

DOT UNLOADING REGULATIONS COMPLIANCE PROJECT

Aberdeen Plant

November 7, 1990

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Table of Contents

Introduction	1
Design Basis	3
Process Description	3
Impact Statements	4
Instrument List	5
Work List	17
Drawing List	17

DOT UNLOADING REGULATIONS COMPLIANCE PROJECT
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Introduction

Project Description

This project will install remotely actuated isolation valves at the VCM railcar unloading stations to comply with the Department of Transportation requirements. The valves will isolate the railcar liquid and vapor lines and the VCM storage area in the event that a VCM leak is detected.

Two additional gas mixture monitors will be added to improve the ability to detect a leak at the railcars. The monitors will be connected to the existing leak detection and isolation system at the tank farm.

Problem Definition

This project addresses the DOT Unloading Requirements under 49CFR174.67(i) by providing "attended" immediate shutoff of the process and railcar in the event of an unloading malfunction. The project will;

- 1) Add two additional VCM lower explosion limit sensors.
- 2) Add emergency shutoff valves on all the railcars.
- 3) Add emergency shutoff valves or ball check valves to isolate the process.
- 4) Change the monitoring of VCM in the area by placing two of the fixed point monitors on a different gas chromatograph.

These additions address the plant's need, based on DOT regulations, to attend the railcar through non-human monitoring during unloading and provides for immediate shutoff. The requirements for non-human monitoring are;

- 1) equipment used must provide surveillance capability at least equal to that of a human observer on-site or at a remote location;

DOT UNLOADING REGULATIONS COMPLIANCE PROJECT
Aberdeen Plant
November 7, 1990

- 2) equipment used should be designed to provide immediate notification of malfunction to a person responsible for unloading, but if not so designed, equipment must be checked at least once every hour for proper functioning;
- 3) in the event of known equipment malfunction, human observation of the unloading, as described above, must be instituted immediately; and
- 4) the person responsible for unloading must have the capability to halt the flow of product immediately.

Economic Evaluation

There are no economics associated with this Safety and Health project.

Alternatives Considered

- 1) Use of a camera for observation and automated valves. This was not considered to be the most effective way to "attend" the railcar. VCM leaks would be difficult to detect through a camera.
- 2) Addition of more yard personnel. This was too costly.
- 3) Addition of process isolation valves only with railcar monitoring. This did not provide for shutoff of the railcar.
- 4) Automated valves for emergency shutoff of the process. The additional valves, 16 in all, were costly and the ball check valve provides a emergency shutoff in this clean service.

DOT UNLOADING REGULATIONS COMPLIANCE PROJECT**Aberdeen Plant****November 7, 1990****Design Basis**

This design addresses DOT regulation 49 CFR 174.67(i) concerning the unloading of hazardous waste. The regulation states that "throughout the entire period of unloading ... the car must be attended by the unloader." The %LEL sensors and the emergency shutoff valves will provide "attended" immediate shutoff in case of an unloading malfunction.

Process Description

When a railcar is being prepared for unloading the new emergency shutoff valves, HV-101 and HV-102 will be added to the vapor and liquid railcar valves by the operator. The unloading hose will be hammer locked on the shutoff valves and the manual valves, both process and railcar, opened. The quick connect air connection will be hooked up. When the manual air valve is opened the railcar and process emergency shutoff valves, HV-101, HV-102, and HV-122 will open.

In an emergency, the railcar will be isolated by HV-101 and HV-102. The process will be isolated with HV-122 on the vapor line and the new ball check valve on the liquid line. Check valves could not be added to the vapor line because flow must travel in both directions.

The spare liquid lines will require ball check valves to comply in the case of an excess flow valve checking and the railcar being unloaded through the spare liquid line.

To disconnect the railcar the emergency shutoff valves are closed by closing the manual valve in the air line to the valves and disconnecting the quick connect. The railcar is valved off and the emergency shutoff valves removed.

(*) Typical for each of eight unloading stations

DOT UNLOADING REGULATIONS COMPLIANCE PROJECT
Aberdeen Plant
November 7, 1990

Two additional sensors, AT-113 and AT-114, will satisfy the non-human monitoring part of the "attended" definition. The sensors will be located in the two gaps in the circle of %LEL sensors around the VCM railcar unloading stations. (See Drawing No.1.) These sensors will signal the %LEL monitor, AI-127. The monitor will be tied into the existing %LEL alarms in the control room.

Two of the four fixed point monitors at the unloading site will be modified to be monitored from a different GC. Currently if one GC is out of service all the fixed point monitors at the unloading stations would be out of service. By moving two points to another GC, two GCs will service the unloading stations instead of one. (See Drawing No.1.)

The emergency shutoff valves for both the railcar and process will be tied in to the VCM sphere emergency isolation switch, HS-103, the 20% LEL VCM storage alarm, XAH-601, the VCM unloading deluge system, CV-9901, and PSL-101, the low pressure switch on the air line. If any of the four are activated the emergency shutoff valves will close. HS-101 will allow the system bleed valve, SOV-101 to be de-activated while maintenance is performed on the interlocking systems.

Impact Statements

This project will greatly reduce the possibility of a massive VCM release by providing emergency shutoff valves at the railcar and to the process. By providing immediate remote shutoff valves the probability of VCM exposure to the operators in an emergency situation is reduced.

DOT UNLOADING REGULATIONS COMPLIANCE PROJECT
Aberdeen Plant
November 7, 1990

Instrument List

AI-127	%LEL Gas Monitor
AT-113	Gas Monitor Sensor
AT-114	Gas Monitor Sensor
HS-101	SOV-101 Isolation Switch
HV-101	2" VCM Railcar Liquid Emergency Shutoff Valve
HV-102	2" VCM Railcar Vapor Emergency Shutoff Valve
HV-103	2" VCM Railcar Liquid Emergency Shutoff Valve
HV-104	2" VCM Railcar Vapor Emergency Shutoff Valve
HV-105	2" VCM Railcar Liquid Emergency Shutoff Valve
HV-106	2" VCM Railcar Vapor Emergency Shutoff Valve
HV-107	2" VCM Railcar Liquid Emergency Shutoff Valve
HV-108	2" VCM Railcar Vapor Emergency Shutoff Valve
HV-109	2" VCM Railcar Liquid Emergency Shutoff Valve
HV-110	2" VCM Railcar Vapor Emergency Shutoff Valve
HV-111	2" VCM Railcar Liquid Emergency Shutoff Valve
HV-112	2" VCM Railcar Vapor Emergency Shutoff Valve
HV-113	2" VCM Railcar Liquid Emergency Shutoff Valve
HV-114	2" VCM Railcar Vapor Emergency Shutoff Valve
HV-115	2" VCM Railcar Liquid Emergency Shutoff Valve
HV-116	2" VCM Railcar Vapor Emergency Shutoff Valve

DOT UNLOADING REGULATIONS COMPLIANCE PROJECT
Aberdeen Plant
November 7, 1990

HV-122	1 1/2" VCM Process Liquid Emergency Shutoff Valve
HV-124	1 1/2" VCM Process Liquid Emergency Shutoff Valve
HV-126	1 1/2" VCM Process Liquid Emergency Shutoff Valve
HV-128	1 1/2" VCM Process Liquid Emergency Shutoff Valve
HV-130	1 1/2" VCM Process Liquid Emergency Shutoff Valve
HV-132	1 1/2" VCM Process Liquid Emergency Shutoff Valve
HV-134	1 1/2" VCM Process Liquid Emergency Shutoff Valve
HV-136	1 1/2" VCM Process Liquid Emergency Shutoff Valve
PAL-101	Low Pressure Alarm Activated by PSL-101
PSL-101	Low Pressure Switch on Air to Emergency Valves
SOV-101	Solenoid for Air Bleed on System

VISTA**Vista Chemical Company**
GENERAL ENGINEERING
HOUSTON, TEXAS**Specification Sheet****SPECIFICATION DATA SHEET**PROJECT NO. _____
A.F.E. NO. _____
P.O. NO. _____
MADE BY DEK
DATE 10/30/90 APP'D BY _____PLANT ABERDEEN PROJECT DOT UNLOADINGITEM NO. AI-127, GAS MONITOR
SERVICEQUANTITY : 1MANUFACTURER : GENERAL MONITORS (I)MODEL NO. : 580SERVICE : TO PROVIDE ADDITIONAL MONITORING OF AIR
IN VCM UNLOADING AREA. EACH UNIT RECEIVES
SIGNALS FROM TWO SENSORS AND DISPLAYS THE
HIGHER OF THE TWO READINGS.TEMPERATURE RANGE : 0°F TO 150°FPOWER REQUIREMENTS : 12-15-VDCMETER SCAN : 0-100% LOWER EXPLOSION LIMIT (LEL)LOCATION : OLD MODULE OLD CONTROL ROOM**NOTES:**

- 1) TO MATCH EXISTING UNITS
- 2) MONITOR TO BE TIED TO EXISTING LEL ALARMS.
25% LEL AND 45% LEL

SPEC NO. 1 REV. 0
SHEET 1 OF 1

VISTA**Vista Chemical Company**
GENERAL ENGINEERING
HOUSTON, TEXAS

Specification Sheet

SPECIFICATION DATA SHEET

PROJECT NO. _____

A.F.E. NO. _____

P.O. NO. _____

MADE BY DEKDATE 10/30/90 APP'D BY _____PLANT ABERDEEN PROJECT DOT UNLOADINGITEM NO. _____
SERVICE AT-113, AT-114, GAS SENSORQUANTITY : 2TYPE : DIFFUSION, LOW TEMPERATURE CATALYTIC BEADMANUFACTURER : GENERAL MONITORS (I)MODEL NO. : 10001-1SERVICE : TO SENSE VCM CONCENTRATIONS IN THE
VCM UNLOADING. THESE SENSORS WILL
SEND A SIGNAL TO AI-127.LOCATION : NORTHEAST CORNER OF VCM UNLOADING
AND WEST OF CENTER POINT OF UNLOADING
- 3 FEET ABOVE GROUND

NOTES :

1) TO MATCH EXISTING SENSORSSPEC NO. 2 REV. 0
SHEET 1 OF 1

VISTA**Vista Chemical Company**
GENERAL ENGINEERING
HOUSTON, TEXAS**Specification Sheet****SPECIFICATION DATA SHEET**

PROJECT NO. _____

A.F.E. NO. _____

P.O. NO. _____

MADE BY DEKDATE 11/13/90 APP'D BY _____PLANT ABERDEEN PROJECT DOT UNLOADINGITEM NO. _____
SERVICE HS-101, HAND SWITCHQUANTITY : 1

SERVICE : ON/OFF SWITCH FOR SOV-101. WHEN
IN "ON" POSITION SOV-101 IS IN READY
MODE. WHEN IN "OFF" POSITION SOV-101
WILL NOT OPERATE THROUGH ELECTRICAL
INTERLOCKS.

ENCLOSURE : CLASS I DIV. 2

VISTA**Vista Chemical Company**
GENERAL ENGINEERING
HOUSTON, TEXAS**Specification Sheet****SPECIFICATION DATA SHEET**

PROJECT NO. _____

A.F.E. NO. _____

P.O. NO. _____

MADE BY DEKDATE 11/2/90 APP'D BY _____PLANT ABERDEEN PROJECT DOT UNLOADING REGULATIONSITEM NO.
SERVICE

HV-101, HV-102, HV-103, HV-104,
 HV-105, HV-106, HV-107, HV-108,
 HV-109, HV-110, HV-111, HV-112,
 HV-113, HV-114, HV-115, HV-116 (16 REQUIRED)

SERVICE : EMERGENCY SHUTOFF VALVES FOR
 VCM RAILCAR UNLOADING (LIQUID AND VAPOR)
 ON RAILCAR

TYPE : NS60-26 "SNAPPY JOE" EMERGENCY
 SHUTOFF VALVE

SEALS : VITON

MANUFACTURER : FISHER

FAILURE : VALVES TO FAIL CLOSED WITH LOSS
 OF INSTRUMENT AIR

OPERATION : THE EMERGENCY SHUTOFF VALVES WILL CLOSE
 WITH LOSS OF INSTRUMENT AIR THROUGH
 SOV-101 OR AIR CONNECTION FAILURE.
 ANY OF THE FOLLOWING WILL DE-ENERGIZE
 SOV-101 BLEEDING INSTRUMENT AIR OFF
 SYSTEM CLOSING ALL EMERGENCY SHUTOFF
 VALVES :

- 1) 20% LEL VCM STORAGE ALARM, XAH-601
- 2) VCM EMERGENCY ISOLATION SWITCH SPHERE, HS-103
- OR 3) VCM UNLOADING DELUGE SYSTEM, CV-9901

NOTES :

- 1) USE KEMPER FIG. NO. 206 MALE END ON
 "SNAPPY JOE" FOR HOSE CONNECTION
- 2) MODIFY CONNECTIONS TO FIT RAILCAR

CONTACTS : DAN DANLEY - SQUIBB-TAYLOR - 1-800-238-2664
 MARK HOOD - FISHER - 214-542-5512

SPEC NO. 4 REV. 0
 SHEET 1 OF 1

VISTA
Vista Chemical Company
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 HOUSTON, TEXAS

Specification Sheet
SPECIFICATION DATA SHEET

PROJECT NO. _____

A.F.E. NO. _____

P.O. NO. _____

MADE BY _____ DEK

DATE 11/2/90 APPD BY _____

REGULATION _____

PLANT ABERDEENPROJECT DOT UNLOADINGITEM NO.
SERVICE
 HV-122, HV-124, HV-126, HV-128,
 HV-130, HV-132, HV-134, HV-136 - VAPOR LINES

 SERVICE : EMERGENCY SHUTOFF VALVES FOR VCM RAILCAR
 UNLOADING TO PROCESS

TYPE : 1½" TUFLINE 067

ACTUATOR : BETTIS SPRING RETURN (1)

FAILURE : FAIL CLOSED WITH LOSS OF AIR (2)

NOTES :

- (1) OR COMPANY APPROVED EQUIVALENT
 (2) MUST OPEN ON 40 PSIG OF AIR

 SPEC NO. 5 REV. 0
 SHEET 1 OF 1

VISTA**Vista Chemical Company**
GENERAL ENGINEERING
HOUSTON, TEXAS**Specification Sheet****SPECIFICATION DATA SHEET**

PROJECT NO. _____

A.F.E. NO. _____

P.O. NO. _____

MADE BY DEKDATE 11/2/90 APP'D BY _____

PLANT

ABERDEEN

PROJECT

DOTUNLOADINGREGULATIONSITEM NO.
SERVICEPSL-101/PAL-101SERVICE : PRESSURE SWITCH WILL SIGNAL LOW
PRESSURE ALARM ON LOW AIR PRESSURE

SETTING : 40 PSIG

ALARM : ALARMS AT 20 PSIG AND FALLING PRESSURE
USE EXISTING ALARM POINT

MANUFACTURER : ROBERT SHAW

ENCLOSURE : CLASS I DIVISION 2

NOTES :

(1) OR COMPANY APPROVED EQUIVALENT

SPEC NO. 6 REV. 0
SHEET 1 OF 1

VISTA**Vista Chemical Company**
GENERAL ENGINEERING
HOUSTON, TEXAS**Specification Sheet****SPECIFICATION DATA SHEET**

PROJECT NO. _____

A.F.E. NO. _____

P.O. NO. _____

MADE BY DEKDATE 11/2/90 APP'D BY _____PLANT ABERDEEN PROJECT DOT UNLOADING REGULATIONSITEM NO.
SERVICESOV-101

SERVICE : AIR SUPPLY SOLENOID OPERATED VALVE

FAILURE : FAIL CLOSED

MAXIMUM INLET PRESSURE : 100 PSIG

NORMAL PRESSURE : 65 PSIG

OPERATION : WHEN OPEN, SUPPLIES AIR TO OPEN ALL
EMERGENCY SHUTOFF VALVES. WHEN
CLOSED, BLEEDS AIR OFF SYSTEM
TO CLOSE ALL EMERGENCY SHUTOFF
VALVES.

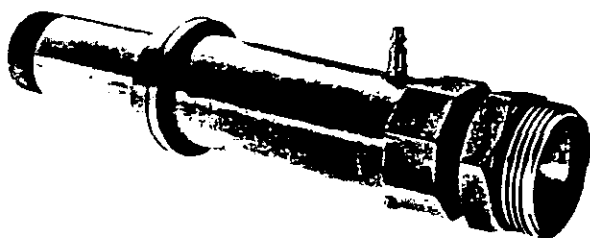
LINE SIZE : 1"

ENCLOSURE : CLASS I DIVISION 2

MANUFACTURER : VERSA VALVE

SPEC NO. 7 REV. 0
SHEET 1 OF 1

TYPE N560 EMERGENCY SHUTOFF VALVES



Type N560-26

Series N560 Snappy Joe ESVs are designed expressly for attachment to the shutoff valves on railroad tank cars, see installation drawing. Usually three N560s will be used, two on the liquid lines and one on the vapor line. NFPA 58 regulations call for ESV protection on both sides of the transfer hose or piping.

While conventional ESVs intended for bulkhead installations could be used on tank car service, they are generally unsatisfactory for this application, being too bulky and cumbersome for easy handling on top of a tank car.

The N560 series is pneumatically opened and closed at the valve by means of a standard quick-disconnect coupling (furnished with the valve). Depending upon pressure in the tank car, approximately 20 to 45 psig is needed to open the valve. Remote closure from one or more points, such as the unloading riser and another remote location, is accomplished by exhausting pressure from the N560's piston chamber with a pneumatic control valve.

FEATURES

Light Weight — N560 ESVs weigh only about 14 pounds, making them easy to handle at an unloading riser. In addition, the valve is shaped like an elongated pipe fitting to facilitate connection to the tank car shutoff valves.

Different Nipple Lengths — Type N560 comes with a long nipple (5.15") to allow the valve to be connected through various size tank car dome openings. The N561 has a shorter nipple (1.30") for use where the tank car dome opening does not present a connection problem.

Wrenching Hex — To further ease attachment, a wrenching hex is built-in to

the body, preventing wear or damage when connecting or disconnecting. A 1/4" FNPT opening in the hex portion can be used to install a bleed valve.

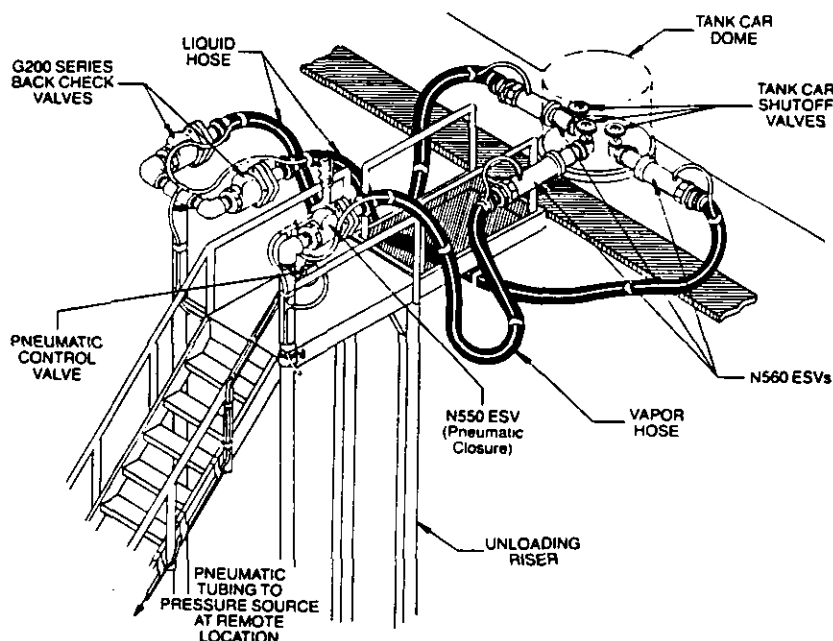
No External Moving Parts — All moving parts are inside the N560 series to help minimize damage from rough handling. Should the quick-disconnect nipple be damaged, replacements are widely available through air supply outlets.

Hardened Threads — The 2" MNPT threads on the nipple portion of N560s are of hardened stainless steel which holds up against repeated connection and disconnection to the shutoff valves on the tank car.

Excess Flow Valve — Poppet design is similar to Fisher's internal valve series, making possible the incorporation on an excess flow spring. The spring has a closing flow of 200 gpm (other closing flows available on special order).

Fuse Plug — Thermal protection is furnished by a steel cased fuse plug which melts if exposed to 212° F. When the plug melts, pressure can escape from the piston chamber, closing the valve.

Dual Service — Since the body and internal parts are of either stainless steel or plated steel, the N560 series can be used on NH₃ service as well as propane gas.

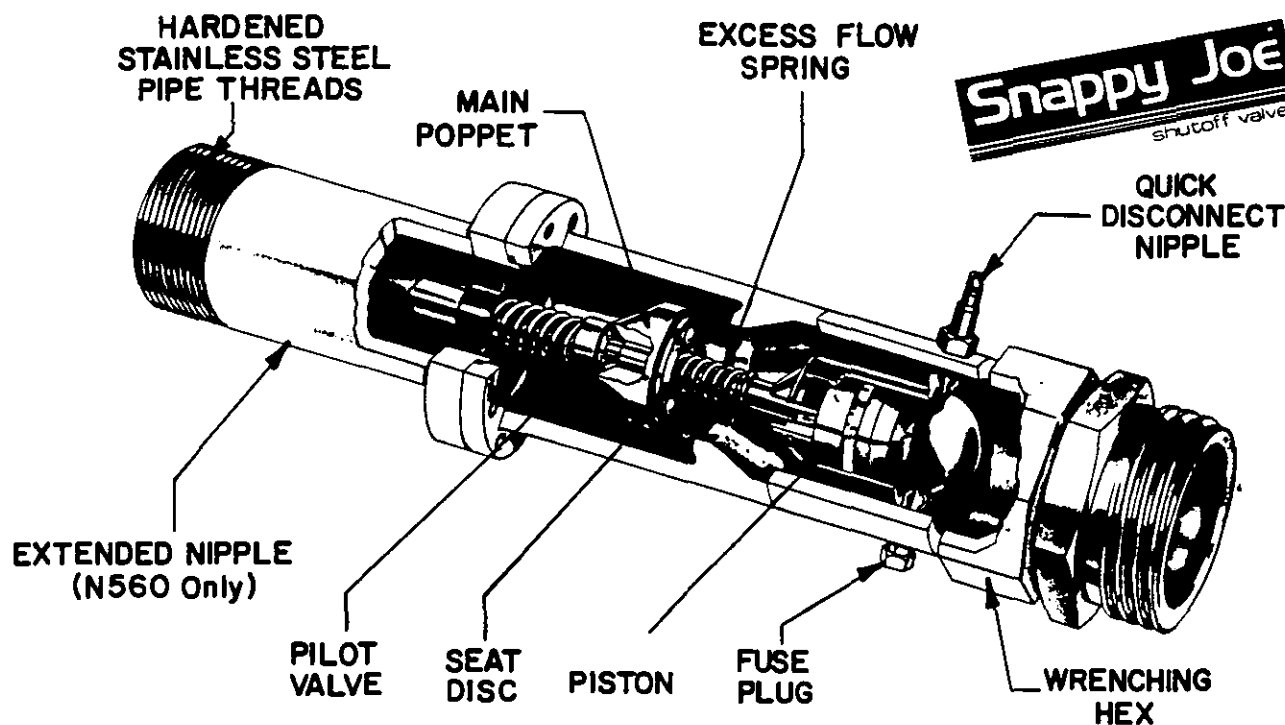


Installation schematic of N560 and related equipment on unloading riser

ORDERING INFORMATION

TYPE NUMBER	NIPPLE LENGTH	SHUTOFF VALVE CONNECTION	HOSE CONNECTION
N560-26	5.15"	2" MNPT	3/4" M. Acme
N561-26	1.30"		

TYPE N560 EMERGENCY SHUTOFF VALVES



PNEUMATIC CLOSURE ACCESSORIES

Pneumatic controls and fittings are needed to remotely close the N560 series and the N550/P327A (page 2 and 3). Fisher does not manufacture these items, and a handling and stocking charge would have to be added if they were offered. Since these accessories are readily available from a number of sources, it was felt that the end user could obtain the equipment himself, thus saving money.

A listing of pneumatic accessories that appear to be suitable follows. Fisher has not extensively tested any of this equipment and cannot guarantee these components will function satisfactorily under all conditions.

CONTROL VALVES

The push-to-close button type (using the palm of your hand) of pneumatic control valve appears to make the best choice as a remote closure valve. It is usually easy to see if the valve is open or closed, and it's also easy to close the valve quickly in an emergency situation. All valves are the three-way type unless noted.

Model #01DPBA3-R — Numatics, Inc., Highland, Michigan

1/4" NPT connections. Compact and reasonably priced, seems to have good weatherproofing. Lapped metal seats (not affected by contaminants).

Model #PC52A — Mead, Chicago, Illinois

1/8" NPT connections. Very compact, but not too well sealed against dirt. NOTE: Do not use Model #PC52 because it is spring returned.

Model #18002-112-0102 — Mac Valves, Wixom, Michigan

1/4" NPT connections. This is a 4-way valve, but port number 2 could be plugged. Largest of the three valves.

Model #382-0602 Air Pal — Airmatic/Beckett-Harcum, Wilmington, Ohio

1/4" NPT connections. O-ring seats and no special dirt seals.

FITTINGS

Available in 1/8" and 1/4" NPT sizes, tees and elbows are needed to connect tubing to the control valves.

Imperial Eastman — "Poly-Flo" fittings in brass or plastic, compression type connector.

Legris, Inc., Rochester, N.Y. — LF3000 fittings with wide range of push-in tubing connectors.

TUBING

Plastic tubing (1/4" size) is the easiest to install and is widely available. Black tubing is more resistant to sun light.

Type 44P "Poly-Flo Black" — Black polyethylene tubing that is flexible and has a low melting point.

Type 44-NF "Nylo-Seal Black" — Black nylon tubing, stiffer than "Poly-Flo" and more chemically resistant with high melting point.

Both of the above are manufactured by Imperial Eastman.



3094 CONNAHBROOK
MEMPHIS, TENNESSEE 38116

FACSIMILE MESSAGE FORM

FACSIMILE MACHINE NUMBER 901-346-1790

NUMBER OF PAGES (INCLUDING THIS PAGE) 1FACSIMILE NUMBER OF RECEIVING MACHINE 601 369-3630FROM Dan Darley LOCATION Memphis, TNTO Doug Knitting LOCATION Vista Chemical

DESCRIPTION OF MESSAGE

Doug,N560V-26 Vokes w/ VistaList #2095.07Your Cost. #1047.54Delivery About 12 weeks

STATUS NORMAL URGENT STRICTLY CONFIDENTIAL

DATE 9-25-90 FROM

ACKNOWLEDGMENT REQUIRED BY

REGARDS,

SQUIBB-TAYLOR INC.

FAX NO. 901-346-1790

DOT UNLOADING REGULATIONS COMPLIANCE PROJECT
Aberdeen Plant
November 7, 1990

Work List

1. Install additional LEL monitor AI-127 in Old Module old control room.
2. Install additional sensors AT-113 and AT-114.
3. Tie AI-127 outputs to the existing %LEL alarms in the control room.
4. Install SOV-101 and PSL-101 in the air supply line.
5. Use existing spare alarm for PAL-101 in control room.
6. Install process emergency shutoff and ball check valves, HV-122 and others.
7. Prepare railcar emergency shutoff valves HV-101 and HV-102 by added nipples and fittings for railcar usage.
8. Install storage baskets on the unloading booms for railcar emergency shutoff valves.
9. Add quick connects and flex hose on the booms to the railcar emergency shutoff valves.
10. Tie-in the SOV-101 to HS-101, HS-103, CV-9901, and XAH-601.
11. Rotate fixed point monitors such that two are on one GC and the other two are on another.

Drawing List

Drawing No. 1 - Additional VCM LEL Monitors

Drawing No. 2 - PI and D Diagram - DOT Unloading

DATE 11/13/90 MADE BY DEK
PROJECT DOT UNLOADING
PLANT ABERDEEN

18

