VCM GAS MONITORING SYSTEM

VCM TANK FARM AREA

ABERDEEN CHEMICAL PLANT

MARCH 8, 1985

Work By: Frank G. Jeanson
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Senior Process Engineer

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R. A. Frohreich
Chief Process Engineer

VCM GAS MONITORING SYSTEM

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VCM GAS MONITORING SYSTEM

RAILCAR UNLOADING AREA

ABERDEEN CHEMICAL PLANT

I. Purpose of Design

The purpose of this design is to provide the VCM railcar unloading area with an additional gas monitoring system to detect serious VCM releases. Presently, there are six fixed point monitor locations that are tied into one of the plant's Honeywell GC's. These monitor locations are listed below:

1. Sphere (grade level).
2. Compressor shed (grade level).
3. Between railcar unloading stations number 1 and 6 (Top of railcar level).
4. Between railcar unloading stations number 2 and 7 (Top of railcar level).
5. Between railcar unloading stations number 3 and 8 (Top of railcar level).
6. Between railcar unloading stations number 4 and 9 (Top of railcar level).

These existing monitors do not provide immediate response and are not distributed throughout the entire VCM tank farm area. Also, since this area is not monitored by plant personnel the majority of the time and since it has the potential for a serious release, additional protection is needed.

In addition to the gas monitoring system, this design will provide a pressurization blower for the fire pump houses near the VCM tank farm. The purpose of this blower is to prevent VCM from entering the buildings in the event of a serious VCM leak.

This design will also provide for Item 84-6 of the Underwriter's Insurance Company recommendations. This item recommended installing vapor detectors for the sphere's VCM transfer pumps to the old and new module.

VCM GAS MONITORING SYSTEM

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II. Process Description

This design will provide for the installation of ten VCM gas sensors, AT-101 through AT-110, in the VCM tank farm area (see P&I diagram for locations). These sensors will be tied into dual channel combustible gas monitors, AI-121 through 125. Each monitor will accept signals from two sensors and display the higher of the two readings. The monitors will indicate the percent of the lower explosive limit (LEL) of VCM gas in the air. The monitors will be tied into alarms in the vinyl control room. The first alarm will be set at 25% LEL and the second alarm will be set at 45% LEL.

Should any of the monitors indicate a low level (25% LEL) of VCM gas in the air, the panel operator will notify the yard operator of the situation. If the monitors indicate a high level (45% LEL) of VCM gas in the air, the panel operator will then notify the yard operator to shut down any transfer or unloading equipment that is being used. When this equipment is off, the panel operator will isolate the sphere by pushing the sphere control valve override switch. This switch will close the following valves:

(1) The valve on the vapor line to/from the compressors.

(2) The valve on the liquid line from the compressors.

(3) The valve on the liquid line to the VCM transfer pumps.

(4) The valve on the liquid recirculation line from the VCM transfer pumps.

The monitors will be equipped with relay connections to tie into the existing sphere isolation control valve override switch. However, the relay connection will not be tied into this switch until the REMOTE OPERATING VALVES project is installed. When this project is installed, additional equipment and valves will be shut off by the sphere isolation control valve override switch. This includes:

(1) The valve on the liquid return line from the VCM vapor line knockout pot.

(2) The five VCM compressors in the VCM tank farm.

(3) The two VCM transfer pumps.

After installation of this project, the relay connections from the gas monitors will be tred into the sphere control valve override switch. Should the monitors indicate a high level (45% LEL) of VCM gas in the air, the sphere control valve override switch will automatically shut off all the valves ahd equipment mentioned above. When the isolation switch is used, it will override the motor controls and shut down the units should they be in service.

VAB.0001106274

VCM GAS MONITORING SYSTEM

VCM TANK FARM AREA

ABERDEEN CHEMICAL PLANT

II. Process Description - Continued

In addition to the vapor monitors, a pressurization blower, F-150, will be installed for the fire pump houses. This blower will provide air to pressurize fire pump houses #1, #2, #3, and #4. Pressurizing the fire pump houses will prevent any VCM from entering the buildings in the event of a serious VCM leak.

The blower's controls will be tied into the 25% LEL alarm in the control room so that when this alarm goes off, the blower starts. The blower was sized to maintain a 0.25 inch of water pressure in the buildings while providing enough air to the diesel engines for combustion. This blower will be equipped with an extended inlet stack to provide VCM free air in the event of a serious release.

VCM GAS MONITORING SYSTEM

VCM TANK FARM AREA

ABERDEEN CHEMICAL PLANT

III. Equipment and Instrument Specifications

Item No.	Description
AI-121	VCM transfer pumps gas monitor
AI-122	South unloading stations gas mointor
AI-123	Middle unloading stations gas monitor
AI-124	North unloading stations gas monitor
AI-125	Compressor shed gas monitor
AT-101	Gas sensor north of VCM transfer pumps
AT-102	Gas sensor east of actuated valves
AT-103	Gas sensor south of unloading stations
AT-104	Gas sensor between #1 and #6 unloading stations
AT-105	Gas sensor between #2 and #7 unloading stations
AT-106	Gas sensor between #3 and #8 unloading stations
AT-107	Gas sensor between #4 and #9 unloading stations
AT-108	Gas sensor north of unloading stations
AT-109	Gas sensor north of compressor shed
AT-110	Gas sensor north of VCM sphere
F-150	Fire pump house pressurization blower
HS-130	Handswitch for F-150

A

Conoco Inc
Engineering Center
Ponca City, Oklahoma
SPECIFICATION SHEET

SPECIFICATION SHEET
PROJECT NO. _____
A.F.E. NO. _____
DATE 12-21-84 PAGE NO. _____
PREPARED BY EGJ REV. NO. _____
CHECKED BY VLT REV. DATE _____

PLANT Aberdeen Chemical PROJECT VCM Gas Monitoring

ITEM NO / SERVICE AI-121 through AI-125, Gas Monitors (2)

Quantity: 5

Manufacturer: General Monitors (1)

Model No.: 580

Service: To indicate VCM gas concentrations in the VCM tankfarm and railcar unloading area. Each unit will receive signals from two sensors and display the higher of the two readings.

Temperature Range: 0°F to 150°F

Power Requirements: 105-130 VAC, 50-60 Hz; or 12-15 VDC, 12 watts.

Meter Span: 0-100% Lower Explosive Limit (LEL)

Three Alarm Circuits: High, Low, Malfunction.

Battery Backup: Circuit for battery backup to be included.

Location: Indicators to be located west of the vinyl control room in the emergency power generator building.

Notes:

(1) Or company Approved Equal

(2) All five monitors to be tied into existing alarms located on the incinerator alarm annunciator panel. These alarms will be used to indicate 25% LEL and 45% LEL readings from the gas monitors.

VAB.0001106277

SHEET ____ OF ____ REV ____

GENERAL MONITORS, INC.

3037 ENTERPRISE STREET
COSTA MESA, CALIFORNIA 92626
PHONE: (714) 540-4895 TWX 678-372

A

TO: Mr. Frank Jenson
Vista Polymers
Box 91
Aberdeen, MS

Date: 30 January 1985

GMI QUOTATION NO: 6150

Please Reference GMI Quote No. On All Correspondence.

Your Reference: Verbal request of 30 January 1985.

ITEM	DESCRIPTION	QUANTITY	UNIT PRICE	EXT. PRICE
1.	Model 580 System to include one Dual Channel Monitor, 2 ea Sensor P/N 10001-1, 2 ea Sensor Housing P/N 10007 and 1 ea Instruction Manual. Standard Relay Configuration. *Common Alarm Relays	6 ea	$1,764.00	$10,584.00
1a.	Alternate System Model 610 System to include one Four Channel Monitor, 4 ea Sensor P/N 10001-1, 4 ea Sensor Housing P/N 10007 and 1 ea Instruction Manual. Standard Relay Configuration. *Common alarm relays for all Four Channels. Common alarm set point adjustment.	3 ea	$2,973.00	$ 8,919.00
	Note: For a discrete set of alarm relays (Malfunction Low and High) for each channel plus discrete alarm set point adjustment add $470.00 to unit price of item #1A.			
1b.	Alternate System Model 4800 system to include one 16 Channel Monitor, 1 ea Extender Card for Channel Card and one for relay card and one Instruction Manual. Blank Panels included at N/C for inactive channels. Each active channel to include one each channel control card, Relay			

Quotation Firm For:

F.O.B.

Terms: Net 30 Days

Delivery: ARO | Warranty:

Enclosures:

Signature: _____ Sheet No. 1 Of 2 Sheets

Name/Title _____

Local Representative _____ Phone _____

Address _____

VAB 0001106278

GENERAL MONITORS, INC.
3037 ENTERPRISE STREET
COSTA MESA, CALIFORNIA 92626
PHONE: (714) 540-4895 TWX 678-372

TO: Mr. Frank Jenson
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Box 91
Aberdeen, MS

Date: 30 January 1985

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ITEM	DESCRIPTION	QUANTITY	UNIT PRICE	EXT. PRICE
	Card, Sensor P/N 10001-1 and Sensor Housing P/N 10007.			
	11 active channels	1 ea	$11,784.00	$11,784.00
	12 " "	1 ea	$12,597.00	$12,597.00
	13 " "	1 ea	$13,410.00	$13.410.00
	14 " "	1 ea	$14,223.00	$14,223.00
	15 " "	1 ea	$15,036.00	$15.036.00
	16 " "	1 ea	$15,849.00	$15,849.00
	Standard Relay Configuration*			
	Note: The Standard Relay Configuration is			
	Malfunction. SPDT, non-latching, energized			
	** Low Alarm . DPDT, non-latching, de-energized.			
	** High Alarm. DPDT, latching, de-energized.			
	other relay options (Latching and energized) are available.			
	**Model 4800 Low & High alarm Relays are SPDT. For DPDT add $22.00 for each active channel in Item #1b.			

Quotation Firm For: 60 Days
F.O.B. Costa Mesa, CA 92626
Terms: Net 30 Days
Delivery: 4 to 6 weeks ARO | Warranty: 2 years
Enclosures: Product Catalog

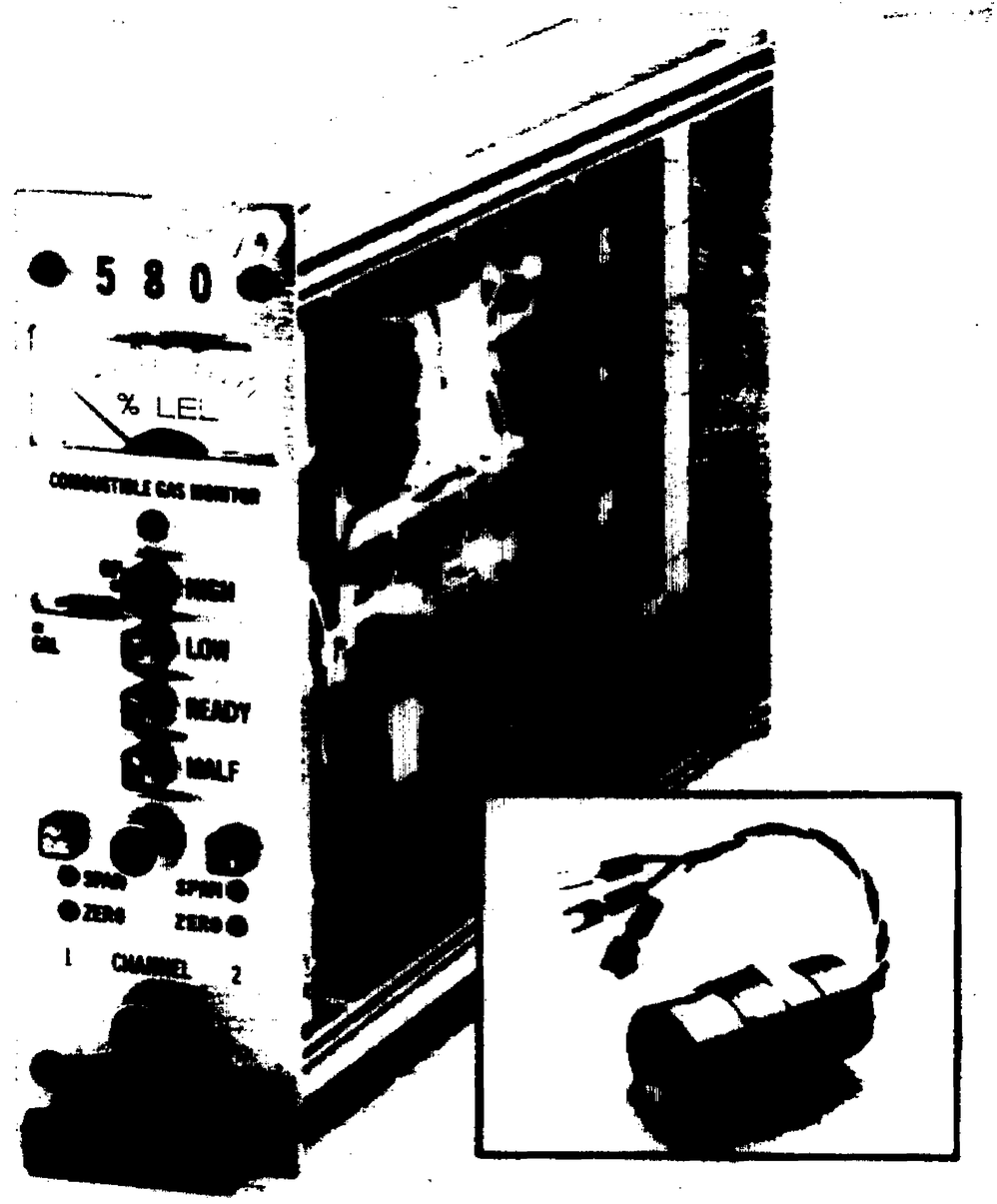
Signature: Ken Kaub Tech. Rep. Sheet No. 2 Of 2 Sheets
Name/Title Ken Kaub

VAB.0001106279

Local Representative _____ Phone _____
Address _____

GENERAL MONITORS

Combustible Gas Monitor



Description

General Monitors' Model 580 is a compact, highly-versatile system for continuously monitoring combustible gas concentrations in two locations. The system consists of two remote sensing assemblies and a solid-state controller.

For safety, reliability, and ease of calibration, sensor outputs are not summed. Each channel is completely independent and has its own constant current sensor drive circuit. Sensors are available to meet various service requirements for most gases.

The Model 580 independently monitors two locations. The controller automatically displays the higher reading channel on an analog meter, scaled from 0-100% LEL (Lower Explosive Limit). Manual override switching permits readout of the low channel at any time. Low and high alarm set-points are common to both channels. Calibration of each channel is done independently, and an alarm override switch disables the alarms during the calibration mode. A 45 second time delay also disables the alarms on start-up.

Customers may select from a wide variety of relay options, such as normally energized or de-energized high and low alarms, and latching or non-latching high and low alarms. The malfunction relay circuitry is normally energized and monitors both channels.

Features

- ☐ "Peak Picking" Circuitry
  - Automatically displays highest reading channel
- ☐ Compact Packaging
  - Dimensions: 2"W x 7"H x 11.5"D (51 mm W x 178 mm H x 292 mm D)
- ☐ Low Power Consumption
- ☐ Analog Meter Standard
- ☐ Independent 3 AMP/117 VAC DPDT High and Low Alarm Relays
  - 3 AMP/117 VAC SPDT Malfunction Alarm Relay
- ☐ Variety of Relay Options
  - Normally energized or de-energized high and low alarm
  - Latching or non-latching high and low alarm
  - Remote Reset
- ☐ Superior Reliability
  - Two week factory burn-in of system
  - Single P.C. board
  - Solid-state circuitry
  - Proven catalytic sensor
  - Malfunction alarm circuitry
  - Positive contact field terminals
  - Time delay
  - Constant current supply to sensor
- ☐ Safe, Easy Calibration
  - Fully accessible calibration adjustments
  - Alarm relays automatically disabled while in calibration mode
- ☐ Low Cable Costs
  - 40 ohm loop resistance, e.g. 3000 ft. (910 meters) one way of #18 AWG cable
    7600 ft. (2320 meters) one way of #14 AWG cable
- ☐ User Protection
  - Two year warranty
  - CSA approved

Applications — Protection from hazardous combustible gases in:

- ☐ Fuel Loading Facilities
- ☐ Compressor Stations
- ☐ LNG Processing and Storage
- ☐ Oil Well Logging
- ☐ Sewage Plants
- ☐ Gas Turbine Enclosures
- ☐ Drilling and Production Platforms
- ☐ Solvent Vapors

Sensor Elements

General Monitors' sensors are designed for reliable performance and long life. Each sensor must undergo extensive burn-in and rigid quality control procedures before shipment.

The sensors consist of two catalytic bead elements in a balanced Wheatstone bridge circuit (See Principle of Operation). These low temperature catalytic bead sensing elements require minimal sensor excitation current, greatly increasing sensor life.

Principle of Operation

A catalytically treated ceramic active bead and a passivated ceramic reference bead form two legs of a Wheatstone bridge circuit. Combustible gases diffuse through a flame arrestor and oxidize on the catalytically treated active bead, causing an increase in its temperature and electrical resistance. This results in an unbalancing of the Wheatstone bridge circuit. The reference bead, inert to combustible gases, compensates for ambient temperature, humidity and pressure changes. The difference in resistance of the active and reference beads is converted into a sensor signal which is amplified in the controller, sent to the indicator and alarm circuits, and displayed on an analog meter. The meter is scaled in percent of the Lower Explosive Limit (% LEL). In the Model 580 the two sensor inputs are continuously compared, the higher signal being displayed on the meter.

Two adjustable electronic alarm circuits may be field-set for any alarm level up to 100% LEL. The low alarm signal indicates potentially hazardous gas accumulations at low concentrations, allowing time for corrective action. The high alarm signal indicates immediate danger. A flashing malfunction LED will indicate low input power, sensor removal or damage, "CAL" mode, severed cable or current failure. Two LED channel indicators are provided to indicate the higher channel.

A variety of alarm relay options provides contacts for high, low and malfunction alarms to be wired to auxiliary lamps, horns, fans or shut-down equipment.

VAB.0001106280

Independent Channel Calibration

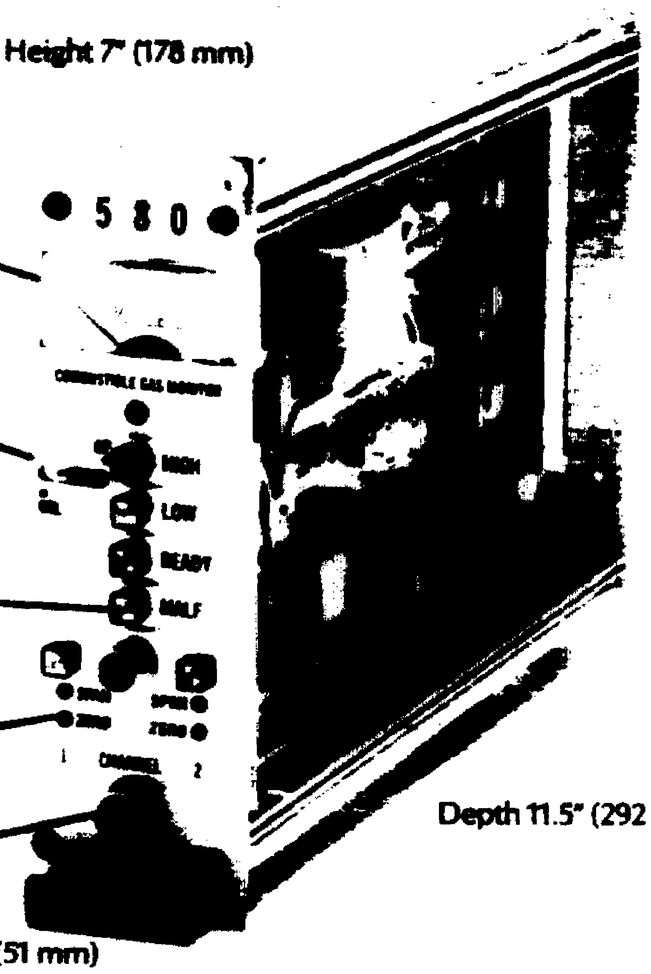
% LEL Meter
Analog output meter with linear scale calibrated in the percent of Lower Explosive Limit (% LEL).

Recessed Toggle Switch
Used for normal operation or calibration. When in the "CAL" mode high and low alarms are disabled.

Status Indicators
HIGH alarm — flashing red LED
LOW alarm — flashing amber LED
READY (power on) — steady green LED
MALF (malfunction) — flashing amber LED
*High channel indicators — green LED's
Channel select switch — black button

Calibration Potentiometers
HIGH and LOW alarms — set point adjustments located on circuit board.
SPAN and ZERO adjustments for each channel accessible through front panel.

Reset Button
Used for manual reset of latching high and low alarm circuits.



Height 7" (178 mm)

Depth 11.5" (292 mm)

Width 2" (51 mm)

Calibration

By placing the recessed toggle switch on the front panel to the calibration mode, the high and low alarm relays are held in standby condition and the "MALF" LED flashes. Zero and span pots are accessible from the front panel. Calibration is accomplished by adjusting the meter to zero and exposing one of the two sensors to a known concentration calibration gas and adjusting the meter with the span pot to indicate the concentration. The alarm adjustments are located on the side of the controller to prevent tampering.

Relay Options

The versatility of the Model 580 is enhanced by the availability of different relay operating modes for specific user requirements. These relay options include normally energized or de-energized high and low alarms, latching or non-latching high and low alarms and sealed relays.

CSA performance certified to C22.2 No. 152-1976

Controller Specifications

Mounting Options:
Rack, panel and wall

Dimensions:
2"W x 7"H x 11.5"D
(51 mm W x 178 mm H x 292 mm D)

Weight:
4 lbs. (1.80 kg)

Temperature Range:
0°F to 150°F (−18°C to +66°C)

Power:
117 VAC ±15% (220 VAC ±15% optional), 50-60 Hz, 22-30 VDC, 8 watts nominal

Meter Range:
0-100% Lower Explosive Limit (% LEL)

Repeatability:
±2% full scale

Linearity:
±5% full scale

Alarm Circuits:
High, low and malfunction:
Standard high and low DPDT 3 AMP/117 VAC resistive, malfunction SPDT 3 AMP/117 VAC resistive, high and low normally de-energized, malfunction normally energized.

LED Status Indicators:
Flashing red for high alarm, flashing amber for low alarm, green for ready (power on), flashing amber for malfunction, flashing amber for calibration mode, steady green for each channel indicator.

Electrical Classification:
General purpose for mounting in non-hazardous area

Warranty:
Two years

Sensor Specifications

Type:
Continuous diffusion, low temperature catalytic bead. Standard Industrial Hydrocarbon Sensor, High Temperature Standard Industrial Hydrocarbon Sensor.

Temperature Range:
−65°F to +200°F (−55°C to +93°C); High Temperature Sensor to 400°F (200°C)

Response Time:
Typically 6-second time constant when exposed to 50% LEL of methane gas

Zero Drift:
Less than 5% per year

Life:
3 to 4 years, normal service

Electrical Classification:
NEC and CSA, Class I, Division 1, Group B, C and D: VDE 0171 (Ex) sd 3n G5

Warranty:
Two years

Cable Length:
Maximum 3 wire cable length allowable between controller and sensor assembly with one way resistance of 20 ohms (total 40 ohms loop)

AWG	FEET	METERS
20	1900	580
18	3000	910
16	4800	1460
14	7600	2320

Represented by:

GENERAL MONITORS, INC.
3037 Enterprise Street • Costa Mesa, CA 92626
Tel. (714) 540-4895 • Telex 678-372 • FAX (714) 557-2516

VAB.0001106281

A

Conoco Inc
Engineering Center
Ponca City, Oklahoma
SPECIFICATION SHEET

SPECIFICATION SHEET
PROJECT NO.
A.F.E. NO.
DATE 12-20-84 REQ. NO.
PREPARED BY FGJ REQ. NO.
APPROVED BY VLT REQ. NO.

PLANT Aberdeen Chemical PROJECT VCM Gas Monitoring

ITEM NO
SERVICE AT-101 through AT-110, Gas Sensors

Quantity: 10

Type: Diffusion, low temperature catalytic bead

Manufacturer: General Monitors (1)

Model No: 10001-1

Service: To sense VCM concentrations in the VCM tankfarm and railcar unloading area. These sensors will send a signal to respective General Monitors indicating units. Refer to P&I or process description for Tie-in details.

Location: Sensors to be located between 2 and 3 feet above ground level at each of the designated locations on the P&I diagram

Notes:

(1) Or company approved equal

VAB.0001106282

SHEET

Conoco Inc
Engineering Center
Ponca City, Oklahoma
SPECIFICATION SHEET

SPECIFICATION SHEET
PROJECT NO. _____
A.F.E. NO. _____
DATE 1-25-85 REQ. NO. _____
PREPARED BY ECT REQ. NO. _____
APPROVED BY YLT REQ. NO. _____

PLANT Aberdeen Chemical PROJECT VCM Gas Monitoring

ITEM NO / SERVICE F-150 Blower (see note 2)

Service: Fire Pump House pressurization

Location: Fire Pump House Area (Fire pump houses #1, #2, #3, #4) grade level.

Material: Air

Density: .076 lb/ft^3

Rate: 3500 SCFM @ 0.50" H_2O

Minimum Pressure Required in Buildings: .15" H_2O

Temp.: 10°F min.
100°F max.

Mat'l of Const.: C.S.

Manufacturer: The New York Blower Co. (1)

Model No.: 155 KB-1

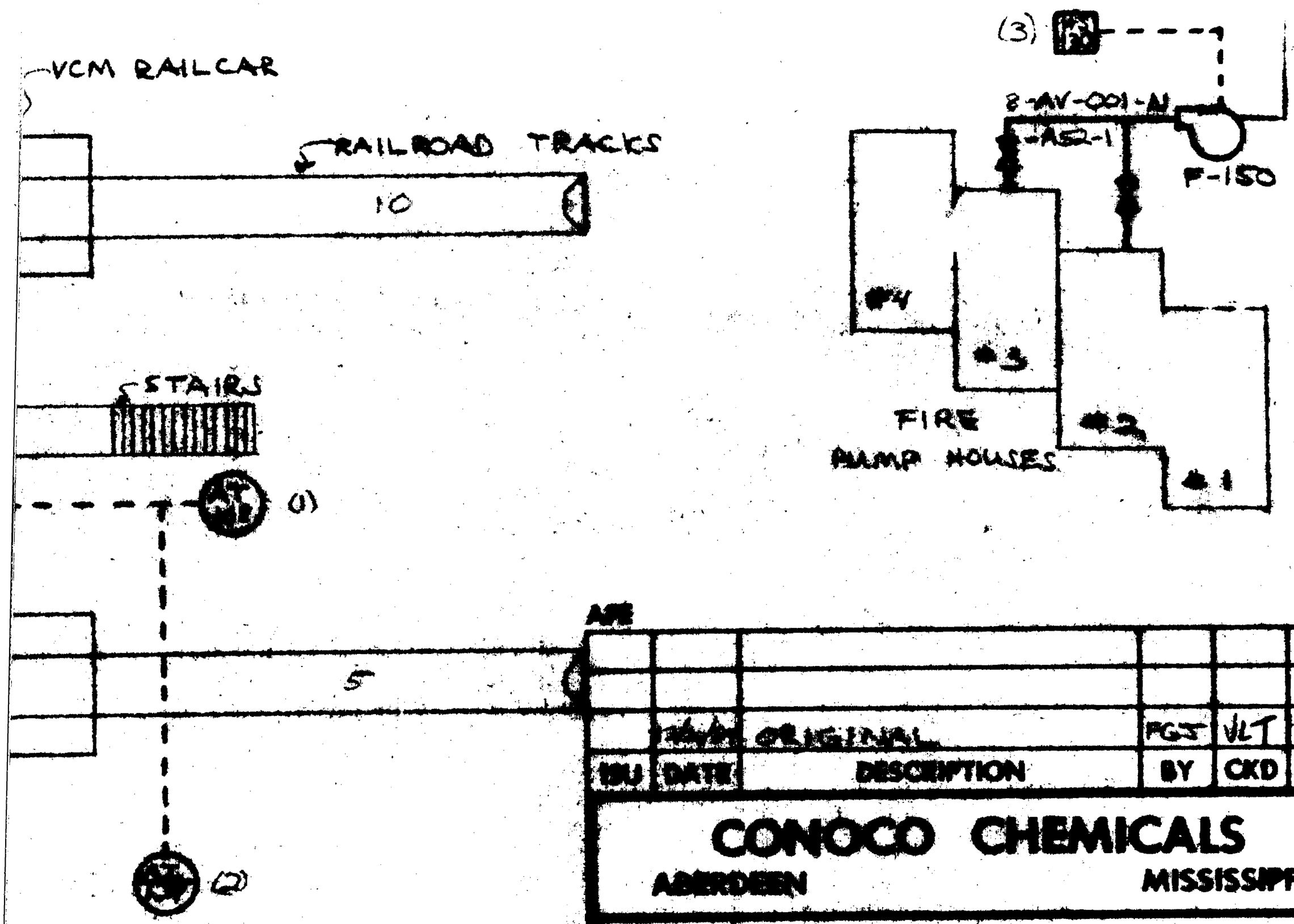
Description: 1½ hp, 1750 RPM

Combustion Air Required For Each Detroit Diesel Engine:
620 SCFM

Notes:

(1) Or Company approved equal
(2) Blower handswitch, HS-130, to be tied into the ~5% LEL control panel alarm for any of the gas monitors.
(3) Provide screen for inlet of blower.
(4) Provide local Hand/OFF/Auto switch for blower (see spec. sheet for HS-130).
(5) Provide belt guards for blower.

VAB.0001106283



ISU	DATE	DESCRIPTION	BY	CKD	APD
		ORIGINAL	PGT	VLT	RAF

CONOCO CHEMICALS

ABERDEEN MISSISSIPPI

VCM GAS MONITORING SYSTEM
VCM TANK FARM AREA
PLOT PLAN

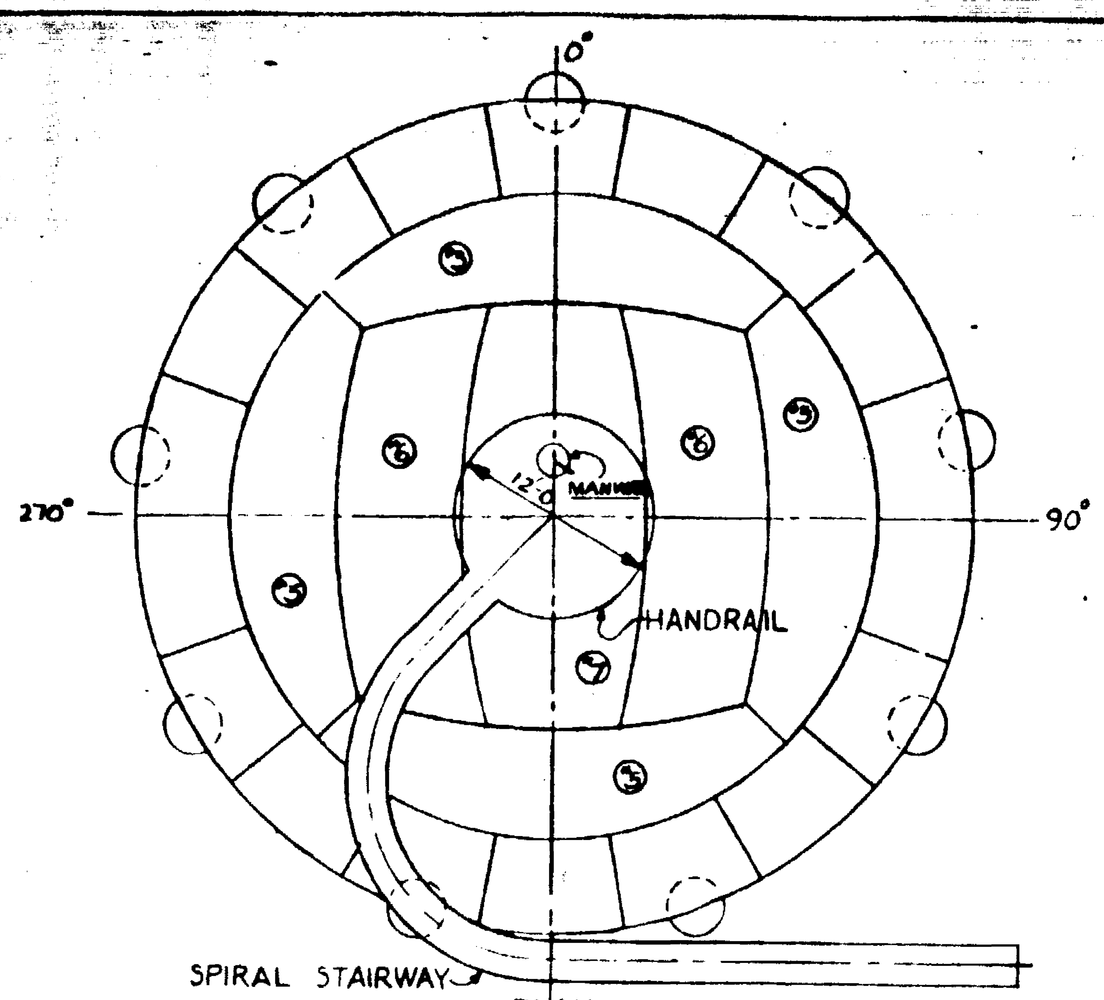
SCALE: NONE

APD: RAF
DATE: 6-26-85

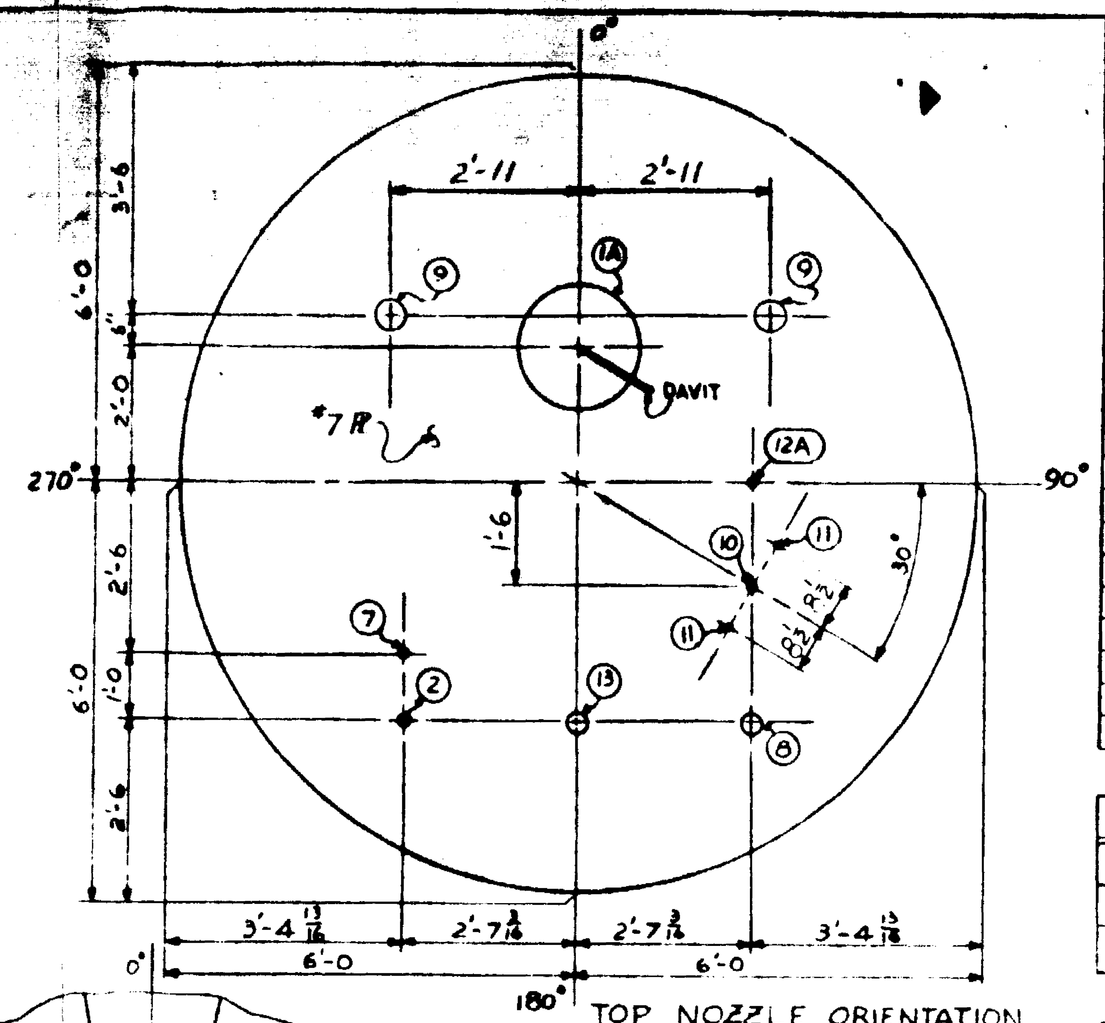
No.

DWR.

VAB.0001106284



PLAN



TOP NOZZLE ORIENTATION

LIST OF ACCESSORY ITEMS FURNISHED BY CB&I Co.		
ITEM	NO REQ'D	DESCRIPTION
1 & 1A	2	20 ϕ 150# TOP & BOTTOM MANWAYS
2	1	2 ϕ 150# VENT NOZZLE
3	1	3 ϕ 150# DRAIN NOZZLE
4	1	6 ϕ 150# LIQUID OUTLET NOZZLE W/ VORTEX BREAKER
5	1	1½ ϕ 150# TEMP. GAUGE NOZZLE
6	1	6 ϕ 150# LIQUID INLET NOZZLE
7	1	1½ ϕ 150# PRESSURE GAUGE NOZZLE
8	1	4 ϕ 150# VAPOR NOZZLE
9	2	6 ϕ 150# SAFETY VALVE NOZZLE
10	1	1½ ϕ 150# LIQ. LEVEL GAUGE NOZ
11	2	1¼ ϕ 150# LEVEL GAUGE WIRE NOZ
12	2	1½ ϕ 150# DIFFERENTIAL PRESS. UNIT NOZZLE
13	1	4 ϕ 150# SPARE NOZZLE
14	1	¾ ϕ 150# SAMPLE NOZZLE
	1	SPIRAL STWY. W/TOP HANDRAIL WIER RING & DEFLECTORS
15	1	3 ϕ 150# BY-PASS NOZZLE

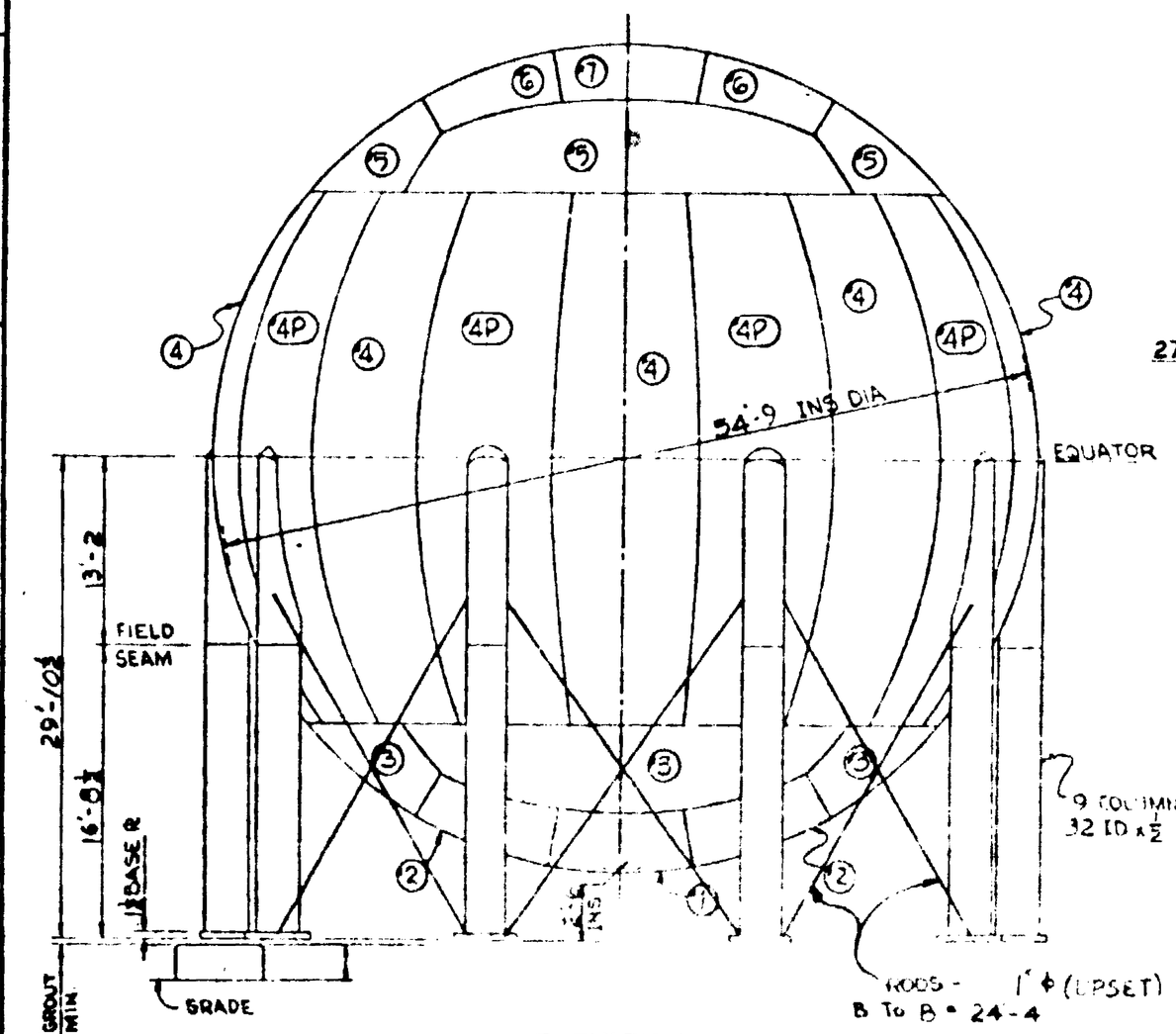
NON DESTRUCTIVE EXAMINATION	
EXAMINATION METHOD	SYMBOL
RADIOGRAPHIC EXAM.	RT
SOLUTION FILM TEST	SFT

— MATERIAL —
SHELL Rs & REINF Rs - SA516 GR. 70
SUPPORTS A283C

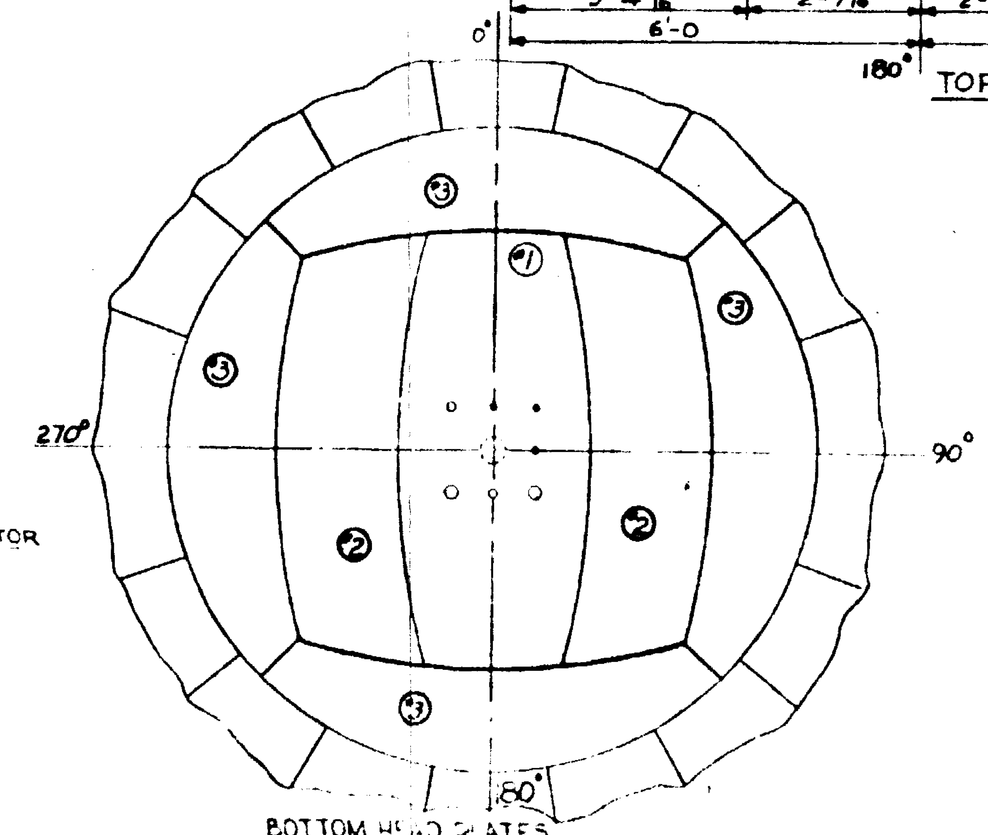
— GENERAL NOTES —
SPECIFICATIONS ASME SECTION VIII DIV. I

CAPACITY - 15,000 BBLS.
DESIGN PRESSURE - 100 PSIG.
DESIGN TEMPERATURE - 128°F
JOINT EFFICIENCY - 100%
CORROSION ALLOWANCE - ⅛ ON "1" & 2 R, 1/16 ON "3" R
SERVICE - VINYL CHLORIDE MONOMER
X-RAY 100%
VACUUM RATING - 15 PSIG
PAINT SHOP: PRIME (OTHER) FIELD: NONE BY CB&I MANUFACTR
INSPECTION SHOP: HARTFORD FIELD: HARTFORD

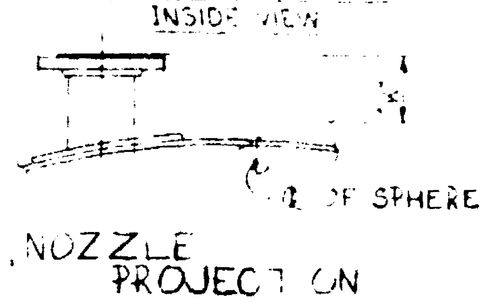
SHIM AND GROUT COLUMN BASE BEFORE TESTING FOUNDATIONS BY OTHERS
HYDROSTATIC TEST IN STRICT ACCORDANCE WITH CB&I TEST INSTRUCTIONS. TEST TO 155 PSI AT TOP WITH SPHERE FULL OF WATER.



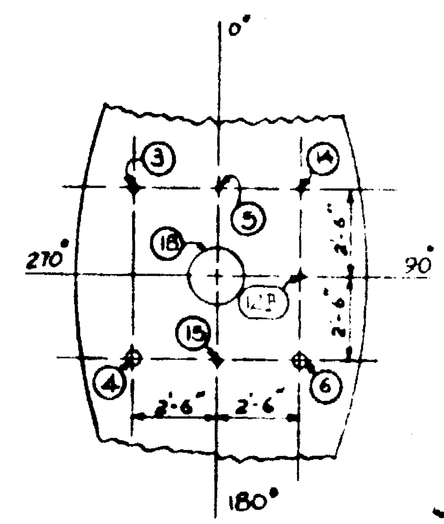
ELEVATION



BOTTOM HEAD PLATES INSIDE VIEW



NOZZLE PROJECTION



BOTTOM NOZZLE ORIENTATION (INSIDE VIEW - SHOWN SOLID FOR CLARITY)

MARK	K	MARK	K
1A	8⅛	7A	4¾
1B	9	9B	4¾
2	3 13/16	10	6
3	5¼	11	5 3/32
4	2¾	12A	6
5	6⅜	12B	6⅜
6	6¾	13	5 5/16
7	5 3/32	14	5¼
8	3 13/16	15	6⅝

LIST OF SHELL Rs FOR ONE SPHERE		
MARK	NO REQ'D	THK'S
*1	1	1.273
*2	2	1.273
*3	4	1.203
*4	9	1⅛
*4P	9	1.207
*5	4	1.007
*6	2	.981
*7	1	.981

DETAILED FOR ONE REQ'D
DESIGNED UNDER ASME CODE SECTION VIII DIV. I

2 GEN. CONT. 2 761,467 2 GEN. 74

CHICAGO BRIDGE & IRON COMPANY

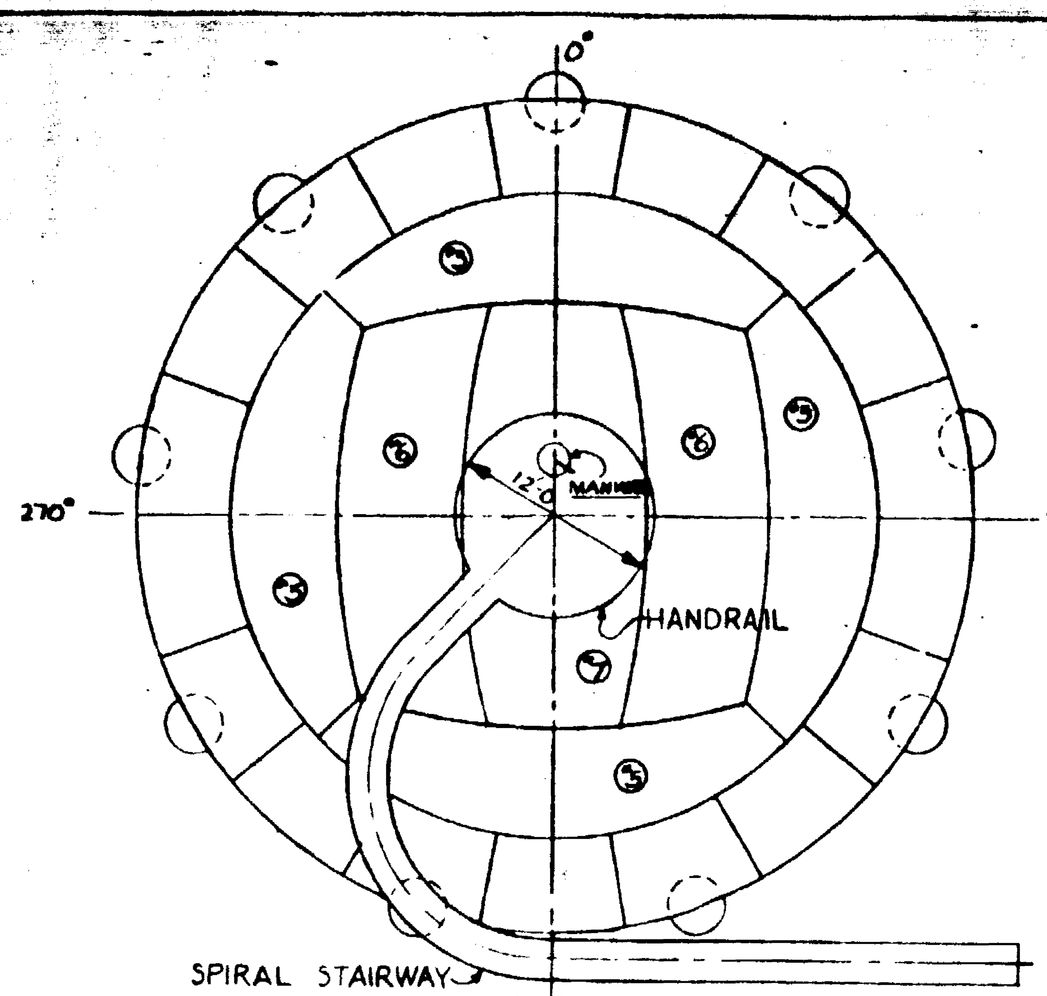
GENERAL PLAN
FOR 54'-9" HOMTONSHIRE
CONOCO CHEMICAL CO.
ABERDEEN, MISS.
CONTRACT NO.
DRAWN BY SBM DATE 5-10-74
APPROVED BY AB DATE 5-13-74
E.S. LIPINSKI
74-2498
DWG. NO. 1 REV. 2

NO	BY	DATE	REMARKS
REVISIONS			

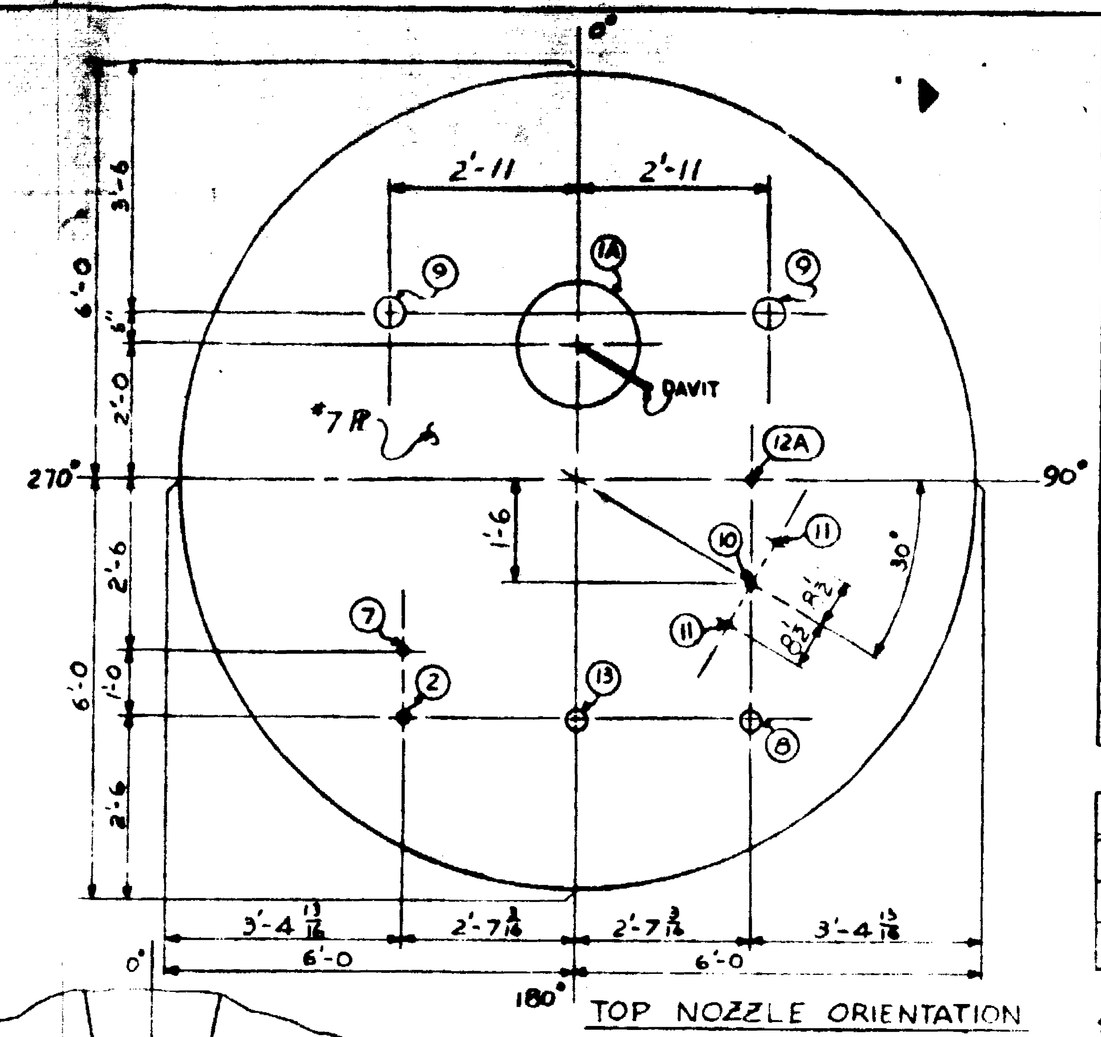
CHECKED BY - FBF
APPROVED BY - AB

9G4-4

V.AB.0001106285



PLAN



TOP NOZZLE ORIENTATION

LIST OF ACCESSORY ITEMS FURNISHED BY CB&I Co.		
ITEM	NO. REQ'D	DESCRIPTION
1 & 1A	2	20 ϕ 150# TOP & BOTTOM MANWAYS
2	1	2 ϕ 150# VENT NOZZLE
3	1	3 ϕ 150# DRAIN NOZZLE
4	1	6 ϕ 150# LIQUID OUTLET NOZZLE W/ VORTEX BREAKER
5	1	1½ ϕ 150# TEMP. GAUGE NOZZLE
6	1	6 ϕ 150# LIQUID INLET NOZZLE
7	1	1½ ϕ 150# PRESSURE GAUGE NOZZLE
8	1	4 ϕ 150# VAPOR NOZZLE
9	2	6 ϕ 150# SAFETY VALVE NOZZLE
10	1	1½ ϕ 150# LIQ. LEVEL GAUGE NOZ
11	2	1¼ ϕ 150# LEVEL GAUGE WIRE NOZ
12	2	1½ ϕ 150# DIFFERENTIAL PRESS. UNIT NOZZLE
13	1	4 ϕ 150# SPARE NOZZLE
14	1	¾ ϕ 150# SAMPLE NOZZLE
	1	SPIRAL STWY. W/TOP HANDRAIL WIER RING & DEFLECTORS
15	1	3 ϕ 150# BY-PASS NOZZLE

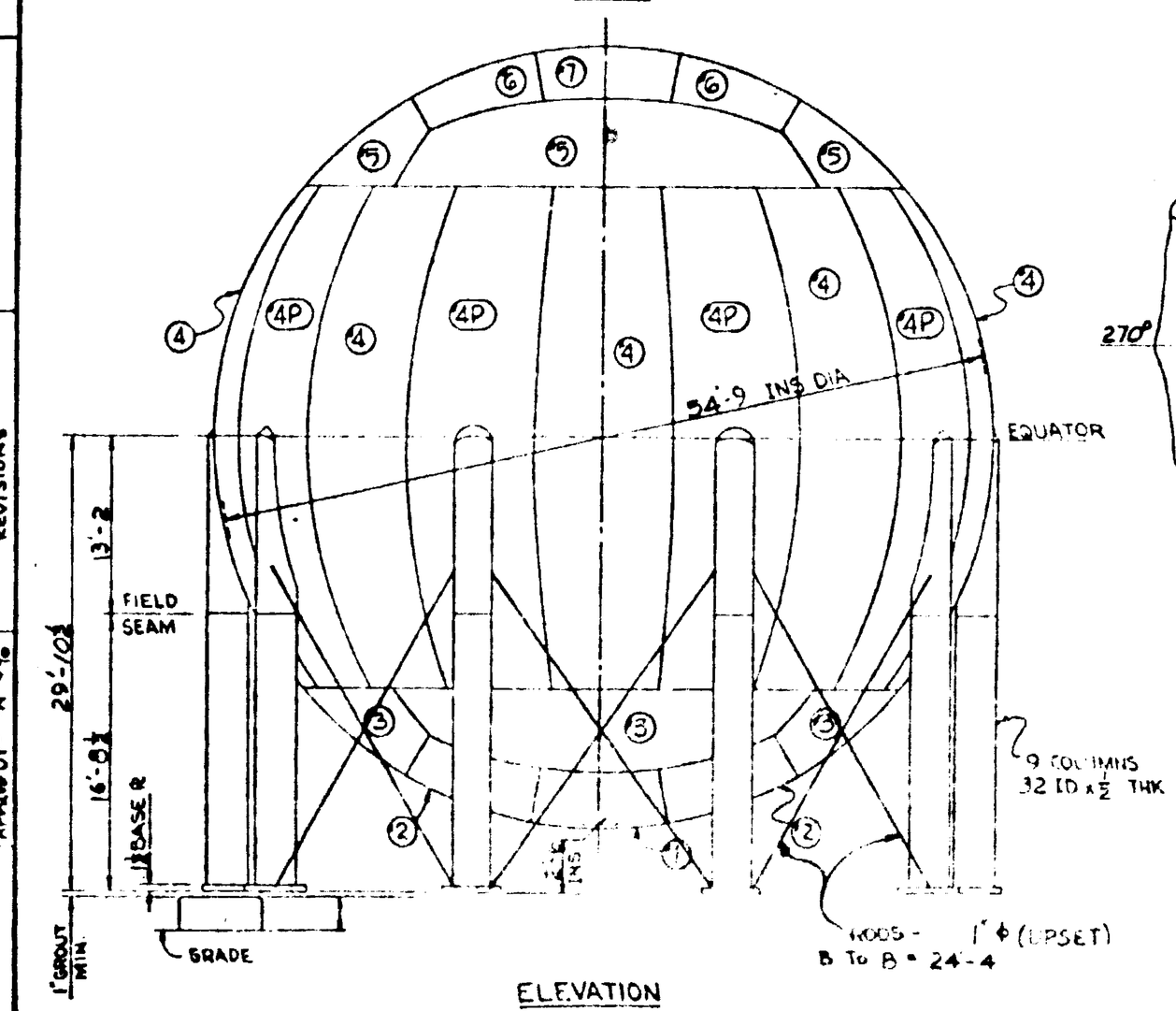
NON DESTRUCTIVE EXAMINATION	
EXAMINATION METHOD	SYMBOL
RADIOGRAPHIC EXAM.	RT
SOLUTION FILM TEST	SFT

— MATERIAL —
SHELL Rs & REINF Rs - SA516 GR. 70
SUPPORTS A283C

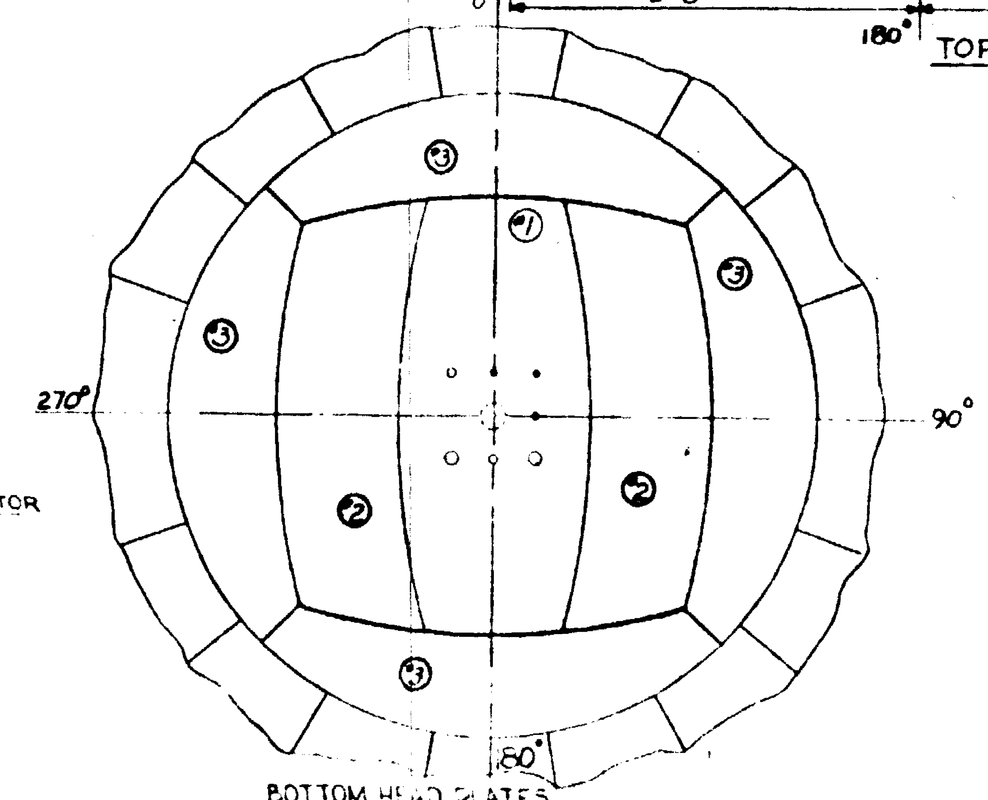
— GENERAL NOTES —
SPECIFICATIONS ASME SECTION VIII DIV. I

CAPACITY - 15,000 BBLS.
DESIGN PRESSURE - 100 PSIG.
DESIGN TEMPERATURE - 128°F
JOINT EFFICIENCY - 100%
CORROSION ALLOWANCE - ⅛ ON "1 ϕ 2 R, 1/16 ON "3 R
SERVICE - VINYL CHLORIDE MONOMER
X-RAY 100%
VACUUM RATING - 15 PSIG
PAINT SHOP: PRIME [illegible] FIELD: NONE [illegible]
INSPECTION MILL: CTR SHOP: HARTFO FIELD: HARTFORD

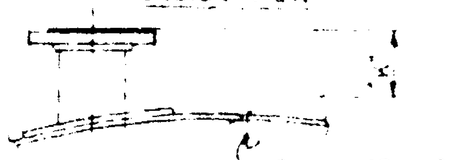
SHIM AND GROUT COLUMN BASE BEFORE FIELD FOUNDATIONS BY OTHER
HYDROSTATIC TEST IN STRICT ACCORDANCE WITH CB&I TEST INSTRUCTIONS. TEST TO 155 P.S.I. AT TOP WITH SPHERE FULL OF WATER.



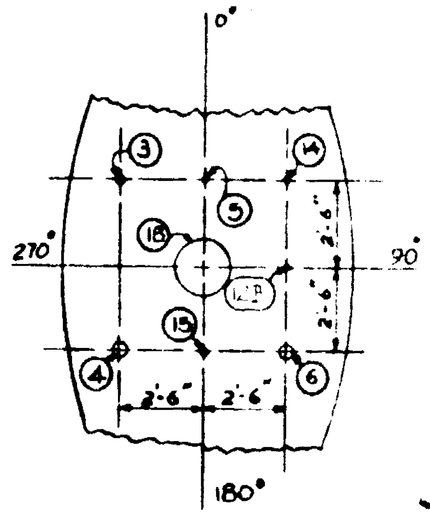
ELEVATION



BOTTOM HEAD PLATES
INSIDE VIEW



NOZZLE PROJECTION



BOTTOM NOZZLE ORIENTATION (INSIDE VIEW - SHOWN SOLID FOR CLARITY)

MARK	K	MARK	K
1A	8⅛	7A	4¾
1B	9	7B	4¾
2	3 13/16	10	6
3	5¼	11	5 3/32
4	6¾	12A	6
5	6⅜	12B	6⅜
6	6¾	13	5 9/16
7	5 3/32	14	5¼
8	3 11/16	15	6⅝

LIST OF SHELL Rs FOR ONE SPHERE		
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DETAILED FOR ONLINE REQ'D
DESIGNED UNDER [illegible] RULES TO [illegible]
2,664,607 2,761,467 2,[illegible] 74

CHICAGO BRIDGE & IRON COMPANY
GENERAL PLAN
FOR 54'-9" HOMTONSHIRE
CONOCO CHEMICAL CO.
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No	BY	DATE	REVISIONS	REMARKS

CHECKED BY - FBF DATE 9/21/73
APPROVED BY - [illegible] DATE 9/10

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