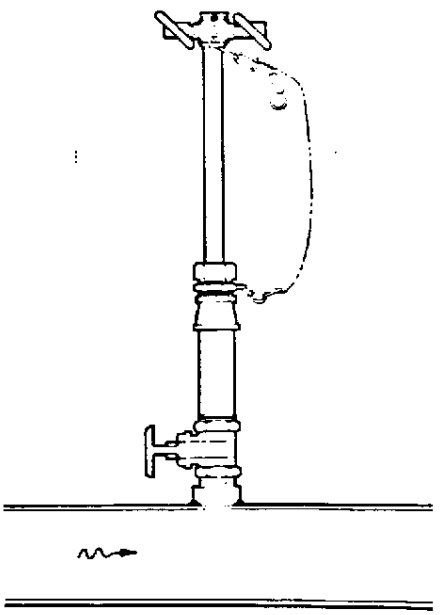


12. Install the instrument valves (supplied with Flo-Tap) and verify that both valves are fully closed.



13. While maintaining hand pressure on the Flo-Tap ANNUBAR, check all connections for leakage by cracking open the unit isolating valve. If there is no apparent leakage, proceed to the insertion.

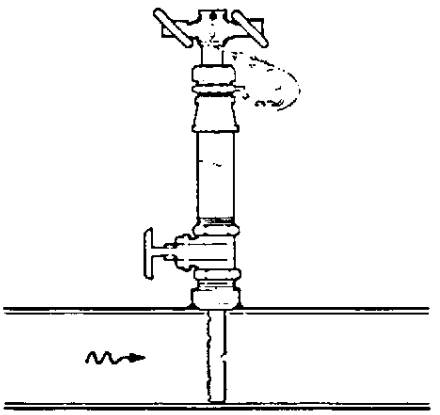
Flo-Tap installed



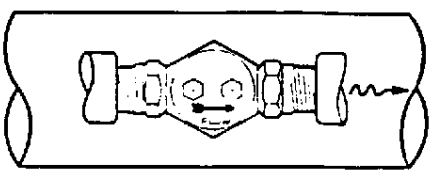
1. Verify that both instrument valves are fully closed. While firmly holding the probe, open the unit isolating valve fully.

2. Manually push the Flo-Tap probe into the line until it contacts the opposite pipe wall. Approximately 50 to 60 pounds of force will be required when performing insertion under full rated line pressure of 70 psig. It may be necessary to loosen the gland slightly for ease of insertion.

Fully inserted



3. While manually holding the Flo-Tap probe in the inserted position, turn the probe until the flow arrow on the Flo-Tap head is aligned in the direction of flow and tighten the compression nut.



4. Still holding the Flo-Tap probe, attach the safety chain link so that it passes through the third link from the end on both ends of the chain supplied as part of the assembly.

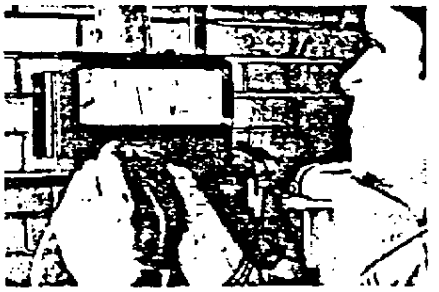
CAUTION

The Flo-Tap probe must be manually held in the inserted position until the compression nut has been tightened and the safety link has been properly installed.

Retraction procedure FTL-73 and FTL-75

5. Inspect the packing gland for evidence of leakage. Tighten the compression nut as required to stop leakage and to retain the probe in the inserted position.

6. Connect instrument lines to the Flo-Tap instrument valves and to the appropriate meter, recorder, transmitter or controller.



7. Open the Flo-Tap instrument valves. Then purge or bleed the connecting lines and readout equipment as required.

1. Fully close the Flo-Tap instrument valves. Then, if required, depressurize and disconnect the instrument lines.

2. While manually holding the probe in the inserted position, remove the safety link from the Flo-Tap chain. Continue holding the probe and carefully loosen the compression nut until line pressure begins to force the probe out of the pipe. Allow the probe to move slowly until it is stopped by the Flo-Tap chain.

CAUTION

The probe must be manually restrained to prevent sudden movement caused by line pressure. Failure to manually restrain the probe during retraction could result in personal injury.

3. After the probe is fully retracted, the Flo-Tap unit isolating valve may be closed to isolate the probe from the lines.

4. The Flo-Tap probe may now be fully removed if desired by separating the packing gland from the reducer and lifting out the probe.

CONOCO

Engineering Center
Ponca City, Oklahoma

Specification Sheet

SPECIFICATION SHEET
PROJECT NO. 194-900-983-VMF
A.F.E. NO. _____
REQ. NO. _____
DATE 9/1/83 APP'D BY _____
MADE BY VMF

PLANT LCVCM PLANT PROJECT INCINERATOR BYPASS REDUCTION

ITEM NO. FE-2
SERVICE ANNUBAR FLOW ELEMENT FOR WET VENT HEADER

TYPE : ANF 75 - ANNUBAR FLANGED MODEL

X-FLANGE DIMENSION : 6"
(TOTAL LENGTH REQ'D FROM OD OF PIPE WALL TO THE FACE OF THE MATING FLANGE.)

CONNECTION : 4" 150# RF FLANGE

MATERIAL : HASTELLOY "C" ELEMENT AND FLANGE

LINE SIZE AND SCHEDULE : 10" FURAN I.D. = 10 "

CALCULATION DATA

APPLICATION : WET VENT HEADER

FLUID : CHLORINATED HYDROCARBONS, HCL, WATER

FLOW RATE : 933 SCFM (MAX) - 92 SCFM (MIN)

PRESSURE : 40 " H_2O (NORMAL) 70 " H_2O (MAX)

TEMP °F : 120 °F (MAX) 120 °F (MAX)

METER TYPE : D/P CELL

BARO PRESS : 14.7 PSIA

DENSITY : MOLECULAR WT. 50.6; 0.13 LB/FT^3 @ OPERATING T & P

K FACTOR : C_D/C_V = 1.13

D/P RANGE : 0.3 " H_2O

NOTES :

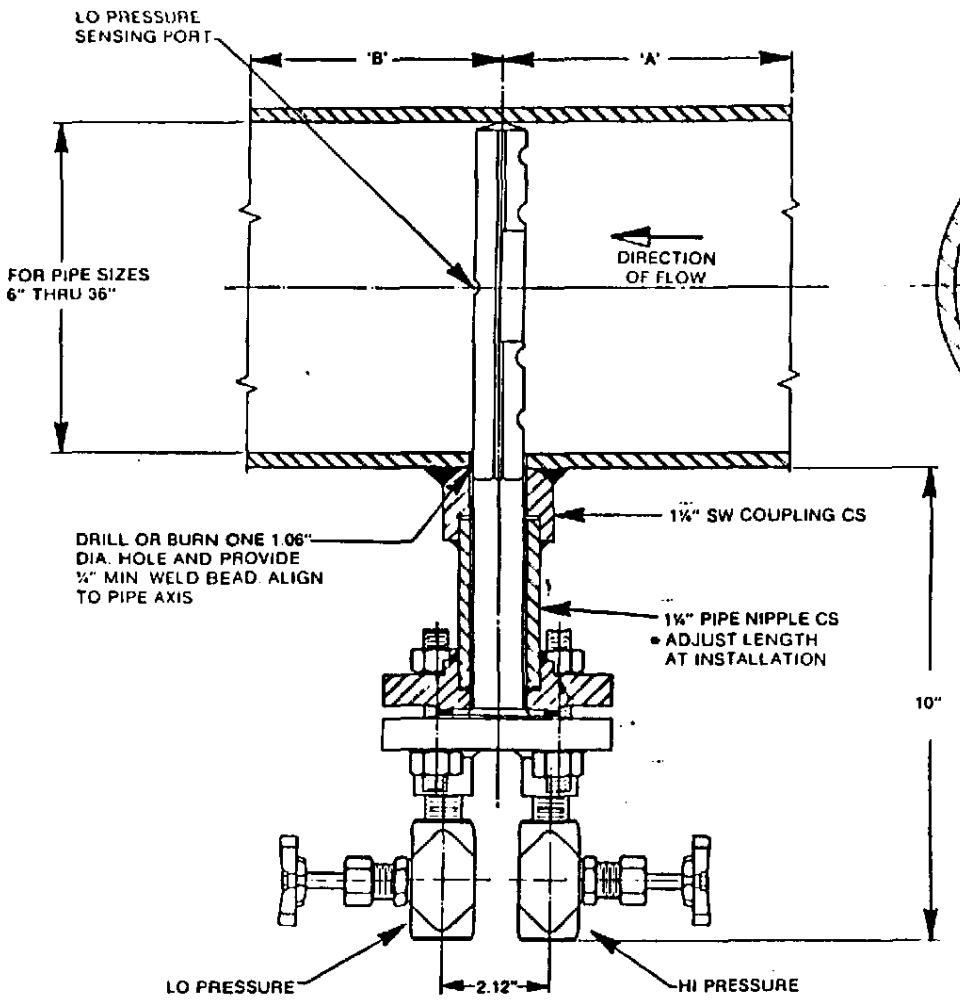
SEE ATTACHMENTS

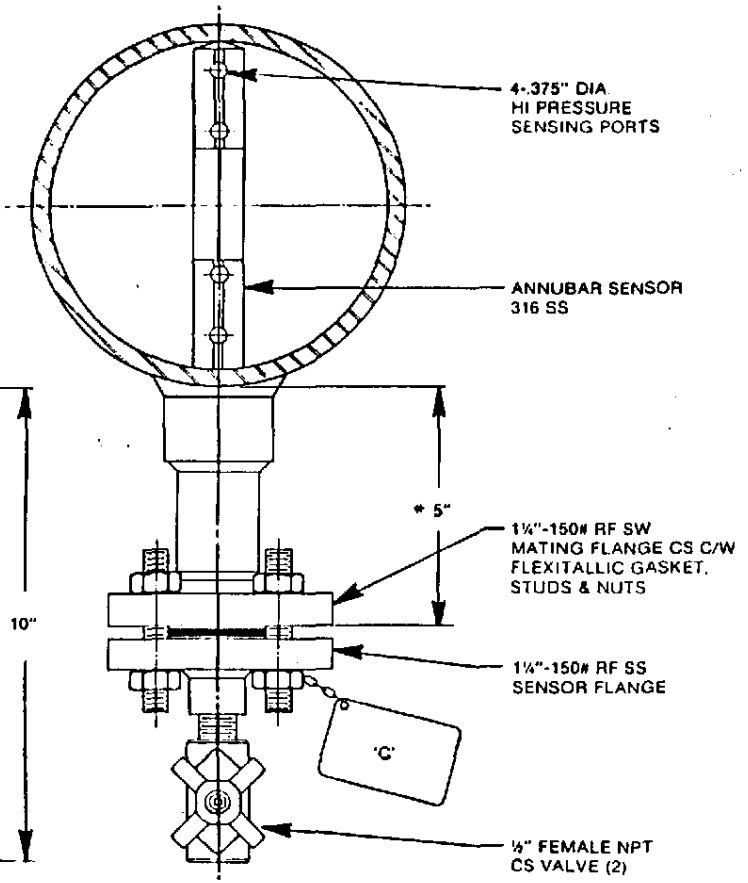
SPEC NO. _____ REV. _____
SHEET 2 OF 7

4.441-S

4-81

CCR 000018493





PROJECT INCINERATOR BYPASS REDUCTION - FE-2
LOCATION VCM PLANT
PIPE SIZE & SCHED. 10"

'A'- 7 OR MORE PIPE DIAMETERS ARE RECOMMENDED FOR UPSTREAM SIDE AFTER VALVES, ELBOWS, ETC.
'B'—3 TO 4 PIPE DIAMETERS ARE RECOMMENDED FOR DOWNSTREAM SIDE.
'C'—PERMANENT RUSTPROOF METAL TAGS SHOWING MIN., NORM. & MAX. DESIGNED FLOWS, METER READINGS FOR DESIGNED FLOW, TAG NO., LINE SIZE, SERIAL NO. & METERED FLUID.

Dieterich Standard Corporation • Subsidiary of DOVER Corporation
Box 9000 • Boulder, Colorado 80306 USA

ANNUBAR MODEL ANF 75

APPROVAL		LATEST REVISION	
By	Date	Letter	Date
	3-7-78		
Drawn by	Checked by	Date Drawn	Scale
HILDA F.	D Coleman	3/6/78	N.T.S.

C-4900

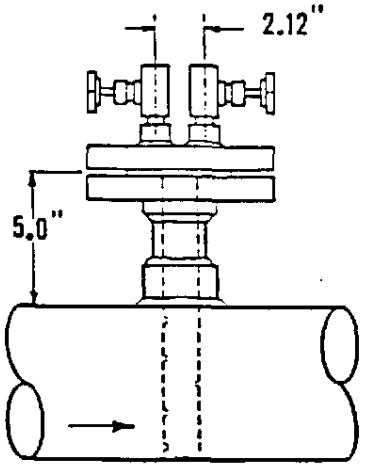
FE-2

WET VENT ANNUBAR

Type ANF 75 ANNUBAR
Drawing C4900 (75)

ANNUBAR Type 75 are available with optional C07 (½" female NPT) or C08 (socket-weld) couplings mounted on a flange on 2-1/8" centers. Unless otherwise specified, these ANNUBARS are designed for a 5" dimension from pip wall to face of mating mounting flange. This 5" dimension must be maintained when installing the mounting hardware.

If mating hardware has not been installed, proceed as follows:



1. Drill or burn a 1-1/16" diameter hole in the pipe wall.
2. Tack weld a 1½" socket-weld coupling to pipe and align so it is perpendicular to the pipe axis and square to its plane. Finish welding coupling.
3. Size a short nipple to obtain the 5" or specified distance from pipe wall to face of mating flange.
4. Weld nipple to weld coupling, making sure that it is perpendicular to the pipe.
5. Although the ANNUBAR is sized to a specified dimension, it is wise to avoid installation problems by checking dimensions at this time. Insert ANNUBAR through the nipple until it bottoms at the opposite pipe wall (or into the opposite side plug, in the case of Type 76).

   Note dimension from outer pipe wall to inside face of ANNUBAR flange. Remove ANNUBAR. The dimension should agree with the 5" or specified dimension.
6. Align mating flange to installed nipple, again making sure the 5" or specified dimension is maintained. Make sure also that the mating flange will align with the ANNUBAR flange such that the flow arrow will point directly downstream. Then weld mating flange to pipe nipple.
7. Install flange gaskets and slide ANNUBAR into the pipe. Complete installation by bolting the ANNUBAR flange to mating flange.

CONOCO

Engineering Center
Ponca City, Oklahoma

Differential Pressure Transmitters

SPECIFICATION DATA SHEET
PROJECT NO. 194-900-983-VMF
A.F.E. NO.
REQ. NO.
DATE 8/31/83 APP'D BY
MADE BY V.M.F

PLANT VCM PLANT LAKE CHARLES, LA. PROJECT INCINERATOR BY-PASS REDUCTION

GENERAL	1	ITEM NO. & TAG		FT-2		FT-1		
	2	SERVICE		WET VENT		DIRECT CHLORINATION		
	3			HEADER		VENT HEADER		
	4	MANUFACTURER		ROSEMOUNT		ROSEMOUNT		
	5	MODEL NO.		1151 DP ALPHALINE		1151 DP ALPHALINE		
SERVICE CONDITONS	6	FLUID		WET VENT GASES		CHLORINATION VENT GASES		
	7	STATE		VAPOR		VAPOR		
	8	PRESSURE, ~~PSIG~~ $"H_2O$	OPER	40	MAX 70	45	75	
	9	TEMPERATURE, °F	OPER	120	MAX 120	60	147	
	10	SPECIFIC GRAVITY @ OPER. T &P.	AIR=1	1.719		1.170		
	11	SEAL LIQUID		FLUOROLUBE		FLUOROLUBE		
	12	SEAL LIQUID SP. GR.						
	13							
DESIGN DETAILS	14	TYPE—ELECTRONIC-PNEUMATIC		ELECTRONIC		ELECTRONIC		
	15	SENSOR TYPE		STRAIN GAGGE		STRAIN GAUGE		
	16	OUTPUT SIGNAL		4-20MA DC		4-20mA DC		
	17	POWER SUPPLY REQUIRED		YES		YES		
	18	ADJUSTABLE SPAN LIMITS, H_2O		0-5		0-5		
	19	CALIBRATED RANGE, H_2O		0-0.3		0-2		
	20	ADJUSTABLE SUPPRESSION RANGE						
	21	CALIBRATED SUPPRESSION RANGE						
	22	MINIMUM ACCURACY						
	23	MINIMUM REPEATABILITY						
	24	BODY STATIC PRESS. RATING						
	25	PROCESS CONNECTION						
	26	ELECTRICAL CLASSIFICATION		EXP. PROOF		EXP. PROOF		
	27	TYPE OF SERVICE		FLOW		FLOW		
	28							
	29							
	30							
MATERIALS	31	BODY		HASTELLOY "C"		316 SS		
	32	ELEMENT		HASTELLOY "C"		316 SS		
	33	PROCESS FLANGES		HASTELLOY "C"		316 SS		
	34							
ACCESSORIES	35	AIR FILTER-REGULATOR						
	36	AIR SUPPLY GAUGE						
	37	OUTPUT GAUGE		0-10 SQRT		0-10 SQRT		
	38	MOUNTING BRACKET		VERTICAL		VERTICAL		
	39							
	40							

NOTES

41 OVERRANGE PROTECTION EQUAL TO STATIC PRESS RATING
42 CONNECTIONS: AIR—1/4" NPT, CONDUIT—1/2"
43 SEE BACK OF SPECIFICATION SHEET FOR LINE DEFINITIONS
44
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QUOTATION WILL NOT BE CONSIDERED IF MANUFACTURER DOES NOT COMPLETE FORM BY FURNISHING INFORMATION FOR BLANK SPACES.

SPEC NO. ____ REV. ____
SHEET 3 OF 7

4-442
5-82

CCR 000018496

CONOCO

Engineering Center
Ponca City, Oklahoma

Pressure Transmitters

SPECIFICATION DATA SHEET
PROJECT NO. 194-900-983-YMF
A.F.E. NO. _____
REQ. NO. _____
DATE 11/4/83 APP'D BY _____
MADE BY V.M. FISHER

PLANT VCM PLANT PROJECT INCINERATOR BYPASS REDUCTION

GENERAL	1	ITEM NO. & TAG	PT-1		PT-1B		
	2	SERVICE	C-901		C-901B		
	3		HCL ABSORBER		HCL ABSORBER		
	4	MANUFACTURER	ROSEMOUNT		ROSEMOUNT		
	5	MODEL NO.	OR EQUIVALENT		OR EQUIVALENT		
SERVICE CONDITIONS	6	FLUID	VENT GASES		VENT GASES		
	7	STATE	VAPOR		VAPOR		
	8	PRESSURE, ~~PSIG~~ "H_2O OPER / MAX	40	80	40	80	
	9	TEMPERATURE, ~~°F~~ °C OPER / MAX	255	300	255	300	
	10	SPECIFIC GRAVITY @ OPER. T.&P.					
	11	SEAL LIQUID					
	12	SEAL LIQUID SP. GR.					
	13						
DESIGN DETAILS	14	TYPE—ELECTRONIC-PNEUMATIC	ELECTRONIC		ELECTRONIC		
	15	ELEMENT TYPE	DIAPHRAGM		DIAPHRAGM		
	16	OUTPUT SIGNAL	4-20mA		4-20mA		
	17	POWER SUPPLY REQUIRED	110V		110V		
	18	ADJUSTABLE SPAN LIMITS, ~~PSI~~ "H_2O	0-100		0-100		
	19	CALIBRATED RANGE, ~~PSI~~ "H_2O	0-80		0-80		
	20	ADJUSTABLE SUPPRESSION RANGE					
	21	CALIBRATED SUPPRESSION RANGE, PSI					
	22	MINIMUM ACCURACY					
	23	MINIMUM REPEATABILITY					
	24	BODY STATIC PRESS. RATING					
	25	OVERRANGE PRESS. LIMIT					
	26	PROCESS CONNECTION					
	27	ELECTRICAL CLASSIFICATION	EXPLOSION PROOF		EXPLOSION PROOF		
	28						
	29						
	30						
MATERIALS	31	BODY	HASTELLOY C		HASTELLOY C		
	32	ELEMENT	HASTELLOY C		HASTELLOY C		
	33						
	34						
	35						
ACCESSORIES	36	AIR FILTER-REGULATOR					
	37	AIR SUPPLY GAUGE					
	38	OUTPUT GAUGE					
	39	MOUNTING BRACKET					
	40						
	41						
NOTES	42	CONNECTIONS: AIR—1/4" NPT, CONDUIT—1/2"					
	43	SEE BACK OF SPECIFICATION SHEET FOR LINE DEFINITIONS					
	44	BOTH PRESSURE TRANSMITTERS SHOULD HAVE A NITROGEN					
	45	PURGE.					
	46						
	47						
	48						
	49						
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	52						

CCR 000018497

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

SPEC NO. _____ REV. _____
SHEET 4 OF 7

4-451-S

6-82

CONOCO

Engineering Center
Ponca City, Oklahoma

Indicators, Recorders, Controllers
(Receiver Instruments)

SPECIFICATION DATA SHEET
PROJECT NO. 194-900-4183-VMF
A.F.E. NO. _____
REQ. NO. _____
DATE 8/31/83 APP'D BY [illegible]
MADE BY VMF

PLANT VCM PLANT, LAKE CHARLES, LA. PROJECT INCINERATOR BY-PASS REDUCTION

GENERAL	1	ITEM NO.	FR-1 (1)	FR-2 (1)	PIC-901
	2	SERVICE	DIRECT CHLORINATION	WET VENT	DIRECT CHLOR.
	3		VENT HEADER	HEADER	VENT BY-PASS
	4	MANUFACTURER	FISHER		EXISTING INDICATOR
	5	MODEL NO.	RD-221		CONTROLLER
DESIGN DETAILS	6	INSTRUMENT FUNCTION	RECORDER/INDICATOR	RECORDER/INDICATOR	
	7	INSTRUMENT MOUNTING	FLUSH	FLUSH	
	8	ELECTRICAL CLASSIFICATION			
	9	POWER SUPPLY	110V	110V	
	10	INPUT SIGNAL	4-20mA	4-20mA	
	11	ACCURACY			
	12	REPEATABILITY			
	13	LOCATION	PANEL	PANEL	
	14				
	15				
INDICATOR-RECORDER	16	NO. OF PENS OR POINTERS	2	2ND PEN FR-1	
	17	SCALE RANGE	0-10√	0-10√	
	18	CHART SIZE AND TYPE	4" STRIP	4" STRIP	
	19	CHART RANGE	0-10√	0-10√	
	20	CHART NUMBER			
	21	CHART FACTOR	150 SCFM	93 SCFM	
	22	CHART DRIVE			
	23				
	24				
CONTROLLER	25	CONTROL MODE (SEE LINE 44)			
	26	CONTROLLER ACTION			
	27	SCALE RANGE			
	28	SET POINT ADJ.: MAN.—REMOTE			
	29	AUTO—MAN. SWITCH AND ADJ.			
	30	OUTPUT SIGNAL			
	31				
	32				
ALARMS	33	ALARM FUNCTION			
	34	QUANTITY AND FORM			
	35	CONTACT RATING			
	36				
	37				
ACCESSORIES	38		RANGE PLUG	RANGE PLUG	HIGH SIGNAL
	39		FOR 4-20mA	FOR 4-20mA	SELECTOR MODULE
	40		TYPE AC-137	TYPE AC-137	HS-901
	41				FISHER
	42				KM 1301
	43				

NOTES

44 CONTROL MODES: P = PROPORTIONAL (GAIN), I = INTEGRAL (RESET), D = DERIVATIVE (RATE), BIAS, GAP, RATIO, BATCH

45 RECORDER INK SUPPLY: CAPILLARY WITH 6 MONTHS MIN. SUPPLY.

46 NOTE : 1, ONE RECORDER FOR FR-1 & FR-2

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48

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50 CCR 000018498

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

SPEC NO. _____ REV. _____
SHEET 5 OF 7

4-439-S

7-82

CONOCO

Engineering Center
Ponca City, Oklahoma

Indicators, Recorders, Controllers (Receiver Instruments)

SPECIFICATION DATA SHEET
PROJECT NO. 194-900-983-VMF
A.F.E. NO. _____
REQ. NO. _____
DATE 8/31/83 APP'D BY _____
MADE BY VMF

PLANT VCM PLANT LAKE CHARLES LA. PROJECT INCINERATOR BY-PASS REDUCTION

GENERAL	1	ITEM NO.	PIC-902	PR-1	PR-1B
	2	SERVICE	WET VENT BY-PASS	C-901 PRESSURE	C-901B PRESSURE
	3				
	4	MANUFACTURER	EXISTING	FISHER	FISHER
	5	MODEL NO.	CONTROLLER	RD-221	RD-221
DESIGN DETAILS	6	INSTRUMENT FUNCTION		RECORDER	RECORDER
	7	INSTRUMENT MOUNTING		FLUSH	FLUSH
	8	ELECTRICAL CLASSIFICATION		EXPLOSION PROOF	EXPLOSION PROOF
	9	POWER SUPPLY		110V	110V
	10	INPUT SIGNAL		4-20 mA	4-20 mA
	11	ACCURACY			
	12	REPEATABILITY			
	13				
	14				
	15				
INDICATOR-RECORDER	16	NO. OF PENS OR POINTERS		TWO	2ND PEN PR-1
	17	SCALE RANGE		0-100 LINEAR	0-100 LINEAR
	18	CHART SIZE AND TYPE		4" STRIP	4" STRIP
	19	CHART RANGE		0-100 LINEAR	0-100 LINEAR
	20	CHART NUMBER			
	21	CHART FACTOR		10" H_2O	10" H_2O
	22	CHART DRIVE		ELECTRIC	ELECTRIC
	23				
	24				
CONTROLLER	25	CONTROL MODE (SEE LINE 44)			
	26	CONTROLLER ACTION			
	27	SCALE RANGE			
	28	SET POINT ADJ.: MAN.—REMOTE			
	29	AUTO—MAN. SWITCH AND ADJ.			
	30	OUTPUT SIGNAL			
	31				
	32				
ALARMS	33	ALARM FUNCTION			
	34	QUANTITY AND FORM			
	35	CONTACT RATING			
	36				
	37				
ACCESSORIES	38		HIGH SIGNAL		
	39		SELECTOR MODULE		
	40		HS-902		
	41		FISHER		
	42		KM 1301		
	43				
NOTES	44	CONTROL MODES: P = PROPORTIONAL (GAIN), I = INTEGRAL (RESET), D = DERIVATIVE (RATE), BIAS, GAP, RATIO, BATCH			
	45	RECORDER INK SUPPLY: CAPILLARY WITH 6 MONTHS MIN. SUPPLY.			
	46				
	47				
	48				
	49				
	50				CCR 000018499
	51				
	52				

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

SPEC NO. _____ REV. _____
SHEET 6 OF 7

4-439-S

7-82

conoco

Engineering Center
Ponca City, Oklahoma

Pressure Gauges and Diaphragm Seals

SPECIFICATION DATA SHEET
PROJECT NO. 194-900-983-VMF
A.F.E. NO. _____
REQ. NO. _____
DATE 9/2/83 APP'D BY _____
MADE BY VMF

PLANT LC VCM PROJECT INCINERATOR BYPASS REDUCTION

GENERAL	1	ITEM NO.	PG-1		PG-2				
	2	SERVICE	DIRECT CHLORINATION VENT HEADER		WET VENT HEADER				
	3								
	4	MANUFACTURER	AMETEK (OR EQUIV)		AMETEK (OR EQUIV)				
	5	MODEL NO.							
SERVICE CONDITIONS	6	FLUID	CHLORINATED HYDROCARBON		CHLORINATED HYDROCARBONS				
	7	FLUID STATE	VAPOR		VAPOR				
	8	PRESSURE, ~~PSIG~~ "H_2O OPER	85	110	80	105			
	9	TEMPERATURE, °F OPER	60	147	120	120			
	10								
DESIGN DETAILS	11	DIRECT READING OR RECEIVER							
	12	MOUNTING							
	13	STEM LOCATION							
	14	CONNECTION							
	15	DIAL DIAMETER							
	16	DIAL SCALE	0 - 200" H_2O		0 - 200" H_2O				
	17	TUBE RANGE							
	18	ACCURACY							
	19	RING STYLE							
	20								
	21								
MATERIALS	22	BOURDON TUBE							
	23	SOCKET							
	24	MOVEMENT							
	25	CASE							
	26	LENS							
	27								
	28								
DIAPHRAGM SEAL	29	TYPE: SCR'D OR FLG'D	FLG'D		FLG'D				
	30	PROCESS CONN. SIZE AND RATING	1" 150 RF		1" 150 RF				
	31	GAUGE CONN. SIZE	¼" NPT		¼" NPT				
	32	LIQUID FILL FLUID	FLUOROLUBE		FLUOROLUBE				
	33	BOTTOM HOUSING MAT'L	HASTELLOY "C"		HASTELLOY "C"				
	34	TOP HOUSING MAT'L	316 SS		316 SS				
	35	DIAPHRAGM MAT'L	VITON		VITON				
	36	DIAPHRAGM FLUSH CONN.							
	37		TYPE 302 YH-ASHCROFT		TYPE 302 YH-ASHCROFT				
STANDARD FEATURES	38	ELEMENT TYPE: BOURDON TUBE							
	39	GAUGE TYPE: SOLID FRONT W/BLOWOUT DISC							
	40	DIAL: PLASTIC FINISH—WHITE W/ BLACK MARKINGS							
	41	POINTER: ADJUSTABLE							
ACCESSORIES	42	SIPHON: MAT'L							
	43	PIGTAIL: MAT'L							
	44	PRESSURE SNUBBER							
	45	FLUSH MOUNTING RING							
	46								
	47								
NOTES	48								
	49								
	50								
	51								

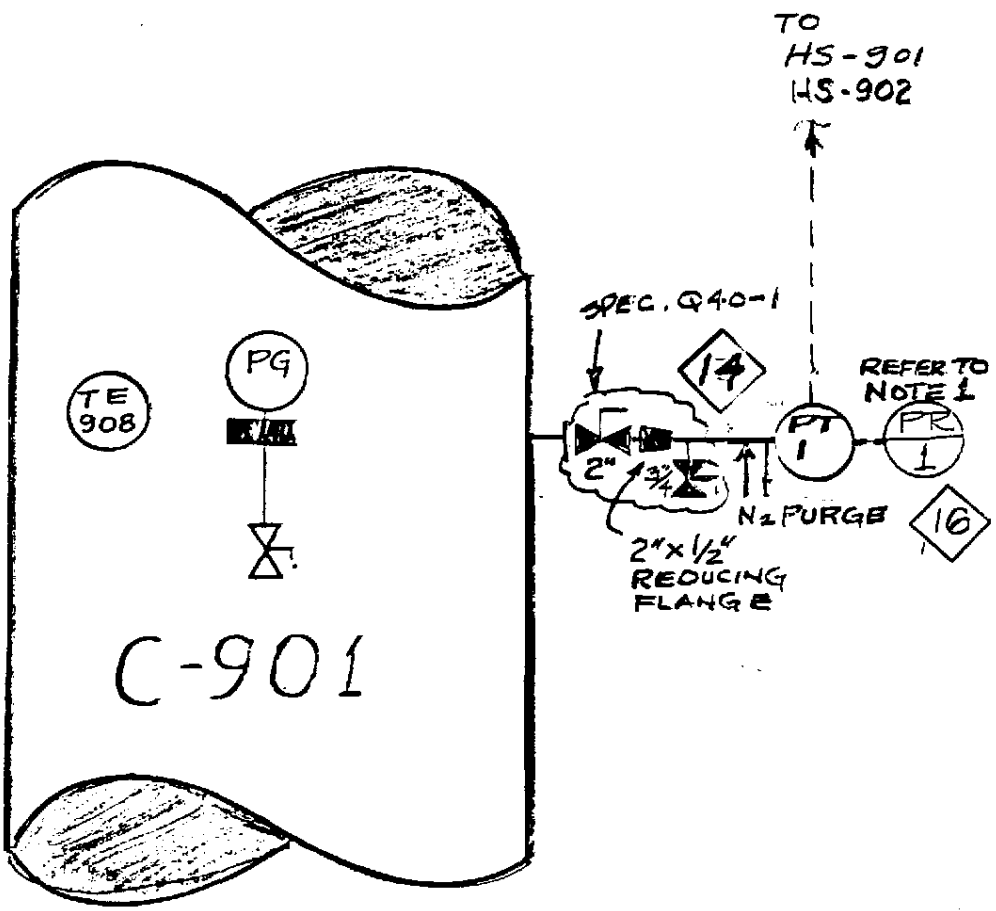
QUOTATION WILL NOT BE CONSIDERED IF MANUFACTURER DOES NOT COMPLETE FORM BY FURNISHING INFORMATION FOR BLANK SPACES.

SPEC NO. ____ REV. ____
SHEET 7 OF 7

4-440-S
5-82

CCR 000018500

DWG No. YCM-194-2



PRESSURE TRANSMITTER
INSTALLATION

NOTE: 1. PT-1 TO BE INSTALLED ON SPARE 2" NOZZLE ON C-901.

PT-1BTO BE INSTALLED ON SPARE 2" NOZZLE ON C-901B.

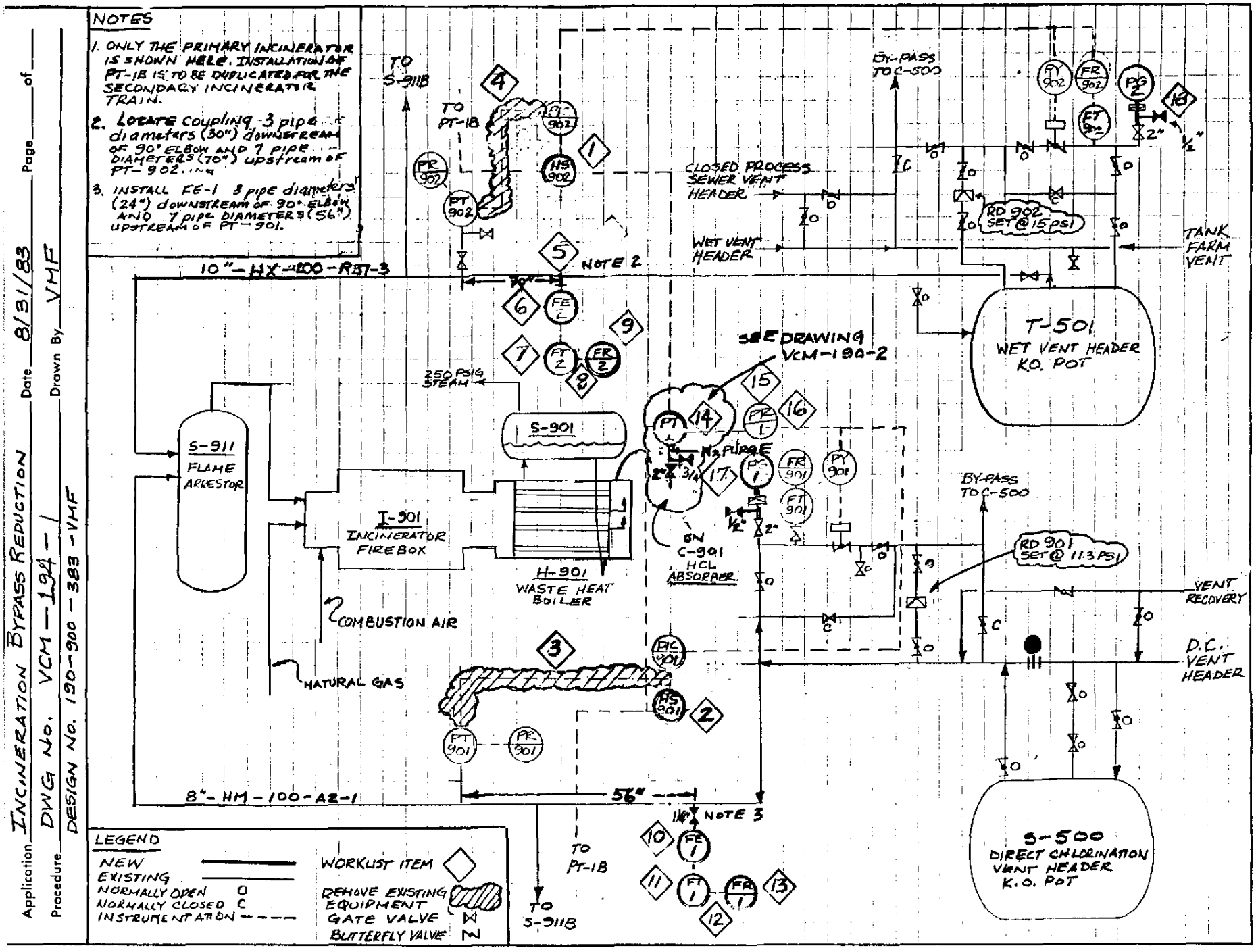
VMF

9/27/83

INCINERATOR BYPASS REDUCTION

190-900-383-VMF

CCR 000018501



Application INCINERATION BYPASS REDUCTION Date 8/31/83 Page ___ of ___

Procedure DWG No. VCM-194-1 Drawn By VMF

DESIGN No. 190-300-383-VMF

CCR 000018502

R. A. Conrad

conoco

To ~~[illegible]~~

Date 2/14/84

What's the schedule on 4 items marked in yellow?

Rac

[redacted]

CCR 000018503