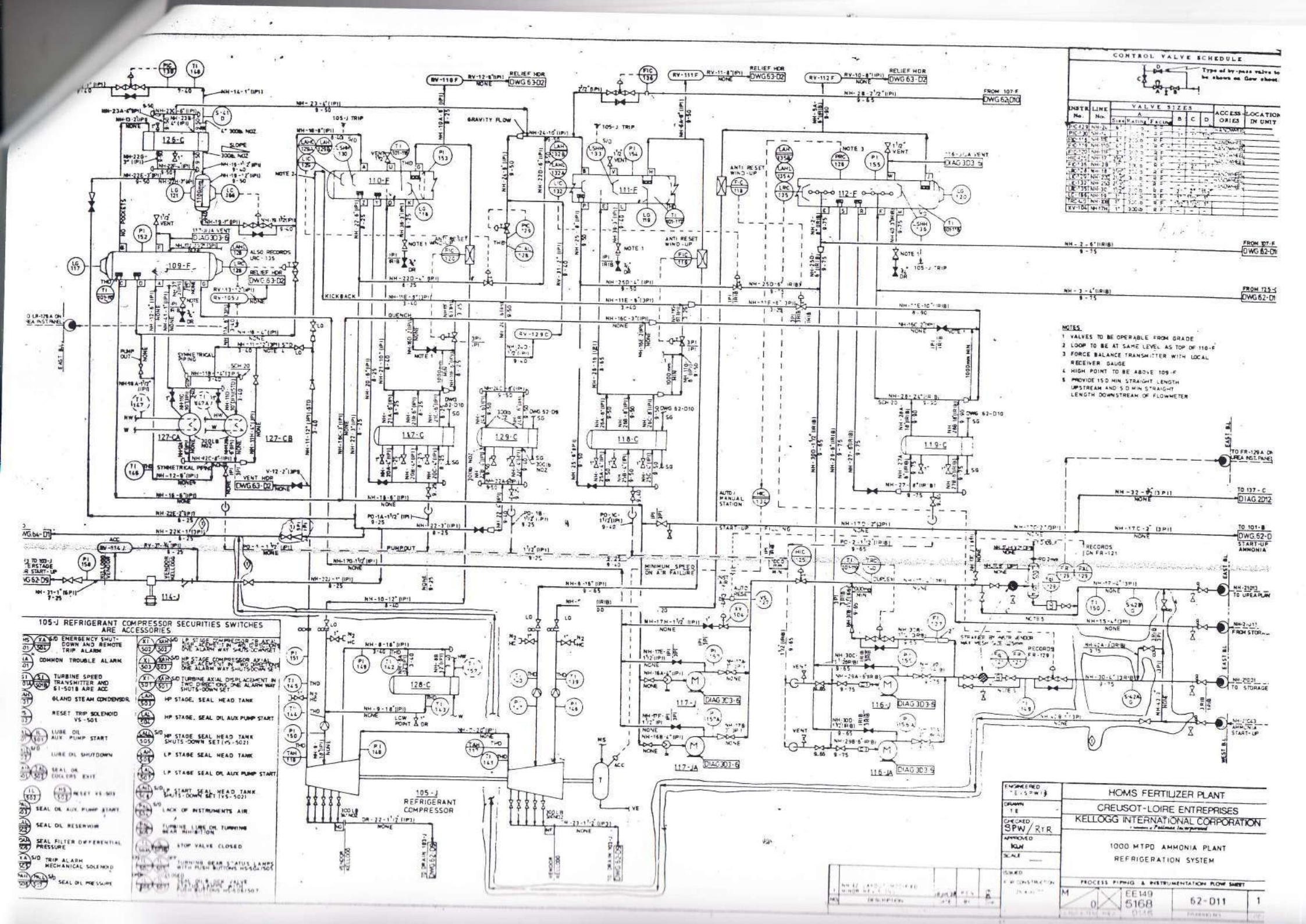
CONTROL VALVE SCHEDULE
NOTES
1 VALVES TO BE OPERABLE FROM GRADE
2 LOOP TO BE AT SAME LEVEL AS TOP OF 110-F
3 FORCE BALANCE TRANSMITTER WITH LOCAL RECEIVER GAUGE
4 HIGH POINT TO BE ABOVE 109-F
5 PROVIDE 15 D MIN STRAIGHT LENGTH UPSTREAM AND 5 D MIN STRAIGHT LENGTH DOWNSTREAM OF FLOWMETER
105-J REFRIGERANT COMPRESSOR SECURITIES SWITCHES ARE ACCESSORIES
105-J REFRIGERANT COMPRESSOR
HOMS FERTILIZER PLANT
CREUSOT-LOIRE ENTREPRISES
KELLOGG INTERNATIONAL CORPORATION
1000 MTPD AMMONIA PLANT
REFRIGERATION SYSTEM
PROCESS PIPING & INSTRUMENTATION FLOW SHEET
EE149
5168
62-D11

PROCESS DESCRIPTION

GENERAL

Converting the plant to use natural gas feed and fuel involves the provision of some new facilities, some modifications to existing facilities, the provision of new catalysts in the primary reformer and the desulphuriser and some changes to operating conditions in various parts of the process.

The design changes are based on the present production capacity of 1000 MTPD of ammonia using feed gas having the following composition and conditions:

Component	Mole %
CH_4	89-91
C_2H_6	4.5-5.0
C_3H_8	0.9-1.1
C_4H_{10}	0.1 maximum
N_2	2.5-4.5
CO_2	0.5 maximum
H_2S	15 ppm maximum normal
	50 ppm short term emergency
Pressure at battery limit	16 kg/cm^2g
Temperature at battery limit	5°C to 10°C
Lower heating value	8560-8790 $kcal/Nm^3$
Water Content	0.5 ppm maximum
Average density @ 0°C and 1 atm	0.770 to 0.793 kg/Nm^3

The process design of the natural gas compression facility is illustrated in drawing no. 12921. Changes in the desulphurisation area and new process conditions in the existing plant are shown in drawing no. 12922 which includes the connections with the new compression facility.

THE M. W. KELLOGG COMPANY

HOMS
NAT. GAS
CONVERSION

(8)

JOB NO 5376
MATERIAL BALANCE

DATE 8 NOV 1985

		35	36	
STREAM NO.		SYN LOOP PURGE & FLASH GAS	REFRIG. PURGE GAS	TOTAL PURGE TO FUEL
COMPOSITION MOLE % DRY				
1 N2		20.11	12.64	20.06
2 H2		60.45	24.19	60.16
3 NH3		2.54	27.94	2.73
4 CH4		12.74	31.91	12.89
5 A		4.16	3.32	4.16
6 HE				
7 H2S				
8 O2				
9 CO2				
10 CO				
DRY TOTAL		100.00	100.00	100.00
DRY GAS FLOW	NM3/H	8683	65	8748
H2O	NM3/H			
TOTAL FLOW	NM3/H	8683	65	8748
TOTAL FLOW	KG/H	4259	44	4303

جدول يبين تحاليل الغاز النظيف الصادر من معمل غاز الجبسة إلى معمل السماد خلال النصف الأول من شهر أيلول ٢٠١١:

(9)

Component	12/9/2011
Nitrogen (N2)	2.72%
Methane C1 (CH4)	89.41 %
Ethane C2 (C2H6)	4.85%
Propane C3 (C3H8)	2.01%
Isobutane IC4 (C4H10)	0.29%
N-Butane C4 (C4H10)	0.45%
Isopentane IC5 (C5H12)	0.17%
N-Pentane C5 (C5H12)	0.10%
Carbon Dioxide (CO2)	0.00%
TOTAL	100%
Hydrogen Sulphide (H2S)PPM	0P.P.M
Gross Heat value	40.127 MJ/SCM
Net Heat value	36.243MJ/SCM
Density	0.765 kG/SCM

PRIMARY OPERATING CONDITIONS

SG 25 (9RIB) LINE SIZE 4"

VAPOUR ☑

PURGE GAS

CAPACITY 10000 Nm³/h

RATE 7300 "

MIN.

NORM. 5,9

DESIGN 20,4

TEMPERATURE 1 - 34.3 °C

VISC. AT OPER. TEMP. 0.01 cP

MOL. WT. 11,07

AT OPER. CONDS.

AT STD. CONDS.

LIQUID / SP. GR.

ORIFICE PLATE	DATA SHEET 850
☑	A3-021B2

BORE 4.026 INCH

REBORE by VENDOR

FLANGE TAPS FLANGE ☑ PIPE ☐

RATING 150 # ANSI RF

ORIFICE ☐

FLANGE ☑

TUBE / INSERT ☐

☐

VARIABLE AREA METER ☐

MAKE TAYLOR

TYPE TD00 111

MANIFOLD VALVE POTS CS ☐ S.S. ☐

PRIMARY INSTRUMENT

TRANSMITTER ☑ OTHER ☐

FORCE BALANCE ☑ ☐

PNEUMATIC ☑ ELECTRONIC ☐

RANGE 0 - 2500 mm H₂O

OUTPUT 0.2 - 1.0 KG/cm²g

MOUNTING SURFACE ☐ YOKE ☑

FLANGE RATING 1500 # MATL. CS

MANIFOLD ☐ BLIND ☑

INSULATION HOUSING ☐

① Check to confirm that materials selected are suitable for the operating conditions.

Refer Spec. Addendum for control valve noise requirement.

Flow conditions are specified at 14.7 PSIA or and 1.03 Kg/cm 2

IND. R - RACK. L - LOCAL.

CONTROL VALVE

LINE NUMBER SG-25 (9RIB) LINE SIZE 2"

ACTUATOR - DIAPHRAGM 667-50 ☑

① PISTON ☐

ACCESSORIES - BONNET ~~RES~~ / EXT. ☑

LOCK-UP RELAY ☐

POSITIONER ☐

HANDWHEEL ☐

① 61-H BOOSTER RELAY ☑

ACTION ON AIR FAILURE OPEN ☐ HOLD ☐ CLOSE ☑

HOLD DRIFTS TO OPEN ☐ CLOSE ☐

ACT. ON FLOW RISE OPEN ☐ CLOSE ☐

① BODY

TYPE:- STRAIGHT THROUGH DBQ ☑

ANGLE ☐

BUTTERFLY ☐

SIZE	RATING	FACING
2"	900 #ANSI	RF

MATERIAL PER PURCH. SPEC. ☑

OTHERWISE ☐

① TRIM

TYPE M-FORM-SINGLE ST.

REDUCED PORT SIZE 1/2" CAGE

MATERIAL PER PURCH. SPEC. ☐

① OTHERWISE 440/440C ☑

OPERATING CONDITIONS

PROCESS FLUID PURGE GAS

FLOW AT STD. COND. Nm³/h	
MIN. NORM.	
MAX. NORM.	7300
DES. MAX.	9125

SIZING ΔP kg/cm²	
MIN. NORM.	
MAX. NORM.	131
DES. MAX.	131

INLET PRESSURE 137 kg/cm²g

TIGHT SHUT-OFF AGAINST I.P. DV

OPERATING TEMP. -23.3 °C

VISCOSITY AT OPER. TEMP. 0.017 cP

SP. GR. AT OPER. TEMP

~~SP. GR. AT STD. CONDS.~~ MOL WT 11.02

VAPOURISATION

UPSTREAM % VAPOUR BY WT.

VAPOUR PRESS. AT INLET TEMP.

DOWNSTREAM

LIQUID FLOW

LIQUID DENSITY

VAPOUR FLOW

VAPOUR DENSITY

OPERATING TEMP.

CALCULATED ~~CF~~ / C_g / ~~CS~~ 92

SELECTED ~~CF~~ / C_g / ~~CS~~ 190

P & I DIAG. No. 62-D10

PURCHASING SPECIFICATIONS

PRIMARY INSTRUMENT 042-L3E

CONTROL VALVE 040 - L1E

RECEIVER INSTRUMENT 040 - L2E

REQUISITION No's OP01-021-101
OP01-027-101
OP01-M77-204

RECEIVER ☑ DIRECT CONN. ☐

RECORDER ☐ CONTROLLER ☑ ①

☐ FBRA2-2ZK020 ☐

CASE: STD ☐ MIN. ☑ LARGE ☐

LOCAL ☐ BOARD MOUNTED ☑

AUTOMATIC / MANUAL SWITCH ☑

PNEUMATIC ☑ ELECTRONIC ☐

SET POINT LOCAL ☑ REMOTE ☐

CASCADE ☐

CONTROL ACTION - PROPORTIONAL ☑

INTEGRAL ☑

DERIVATIVE ☐

ON - OFF ☐

ANTI-RESET WIND UP ☐

RECORDER

INPUT SIGNAL 0.2 - 1.0 KG/cm²g

~~CHART~~ SCALE 0 - 10 SQRT

SCALE RANGE / FACTOR X 1000 Nm³/h

CHART DRIVE - SPRING ☐

PNEUMATIC ☐ ELECTRIC ☐

VOLTS HZ

TREND REC. ☐ DATA SHT. 850A7

ONE PEN ☐ TWO PEN ☐ THREE PEN ☐

ALSO RECORDS

RECORDS ON

ALARM

ANCILLARY EQUIPMENT

DESCRIPTION	QTY	B R L	DATA SHT 850 A
RECEIVER GAUGE	1	L	≥ 28
RECEIVER SWITCH			
SOLENOID VALVE	1	L	≥ 33
AIR SET	1	L	≥ 40
I/P CONVERTER			
P/I CONVERTER			
INST. POWER PACK			
BOOSTER RELAY			
ALARM UNIT			

INSTRUMENT WIRING OR PIPING

DWG. REF.	DETAIL
861A	F3-2

LABEL ENGRAVINGS

FIC-117

PURGE GAS FROM 108-F

(10)

HOMS FERTILIZER PLANT

CREUSOT-LOIRE ENTREPRISES

KELLOGG INTERNATIONAL CORPORATION

FLOW LOOP DATA SHEET

ISSUED:					
RITMEESTER	24 FEB 77	0	EE149 5168 9146	850A3-117	1
ENGINEERED	DATE	CLASS		DRAWING NO	REV.

PRIMARY OPERATING CONDITIONS

LINE/VESSEL No. 167 F — LINE SIZE

LINE SERVICE: GAS/VAPOUR [V] LIQUID [ ] STEAM [ ]

PRESSURE Kg/cm²	NORM	15.9
	DESIGN	19.5
DIFFERENTIAL PRESSURE	MIN	
	NORM	
	DESIGN	
LIQUID HEAD		
TEMPERATURE °C	NORM	-22
	DESIGN	-28

PRIMARY ELEMENT

SEALING LIQUID / SG

PULSATION DAMPENER [ ]

I.O./SEAL POTS CS [ ] SS [ ]

DIAPHRAGM SEAL CS [ ] SS [ ]

SYPHON CS [ ] SS [ ]

PRIMARY INSTRUMENT

TRANSMITTER [V] OTHER [ ]

PNEUMATIC [ ] ELECTRONIC [ ]

RANGE 0 - 25 Kg/cm²g

OUTPUT 0.2 - 1.0 Kg/cm²g

MOUNTING YOKE [V]

TAYLOR 210TF 138

BODY RATING RATL. 55

INDICATOR [V] BLIND [ ]

TYPE - GAUGE PRESS. [V]
DIFF. PRESS. [ ]
ABS. PRESS. [ ]

ELEMENT [illegible]

VIBRATION HOUSING [ ]

NOTES:-

1. Vendors to confirm that material selected are suitable for the operating conditions.
2. See Purch Spec. Addendum for control valve noise requirement.

B - BOARD, R - RACK, L - LOCAL.

CONTROL VALVE

LINE NUMBER SG 26 (1 PI) — LINE SIZE 1"

ACTUATOR - DIAPHRAGM 667-30 [V]
PISTON [ ]

ACCESSORIES - BONNET EXT. [V]
LOCK-UP RELAY [ ]
POSITIONER [ ]
HANDWHEEL [ ]
(1) 61-11 BOOSTER RELAY [V]

ACTION ON AIR FAILURE
OPEN [ ] HOLD [ ] CLOSE [V]

HOLD DRIFTS TO OPEN [ ] CLOSE [ ]
ACT. ON PRESS. RISE OPEN [ ] CLOSE [ ]

BODY

TYPE - STRAIGHT THROUGH ES [V]
ANGLE [ ]
BUTTERFLY [ ]

SIZE	RATING	FACING
1"	300# RTJ	RF

MATERIAL PER PURCH. SPEC [V]
OTHERWISE [ ]

TRIM

TYPE M-FORM/SINGLE ST.
REDUCED PORT SIDE ½" CAGE
MATERIAL PER PURCH. SPEC. [ ]
OTHERWISE AISI 416 [V]

OPERATING CONDITIONS

PROCESS FLUID PURGE GAS

FLOW AT STD. CONDS Nm³/h	MIN. NORM	
	MAX. NORM	357
	DES. MAX.	446
SIZING ΔP Kg/cm²	MIN. NORM	
	MAX. NORM	
	DES. MAX.	>50%

INLET PRESSURE 15.92 Kg/cm²g
TIGHT SHUT-OFF AGAINST ½" [V]
OPERATING TEMP -22.6 °C
VISCOSITY AT OPER. TEMP. 0.017 cP
SP.GR AT OPER. TEMP
SP.GR AT STD.CONDS 1/M = 12.93

VAPOURISATION

UPSTREAM % VAPOUR BY WT.
VAPOUR PRESS. AT INLET TEMP.

DOWNSTREAM:
LIQUID FLOW
LIQUID DENSITY
VAPOUR FLOW
VAPOUR DENSITY
OPERATING TEMP

CALCULATED Cv / Cg / Cf 41
SELECTED Cv / Cg / Cf 47
P & I DIAG No. 850-A10

PURCHASING SPECIFICATIONS
PRIMARY INSTRUMENT 042 - L2E
CONTROL VALVE 040 - L1E
RECEIVER INSTRUMENT 040 - L2E

REQUISITION No.: OP01-021-101
OP01-022-101
OP01-1175-204

RECEIVER / RECORDER

RECEIVER [V] DIRECT CONTROL
RECORDER [ ] CONTROLLER [V] FBBA2-22K010

CASE: STD. [ ] MIN [V] LARGE [ ]
LOCAL [ ] BOARD MOUNTED [V]
AUTOMATIC / MANUAL SWITCH [V]
PNEUMATIC [V] ELECTRONIC [ ]
SET POINT LOCAL [V] REMOTE [ ]
CASCADE [ ]
CONTROL ACTION - PROPORTIONAL [V]
INTEGRAL [V]
DERIVATIVE [ ]
ON - OFF [ ]
ANTI-RESET WIND UP [ ]

RECORDER

INPUT SIGNAL 0.2 - 1.0 Kg/cm²g
~~CHART~~ SCALE C - 25
SCALE RANGE/FACTOR K-1-m²
CHART DRIVE - SPRING [ ]
PNEUMATIC [ ] ELECTRIC [ ]
VOLTS HZ
TREND REC [ ] DATA SHEET 850 A7
ONE PEN [ ] TWO PEN [ ] THREE PEN [ ]
ALSO RECORDS
RECORDS ON
ALARM

ANCILLARY EQUIPMENT

DESCRIPTION	QTY	B R L	DATA SHT 850 A
RECEIVER GAUGE			
RECEIVER SWITCH			
SOLENOID VALVE			
AIR SET	1	L	[illegible]
I/P CONVERTER			
P/I CONVERTER			
INST. POWER PACK			
BOOSTER RELAY			
ALARM UNIT			

INSTRUMENT WIRING OR PIPING

DWG. REF.	DETAIL
861A	PG-3

LABEL ENGRAVINGS

PIC - 126
10% - F PRESSURE
(11)

HOMS FERTILIZER PLANT
CREUSOT-LOIRE ENTREPRISES
KELLOGG INTERNATIONAL CORPORATION

KELLOGG

PRESSURE LOOP DATA SHEET

ISSUED:					
RITTMEISTER	24 FEB 77	0	EE149 5168 9146	850A2-126	2
ENGINEERED	DATE	CLIENT		DRAWING NO.	REV.

PRIMARY OPERATING CONDITIONS

LINE/VESSEL No. NH 14 (1P1) LINE SIZE

LINE SERVICE
- GAS/VAPOUR [V]
- LIQUID [ ]
- STEAM [ ]

PRESSURE Kg/cm²g	NORM	15.6
	DESIGN	20.4
DIFFERENTIAL PRESSURE	MIN	
	NORM	
	DESIGN	
LIQUIDHEAD		
TEMPERATURE °C	NORM	1
	DESIGN	50/0

PRIMARY ELEMENT

- BOILING LIQUID / SG
- PULSATION DAMPENER [ ]
- SEAL/SEAL POTS CS [ ] SS [ ]
- DIAPHRAGM SEAL CS [ ] SS [ ]
- ORIFICE CS [ ] SS [ ]

PRIMARY INSTRUMENT

- TRANSMITTER [V] OTHER [ ]
- PNEUMATIC [V] ELECTRONIC [ ]
- RANGE 0-25 KG/cm²g
- OUTPUT 0.2 - 1.0 "
- MOUNTING: YOKE [V] [ ]
- TAYLOR 210 TF 138
- BODY RATING MATL. SS
- INDICATOR [V] BLIND [ ]
- TYPE - GAUGE PRESS. [V]
  - DIFF. PRESS. [ ]
  - ABS. PRESS. [ ]
- ELEMENT BOURDON TUBE
- INTERSATION HOUSING [L]

NOTES:
1. Vendor to confirm that materials of wetted are suitable for the operating conditions.
2. See Purch Spec. Addendum for control valve noise requirement.

B - BOARD, R - RACK, L - LOCAL.

CONTROL VALVE

LINE NUMBER NH 14 (1P1) LINE SIZE 1"

- ACTUATOR - DIAPHRAGM 667-30 [V]
  - PISTON [ ]
- ACCESSORIES - BONNET FINS/EXT. [ ]
  - LOCK-UP RELAY [ ]
  - POSITIONER [ ]
  - HANDWHEEL [ ]
  - 61-H BOOSTER RELAY [V]
- ACTION ON AIR FAILURE
  - OPEN [ ] HOLD [ ] CLOSE [V]
- HOLD DRIFTS TO OPEN [ ] CLOSE [ ]
- ACT. ON PRESS. RISE OPEN [ ] CLOSE [ ]

BODY

- TYPE - STRAIGHT THROUGH EC [V]
  - ANGLE [ ]
  - BUTTERFLY [ ]

SIZE	RATING	FACING
1"	300# ANSI	RF

- MATERIAL PER PURCH. SPEC [V]
- OTHERWISE [ ]

TRIM

- TYPE M-FLUTE / SINGLE ST.
- REDUCED PORT SIDE ¼" CAGE
- MATERIAL PER PURCH. SPEC. [V]
- OTHERWISE TFE SEAT [V]

OPERATING CONDITIONS

- PROCESS FLUID PURGE GAS
- FLOW AT STD. CONDS NH₃/h — MIN. NORM; MAX. NORM 64; DES. MAX. 80
- SIZING ΔP kg/cm² — MIN. NORM; MAX. NORM; DES. MAX. 750% IP
- INLET PRESSURE 15.50 KG/cm²g
- TIGHT SHUT-OFF AGAINST 15 " [V]
- OPERATING TEMP °C
- VISCOSITY AT OPER. TEMP. 0.01 CP
- SP.GR AT OPER. TEMP
- SP. GR AT STD. CONDS - MW = 15.05

VAPOURISATION

- UPSTREAM % VAPOUR BY WT.
- VAPOUR PRESS. AT INLET TEMP.

DOWNSTREAM:
- LIQUID FLOW
- LIQUID DENSITY
- VAPOUR FLOW
- VAPOUR DENSITY
- OPERATING TEMP

- CALCULATED Cv / Cg / Cs 9.6
- SELECTED Cv / Cg / Cs 18.5
- P & I DIAG No. 62-D 11

PURCHASING SPECIFICATIONS
- PRIMARY INSTRUMENT 042 - L2E
- CONTROL VALVE 040 - L1E
- RECEIVER INSTRUMENT 040 - L2E
- REQUISITION No.s OP01-021-101, OP01-027-101, OP01-117-204

RECEIVER

- RECEIVER [V] DIRECT CONN.
- RECORDER [ ] CONTROLLER [V] FBBA2-2ZK010

- CASE: STD. [ ] MIN [V] LARGE [ ]
- LOCAL [ ] BOARD MOUNTED [V]
- AUTOMATIC / MANUAL SWITCH [V]
- PNEUMATIC [V] ELECTRONIC [ ]
- SET POINT LOCAL [V] REMOTE [ ]
- CASCADE [ ]
- CONTROL ACTION - PROPORTIONAL [V]
  - INTEGRAL [V]
  - DERIVATIVE [ ]
  - ON - OFF [ ]
- ANTI-RESET WIND UP [ ]

RECORDER

- INPUT SIGNAL 0.2 - 1.0 KG/cm²g
- CHART SCALE 0 - 25
- SCALE RANGE/FACTOR KG/cm²g
- CHART DRIVE - SPRING [V]
  - PNEUMATIC [ ] ELECTRIC [ ] VOLTS HZ
- TREND REC [ ] DATA SHEET 850A7
- ONE PEN [ ] TWO PEN [ ] THREE PEN [ ]
- ALSO RECORDS
- RECORDS ON
- ALARM

ANCILLARY EQUIPMENT

DESCRIPTION	QTY	B R L	DATA SHT 850 A
RECEIVER GAUGE			
RECEIVER SWITCH			
SOLENOID VALVE			
AIR SET	1	L	
I/P CONVERTER			
P/I CONVERTER			
INST. POWER PACK			
BOOSTER RELAY			
ALARM UNIT			

INSTRUMENT WIRING OR PIPING

DWG. REF.	DETAIL
861A	P6-6

LABEL ENGRAVINGS

PIC - 130

PURGE GAS TO FUEL SYSTEM

(12)

HOMS FERTILIZER PLANT

CREUSOT-LOIRE ENTREPRISES

KELLOGG INTERNATIONAL CORPORATION

PRESSURE LOOP DATA SHEET

ISSUED:					
PITTMESTER	24 FEB 77	0	EE149 5168 9146	850A2-130	1
ENGINEERED	DATE	CLASS		DRAWING NO.	REV.