

RUPTURE DISC/RELIEF VALVE
PRACTICES MANUAL

VISTA CHEMICAL COMPANY

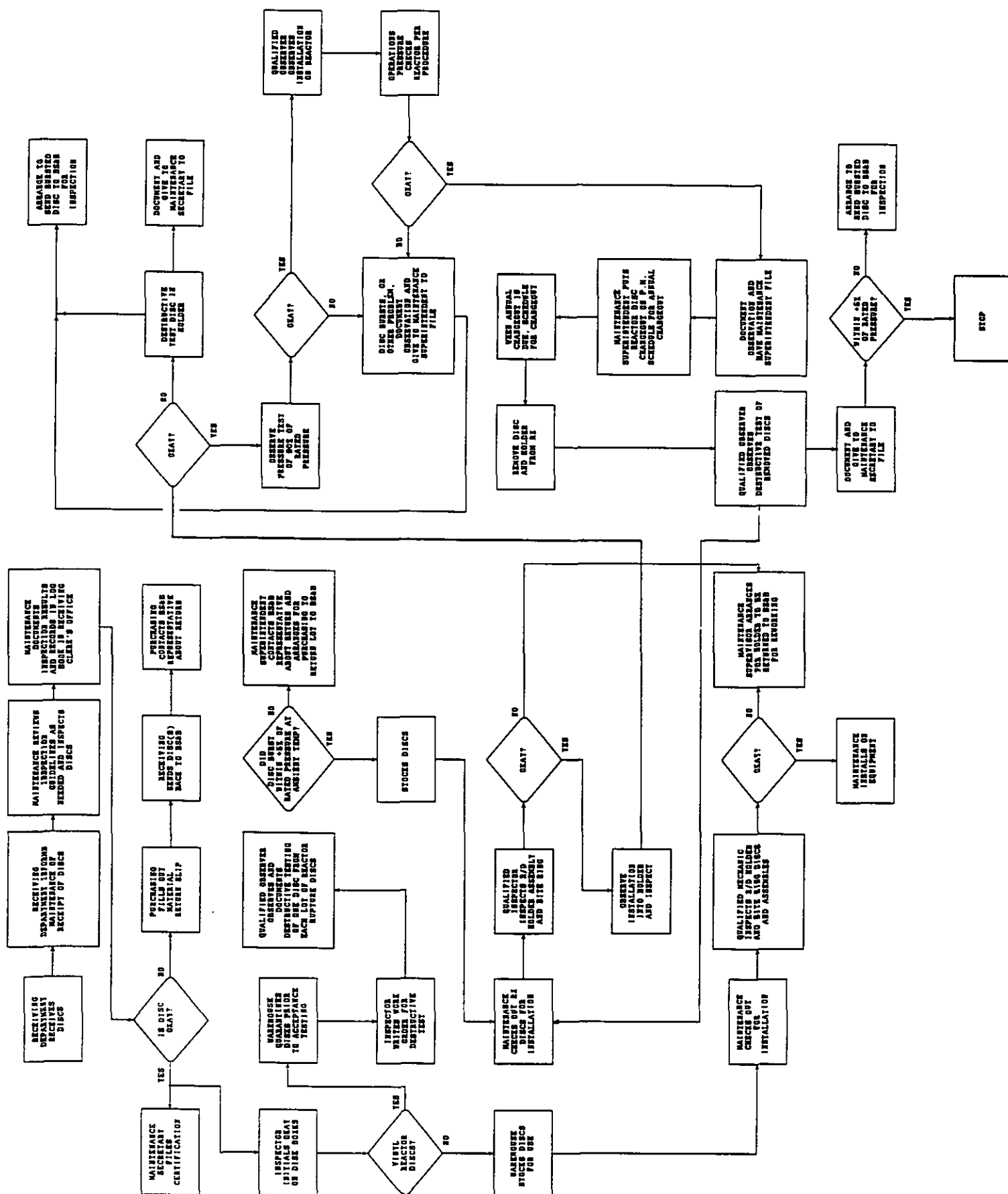
ABERDEEN, MISSISSIPPI

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RUPTURE DISC/RELIEF VALVE
PRACTICES MANUAL

TABLE OF CONTENTS

- I. INTRODUCTION
 - A. Rupture Disc Quality Assurance Program Process Flow Diagram
 - B. Introduction
- II. RUPTURE DISC ORDERING AND PRE-INSTALLATION CHECKOUT
 - A. Specification of Rupture Discs
 - B. Lot Inspection and Pre-Testing
 - C. Recordkeeping
- III. RUPTURE DISC INSTALLATION
 - A. Installation in Holders
 - B. Pressure Testing in the Shop
 - C. Installation in the Plant
 - D. Pressure Checking after Installation on the Reactor
- IV. RUPTURE DISC REMOVAL
 - A. Rupture Disc Changeout
 - B. Destructive Testing
- V. RECORDKEEPING
- VI. TRAINING
- VII. RELIEF VALVES
 - A. Reactor Relief Valves
 - B. Other Relief Valves in Vinyl Chloride Service
 - C. Recordkeeping
- VIII. APPENDICES
 - A. Reactor Rupture Disc Testing Log Sheet Example
 - B. Rupture Disc Checkout Sheet Example
 - C. Reactor Rupture Disc/Relief Valve Settings
 - D. Rupture Discs in VCM Service



Rupture Disc/Relief Valves
Practices Manual
Page 1

1. INTRODUCTION

B. Introduction

Section 61.65 (b)(4) of the National Emission Standards for Hazardous Air Pollutants requires that a rupture disc be installed underneath any relief valve in vinyl chloride service minimize leakage through the relief valve to the atmosphere. In accordance with this requirement, Vista Polymers, Inc. has installed a large number of rupture discs in vinyl chloride service throughout the plant. In addition to preventing relief valve leakage, rupture discs also serve the vital function of protecting the relief valve from polymer buildup on the relief valve seat, which could hinder the proper functioning of the relief valve in an emergency. In either case, proper functioning of the rupture disc/relief valve combination is essential for plant safety.

This program has been developed because of the importance of maintaining the integrity of rupture discs during their handling and installation. Adherence to the procedures outlined in this manual will help to ensure that the change of rupture disc/relief valve malfunctions will be minimized, and that thorough documentation will be available whenever such a malfunction does occur. This documentation may become extremely critical in the event of a VCM release caused by a premature rupture disc failure or other process upset conditions.

II. RUPTURE DISC ORDERING AND PRE-INSTALLATION CHECKOUT

A. Specification of Rupture Discs

All rupture discs in VCM service are listed on Table 1. The following specifications should be noted on the purchase order when ordering these rupture discs.

1. Disc size (specify).
2. Type S-90.
3. Nickel material.
4. 0% manufacturing range.
5. Burst pressure (specify).
6. Burst temperature.
7. Certification of performance.
8. ASME code stamped and certified.
9. Test each disc to 90% of rated burst pressure.
10. Replaces lot no. . . (specify).
11. Serially number all discs in the lot.

B. Lot Inspection and Pre-Testing

All new rupture disc lots received at the plant receiving dock must be thoroughly inspected and tested before they are placed into stock. The following procedures are to be used when new rupture disc lots are received at the Plant:

1. When a lot rupture discs arrives at the receiving dock, care must be exercised when unloading the discs from the truck so as not to damage the discs.

Rupture Disc/Relief Valve
Practices Manual
Page 3

II. RUPTURE DISC ORDERING AND PRE-INSTALLATION CHECKOUT - Continued

B. Lot Inspection and Pre-Testing - Continued

2. The receiver must notify the Maintenance Department that there are new rupture discs at receiving, and a trained inspector will count the number of discs in the lot and inspect each individual disc for flaws.
3. A flaw in a disc is defined as follows:
 - a. Any scratch or indentation which can be felt on the opposite side of the disc.
 - b. Any irregularity in the shape of the domed portion of the disc that can be seen with the eye or felt.
 - c. A pinhole or scratch which could cause the disc to leak.
 - d. A disc without a tag.
 - e. A disc that will not fit the pins of a holder.
 - f. A disc that is labeled differently than the other disc in the same lot.
4. Flawed discs must be removed from the lot and returned to the manufacturer. Discs which pass inspection are initialed on the box by the inspector.
5. Rupture discs which are to be installed on vessels in VCM service must be approved by lot before they can be placed in the storeroom. One disc from each of these lots will be sent to the maintenance shop and burst using the procedures specified in the destructive testing section of this manual.

Rupture Disc/Relief Valve
Practices Manual
Page 4

II. RUPTURE DISC ORDERING AND PRE-INSTALLATION CHECKOUT - Continued

B. Lot Inspection and Pre-Testing - Continued

6. If any rupture disc does not burst within 5% of its rated burst pressure, the entire lot from which the disc was taken must be returned to the manufacturer. Maintenance must notify receiving that these discs have either passed or failed this test.
7. Rupture discs which pass inspection and testing are ok'd for placement in the storeroom. Rupture disc boxes which have not been initialed are not to be placed in the storeroom.

C. Recordkeeping

Administrative Services must keep a record of rupture disc receiving and inspection data. An example logsheet is attached. This information must be stored in the plant for a period of at least two year.

III. RUPTURE DISC INSTALLATION

A qualified maintenance installation observer must be present during all phases of rupture disc installation (vinyl reactors only). The Mechanical Superintendent will keep an updated list of qualified maintenance installation observers.

A. Installation in Holders

All rupture discs must be installed in the holders according to the manufacturer's specifications. These written specifications come with each rupture disc. The following steps outline the general procedure which is to be used when installing rupture discs in holders:

Rupture Disc/Relief Valve
Practices Manual
Page 5

III. RUPTURE DISC INSTALLATION - Continued

1. Before a disc is placed in the holder, the disc, the holder and the holder bolts must be inspected for flaws.
2. Flaws are defined as follows:
 - a. A disc that has any of the defects listed in Section II (b)(3).
 - b. A holder face that is covered with dirt or debris, or is deeply gouged such that it will leak when installed.
 - c. Set screws that are galled or cannot be screw-ed into the holder by hand.
 - d. A holder with a damaged bite ring. A holder is considered damaged if there are indentations or flat spots on the bite ring. This is determined from a visual inspection of the holder. Also, the height of the bite ring must be checked. This is done by the inspector running his fingernail around the bite ring. The bite ring has sufficient height to be reused if it holds the fingernail all the way around the circumference of the bite ring.
3. Flawed components must not be installed in the Plant.
4. Place the disc in the holder and hand install the holder bolts. Using a torque wrench, tighten the holder bolts to the torque specified by the manufacturer. This tightening must be performed in at least four passes; i.e. 25%, 50%, 75%, and 100% of the final torque. A criss-cross tightening pattern must be used when torquing the bolts.

Rupture Disc/Relief Valve
Practices Manual
Page 6

III. RUPTURE DISC INSTALLATION - Continued

A. Installation in Holders - Continued

5. When the installation of the disc in the holder is complete, visually inspect the disc again to see if it has been distorted or otherwise damaged.
6. Rupture discs must not be removed from the holders after installation, otherwise the rupture disc must be discarded.

B. Pressure Testing in the Shop

All reactor rupture discs are to be pressure tested in the maintenance shop to 90% of their rated burst pressure before being installed in the plant. The following testing procedure must be used when pressure testing rupture discs in the maintenance shop.

1. Clean the flanges of the test bench and the faces of the rupture disc holder where the two surfaces meet. Use an asbestos gasket between the flange and the holder.
2. Install the holder on the test bench and tighten the bolts in a criss-cross pattern, making several passes on each bolt.
3. Warn nearby personnel that a rupture disc is being pressure tested.
4. Using pressurized air, slowly open the test valve and pressurize the space beneath the rupture disc. Increase the pressure to 90% of the rupture disc burst pressure 72°F.
5. Slowly depressurize the space underneath the rupture disc and remove the assembly from the test bench. If the disc appears to have been distorted or otherwise damaged during the test, do not install the disc in the plant.

Rupture Disc/Relief Valve
Practices Manual
Page 7

III. RUPTURE DISC INSTALLATION - Continued

B. Pressure Testing in the Shop - Continued

6. If a rupture disc bursts prematurely (less than 90% of its rated burst pressure) or is damaged by the test, the disc must be given intact to Process Engineering.
7. The calibration of the test bench pressure gauge will be checked with a dead weight pressure gauge every six months.

C. Installation in the Plant

Rupture disc assemblies must be installed in the plant accordingly:

1. Before installing the holder assembly between the companion flanges, thoroughly clean the flange faces with a putty knife to remove any solid buildup or debris.
2. Check to see that the flange faces are not gouged or otherwise damaged. Place the rupture disc between the flanges, with the bulged-out side of the disc facing the process.
3. On reactors, use asbestos-type gaskets only. Flexatalic gaskets may be used elsewhere in the plant if desired.
4. When tightening the companion flanges, torque the bolts to the manufacturer's specification using a criss-cross tightening pattern. Make at least four passes on each bolt.

D. Pressure Checking after Installation on the Reactor

After a rupture disc has been installed on a reactor, the reactor will be pressure checked before it is charged. The reactors will be pressure checked to approximately 90% of the pressure of the lowest rated rupture disc on the reactor as shown on the following table:

III. RUPTURE DISC INSTALLATION - Continued

D. Pressure Checking after Installation on the Reactor - Continued

<u>Lowest Rated Disc on a Reactor (PSIG)</u>	<u>Hydrotest Pressure (PSIG)</u>
185	165
195*	175
210	185

* Only for D-600 in low molecular weight resin service.

The pressure check must be witnessed by an approved pressure check observer. Approved pressure check observers consist of all the Vinyl Shift Supervisors, the Vinyl Operations Supervisor, the Vinyl Operations Engineer, and the Vinyl Operations Superintendent. Others may qualify as observers after training.

The pressure checking consists of filling the reactor with water and then increasing the pressure in the reactor to the desired pressure per established procedures. The operators involved must be extremely careful during pressure check procedures not to burst or damage a rupture disc. Bursting a disc during the pressure check will cause reactor downtime to change the disc. A disc can be damaged by hydraulic shock if the reactor becomes liquid full during the pressure check. A damaged rupture disc may burst at lower than the rated pressure, causing leakage through the reactor relief valve. In addition, a damaged disc may not burst at the rated pressure, which could allow a reactor to overpressure. The pressure check observer must witness the pressure check from the field and must verify the final reactor pressure. The reason for the pressure check, the signature of the approved observer, the final reactor pressure, and other test findings will be noted in the reactor pressure check log kept in the Vinyl Control Room.

Rupture Disc/Relief Valve
Practices Manual
Page 9

IV. RUPTURE DISC REMOVAL

A. Rupture Disc Changeout

Rupture discs are to be removed from service and changed accordingly:

1. Any rupture disc which fails in service must be changed as soon as possible after it is discovered that the disc has failed.
2. Any rupture disc which is believed to be covered with resin or otherwise damaged must be changed as soon as possible.
3. All rupture discs on reactors will be changed at least once every twelve months.
4. When a reactor is taken out of service for condenser drilling, the condenser rupture disc(s) will be removed or guard(s) will be installed over the rupture disc nozzle(s) before the drilling operation is started.
5. Any rupture disc which fails in reactor service must be given to Process Engineering.

B. Destructive Testing

All rupture discs taken off of vinyl reactors must be burst in the maintenance shop when taken out of service permanently. The following procedures also apply to new rupture discs which are to be burst when they arrive at the Plant.

1. When removing the holder assembly from the reactor and when transporting the holder assembly to the maintenance shop, use caution so as not to damage the disc or the holder.

Rupture Disc/Relief Valve
Practices Manual
Page 10

IV. RUPTURE DISC REMOVAL - Continued

B. Destructive Testing - Continued

2. When destructively testing a vinyl reactor rupture disc, a qualified maintenance installation observer must be present to observe the testing.
3. Install the holder assembly on the test bench and pressurize the disc with air until the disc bursts.
4. If a rupture disc bursts prematurely (less than 95% of its rated burst pressure), the disc must be given to Process Engineering. Use care so as not to damage these discs.

V. RECORDKEEPING

A record must be kept of all rupture disc installation and testing data. An example logsheet is attached. This information must be stored in the plant for a period of at least two years. This information is stored in the maintenance office.

VI. TRAINING

All maintenance personnel involved in this program are to receive hands-on training in the installation and handling of rupture discs once each calendar year. Records of all personnel who attend these training sessions are to be kept for a period of at least two years.

VII. RELIEF VALVES

All relief valves in vinyl chloride service will be periodically checked to assure that they will operate properly in an emergency situation.

Rupture Disc/Relief Valve
Practices Manual
Page 11

VII. RELIEF VALVES - Continued

A. Reactor Relief Valves

Relief valves on PVC reactors will be removed and sent to a relief valve repair shop for testing, inspection and reworking every five years. The rework includes disassembly, cleaning and replacing/refurbishing internal parts as required so that the relief valve meets the original manufacturers specifications.

All new reactor relief valves purchased will be pretested by the manufacturer. Upon installation, the relief valves will be removed and tested at a relief valve shop every five years.

B. Other Relief Valves in Vinyl Chloride Service

Relief valves in the vinyl chloride service, except those on the reactors, will be tested and refurbished at either a relief valve repair shop or by the plant maintenance personnel. The frequency of testing and refurbishing will be every five years for these relief valves.

C. Recordkeeping

The maintenance department shall keep a record of all tests and repairs made on the relief valves.

REACTOR - D-600

LOCATION	SHELL	SHELL	SHELL	CONDENSER
DATE INSTALLED	6/19/90	6/19/90	6/19/90	6/19/90
DISC SIZE	8"	8"	6"	6"
STOREROOM STOCK NUMBER	073-0006	073-0006	073-0018	073-0018
LOT NUMBER	90002874-2	90002874-2	90002874-1	90002874-1
DESIGN PRESSURE @ 170°F	195	195	200	200
DESIGN PRESSURE @ 72°F	201.3	201.3	200	200
HOLDER NUMBER	55	14	69	65
TEST PRESSURE (90% @ 72°F)	182	182	180	180
TESTER	JWL	JWL	ECM	JWL
OBSERVER - TEST	DEJ	DEJ	JBA, DEK/FWF	DEJ
INSTALLED ON REACTOR BY	JWL, TRS,RSK	JWL, TRS,RSK	JWL, TRS,RSK	JWL, TRS,RSK
OBSERVER - REACTOR	FWF	FWF	FWF	FWF
RELIEF VALVE ASSET NUMBER	78-096	78-095	78-325	78-225
DATE REMOVED	2/13/91	2/13/91	2/13/91	2/13/91
REASON FOR REMOVAL (CIRCLE)	ANNUAL* BURST OTHER	ANNUAL* BURST OTHER	ANNUAL* BURST OTHER	ANNUAL* BURST OTHER
* BURST PRESSURE	202	202	205	205

* RERATED FROM LO-MOLE

RUPTURE DISC CHECKOUT

RECEIVING RECORD SAMPLE ONLY

[illegible]

* 6" RIPTYPE NTSC 9" RIPTYPE NTSC AND TUE 11 P 300 COMMENCED DIMITING NTSC 0022 V

IA BD00250190

THIS IS THE CURRENT RUPTURE DISC AND RELIEF VALVE SETTINGS AND STOCK NUMBERS. DATE IS
MARCH 28, 1991

REACTOR	POSITION	RD SIZE	RUPTURE DISC RATING PSIG/F	RV SET PRESSURE PSIG	STOREROOM NUMBER
D-300	SHELL	8	200/200	199	073-0016
D-300	SHELL	8	200/200	199	073-0016
D-300	SHELL	6	195/200	195	073-0019
D-300	COND	6	185/200	185	073-0005
D-400	SHELL	8	200/200	199	073-0016
D-400	SHELL	8	200/200	199	073-0016
D-400	SHELL	6	195/200	195	073-0019
D-400	COND	6	185/200	185	073-0005
D-500	SHELL	8	200/200	199	073-0016
D-500	SHELL	8	200/200	199	073-0016
D-500	SHELL	6	195/200	195	073-0019
D-500	COND	6	185/200	185	073-0005
D-600	NON-LOW MOLE RELIEF				
D-600	SHELL	8	200/200	199	073-0016
D-600	SHELL	8	200/200	199	073-0016
D-600	SHELL	6	195/200	195	073-0019
D-600	COND	6	185/200	185	073-0005
D-600	LOW MOLE RELIEF				
D-600	SHELL	8	195/170	195	073-0006
D-600	SHELL	8	195/170	195	073-0006
D-600	SHELL	6	200/170	200	073-0018
D-600	COND	6	200/170	200	073-0018
D-700	SHELL	8	215/176	215	073-0023
D-700	SHELL	8	215-176	215	073-0023
D-700	SHELL	8	215-176	215	073-0023
D-700	SHELL	8	210/175	210	073-0024
D-700	SHELL	8	210/175	210	073-0024
D-700	COND	8	215/176	215	073-0023
D-700	COND	8	210/175	210	073-0024
D-741	SHELL	8	200/200	199	073-0016
D-741	SHELL	8	200/200	199	073-0016
D-741	SHELL	6	195/200	195	073-0019
D-741	COND	6	185/200	185	073-0005
D-742	SHELL	8	200/200	199	073-0016
D-742	SHELL	8	200/200	199	073-0016
D-742	SHELL	6	195/200	195	073-0019
D-742	COND	6	185/200	185	073-0005
D-743	SHELL	8	200/200	199	073-0016
D-743	SHELL	8	200/200	199	073-0016
D-743	SHELL	6	195/200	195	073-0019
D-743	COND	6	185/200	185	073-0005

D-744	SHELL	8	200/200	199	073-0016
D-744	SHELL	8	200/200	199	073-0016
D-744	SHELL	6	195/200	195	073-0019
D-744	COND	6	185/200	185	073-0005
D-745	SHELL	8	215/176	215	073-0023
D-745	SHELL	8	215/176	215	073-0023
D-745	SHELL	8	215/176	215	073-0023
D-745	SHELL	8	210/175	210	073-0024
D-745	SHELL	8	210/175	210	073-0024
D-745	COND	8	215/176	215	073-0023
D-745	COND	8	210/175	210	073-0024

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TABLE I

RUPTURE DISCS IN VCM SERVICE

STOCK NUMBER	RUPTURE DISC LOCATION	CONOCO VESSEL #	RUPTURE DISC			RV SET PRESSURE (PSIG)	RUPTURE DISC			RD & HOLDER SIZE (INCHES)	HOLDER TYPE
			MFG.	TYPE	DESIGN PRES/TEMP. (PSIG/°F)		RANGE	MAT'L OF CONST.	IS RD CODE STAMPED		
AREA #1 - VCM UNLOADING AREA											
0293-V	VCM Sphere #1	93-001	BS&B	S-90	100/72	100	02	N1	Yes	6	SRB-7RS
0293-V	VCM Sphere #2	93-001	BS&B	S-90	100/72	100	02	N1	Yes	6	SRB-7RS
0352-C	T-201, Surge Tank	45-305	BS&B	S-90	150/150	150	02	N1	Yes	2	SRB-7RS
0314-N	W. Bullet #1	89-201	BS&B	S-90	150/72	150	02	N1	Yes	6	SRB-7RS
0314-N	W. Bullet #2	89-201	BS&B	S-90	150/72	150	02	N1	Yes	6	SRB-7RS
0314-N	E. Bullet #1	89-202	BS&B	S-90	150/72	150	02	N1	Yes	6	SRB-7RS
0314-N	E. Bullet #2	89-202	BS&B	S-90	150/72	150	02	N1	Yes	6	SRB-7RS
AREA #2 - OLD MODULE REACTORS											
0400-B	D-300 Shell	45-731	BS&B	S-90	200/200	190	02	N1	Yes	8	SRB-7RS
0400-B	D-300 Shell	45-731	BS&B	S-90	200/200	190	02	N1	Yes	8	SRB-7RS
0436-A	D-300 Shell	45-731	BS&B	S-90	195/200	185	02	N1	Yes	6	SRB-7RS
0298-N	D-300 Shell	45-731	BS&B	S-90	185/200	185	02	N1	Yes	6	SRB-7RS
0298-M	D-300 Cond	55-320	BS&B	S-90	185/200	185	02	N1	Yes	4	SRB-7RS
0400-B	D-400 Shell	45-732	BS&B	S-90	200/200	190	02	N1	Yes	8	SRB-7RS
0400-B	D-400 Shell	45-732	BS&B	S-90	200/200	190	02	N1	Yes	8	SRB-7RS
0436-A	D-400 Shell	45-732	BS&B	S-90	195/200	185	02	N1	Yes	6	SRB-7RS
0298-N	D-400 Cond	55-318	BS&B	S-90	185/200	185	02	N1	Yes	6	SRB-7RS
0400-B	D-500 Shell	45-734	BS&B	S-90	200/200	190	02	N1	Yes	8	SRB-7RS
0400-B	D-500 Shell	45-734	BS&B	S-90	200/200	190	02	N1	Yes	8	SRB-7RS
0436-A	D-500 Shell	45-734	BS&B	S-90	195/200	185	02	N1	Yes	6	SRB-7RS
0298-N	D-500 Cond	55-321	BS&B	S-90	185/200	185	02	N1	Yes	6	SRB-7RS
0400-B	D-600 Shell	45-735	BS&B	S-90	200/200	190	02	N1	Yes	8	SRB-7RS
0400-B	D-600 Shell	45-735	BS&B	S-90	200/200	190	02	N1	Yes	8	SRB-7RS
0436-A	D-600 Shell	45-735	BS&B	S-90	195/200	185	02	N1	Yes	6	SRB-7RS
0298-N	D-600 Cond	55-322	BS&B	S-90	185/200	185	02	N1	Yes	6	SRB-7RS

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TABLE I (Continued)

RUPTURE DISCS IN VEH SERVICE

STOCK NUMBER	RUPTURE DISC LOCATION	CONOCO VESSEL#	RUPTURE DISC		DESIGN PRES/TEMP. (PSIG/°F)	RV SET PRESSURE (PSIG)	RANGE	RUPTURE DISC		RD & HOLDER SIZE (INCHES)	HOLDER TYPE	
			MFG.	TYPE				MAT'L OF CONST.	IS RD CODE STAMPED			
AREA #2 (cont.)												
0436-E	D-700 Shell	45-755	BS&B	S-90	215/176	205	OZ	N1	Yes	8	SRB-7RS	
0436-E	D-700 Shell	45-755	BS&B	S-90	215/176	205	OZ	N1	Yes	8	SRB-7RS	
0436-E	D-700 Shell	45-755	BS&B	S-90	215/176	205	OZ	N1	Yes	8	SRB-7RS	
0436-E	D-700 Cond	55-356	BS&B	S-90	215/176	205	OZ	N1	Yes	8	SRB-7RS	
0436-F	D-700 Cond	55-356	BS&B	S-90	210/175	200	OZ	N1	Yes	8	SRB-7RS	
0436-F	D-700 Shell	45-755	BS&B	S-90	210/175	200	OZ	N1	Yes	8	SRB-7RS	
0436-C	D-700 Shell	45-755	BS&B	S-90	205/173	195	OZ	N1	Yes	8	SRB-7RS	
AREA #3 - NEW MODULE REACTORS												
0400-B	D-741 Shell	45-741	BS&B	S-90	200/200	190	OZ	N1	Yes	8	SRB-7RS	
0400-B	D-741 Shell	45-741	BS&B	S-90	200/200	190	OZ	N1	Yes	8	SRB-7RS	
0435-Z	D-741 Shell	45-741	BS&B	S-90	190/200	180	OZ	N1	Yes	6	SRB-7RS	
0298-M	D-741 Cond	55-328	BS&B	S-90	185/200	175	OZ	N1	Yes	6	SRB-7RS	
0400-B	D-742 Shell	45-742	BS&B	S-90	200/200	190	OZ	N1	Yes	8	SRB-7RS	
0400-B	D-742 Shell	45-742	BS&B	S-90	200/200	190	OZ	N1	Yes	8	SRB-7RS	
0435-Z	D-742 Shell	45-742	BS&B	S-90	190/200	180	OZ	N1	Yes	6	SRB-7RS	
0298-M	D-742 Cond	55-329	BS&B	S-90	185/200	175	OZ	N1	Yes	6	SRB-7RS	
0400-B	D-743 Shell	45-743	BS&B	S-90	200/200	190	OZ	N1	Yes	8	SRB-7RS	
0400-B	D-743 Shell	45-743	BS&B	S-90	200/200	190	OZ	N1	Yes	8	SRB-7RS	
0435-Z	D-743 Shell	45-743	BS&B	S-90	190/200	180	OZ	N1	Yes	6	SRB-7RS	
0298-M	D-743 Cond	55-330	BS&B	S-90	185/200	175	OZ	N1	Yes	6	SRB-7RS	
0400-B	D-744 Shell	45-744	BS&B	S-90	200/200	190	OZ	N1	Yes	8	SRB-7RS	
0400-B	D-744 Shell	45-744	BS&B	S-90	200/200	190	OZ	N1	Yes	8	SRB-7RS	
0435-Z	D-744 Shell	45-744	BS&B	S-90	190/200	180	OZ	N1	Yes	6	SRB-7RS	
0298-M	D-744 Cond	55-331	BS&B	S-90	185/200	175	OZ	N1	Yes	6	SRB-7RS	
0436-E	D-745 Shell	45-781	BS&B	S-90	215/176	205	OZ	N1	Yes	8	SRB-7RS	
0436-E	D-745 Shell	45-781	BS&B	S-90	215/176	205	OZ	N1	Yes	8	SRB-7RS	
0436-E	D-745 Shell	45-781	BS&B	S-90	215/176	205	OZ	N1	Yes	8	SRB-7RS	
0436-E	D-745 Cond	55-356	BS&B	S-90	215/176	205	OZ	N1	Yes	8	SRB-7RS	
0436-F	D-745 Cond	55-358	BS&B	S-90	210/175	200	OZ	N1	Yes	8	SRB-7RS	
0436-F	D-745 Shell	45-781	BS&B	S-90	210/175	200	OZ	N1	Yes	8	SRB-7RS	
0436-C	D-745 Shell	45-781	BS&B	S-90	205/173	195	OZ	N1	Yes	8	SRB-7RS	

TABLE 1 (Continued)

RUPTURE DISCS IN VCM SERVICE

			RUPTURE DISC		RUPTURE DISC			RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE DISC		RUPTURE 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CONFIDENTIAL

TABLE 1 (Continued)

RUPTURE DISCS IN VCH SERVICE

STOCK NUMBER	RUPTURE DISC LOCATION	CONOCO VESSEL#	RUPTURE DISC		DESIGN PRES/TEMP. (PSIG/°F)	RV SET PRESSURE (PSIG)	RUPTURE DISC			HOLD TYPE	
			MFG.	TYPE			RANGE	MAT'L OF CONST.	IS RD CODE STAMPED		RD & HOLD SIZE (INCHES)
#4 (cont.)											
0440-P	D-300 Catalyst Pot		BS&B	S-90	330/300		OZ	N1	No	4	SRB-7RS
0440-P	D-400 Catalyst Pot		BS&B	S-90	330/300		OZ	N1	No	4	SRB-7RS
0440-P	D-500 Catalyst Pot		BS&B	S-90	330/300		OZ	N1	No	4	SRB-7RS
0440-P	D-600 Catalyst Pot		BS&B	S-90	330/300		OZ	N1	No	4	SRB-7RS
0436-D	D-700 Catalyst Pot 45-778		BS&B	S-90	330/300		OZ	N1	Yes	6	SRB-7RS
0436-B	D-300 AMS Kill Pot		BS&B	S-90	400/720	400	OZ	N1	No	1	SRB-7RS
0436-B	D-400 AMS Kill Pot		BS&B	S-90	400/720	400	OZ	N1	No	1	SRB-7RS
0436-B	D-500 AMS Kill Pot		BS&B	S-90	400/720	400	OZ	N1	No	1	SRB-7RS
0436-B	D-600 AMS Kill Pot		BS&B	S-90	400/720	400	OZ	N1	No	1	SRB-7RS
0436-B	D-700 AMS Kill Pot 45-780		BS&B	S-90	400/720	400	OZ	N1	No	1	SRB-7RS
#5 - NEW MODULE CHARGE & RECOVERY											
0314-P	E. RVCH Receiver 45317		BS&B	S-90	150/72	150	OZ	N1	No	3 1/4	SRB-7RS
0314-P	W. RVCH Receiver 89-520		BS&B	S-90	150/72	150	OZ	N1	No	3 1/4	SRB-7RS
0314-P	PVCH Receiver 45-745		BS&B	S-90	150/72	150	OZ	N1	No	3 1/4	SRB-7RS
0352-C	RVCH Collect Tank 45-764		BS&B	S-90	150/150	150	OZ	N1	Yes	2	SRB-7RS
0352-Z	RVCH Collect Tank 45-764		BS&B	S-90	250/100	150	OZ	N1	No	1 1/4	SRB-7RS
0352-C	E. RVCH Condenser 55-338		BS&B	S-90	150/150	150	OZ	N1	Yes	2	SRB-7RS
0352-C	W. RVCH Condenser 55-339		BS&B	S-90	150/150	150	OZ	N1	Yes	2	SRB-7RS
0352-B	N. Seal H.O. Sep. 45-763		BS&B	S-90	150/300	150	OZ	N1	Yes	1 1/4	SRB-7RS
0352-B	S. Seal H.O. Sep. 45-763		BS&B	S-90	150/300	150	OZ	N1	Yes	1 1/4	SRB-7RS
0352-B	N. Vacuum Pump 72-902		BS&B	S-90	150/300	150	OZ	N1	Yes	1 1/4	SRB-7RS
0352-B	S. Vacuum Pump 72-901		BS&B	S-90	150/300	150	OZ	N1	Yes	1 1/4	SRB-7RS
0440-B	N. Recov. Compr. 72-905		BS&B	S-90	150/200	150	OZ	N1	No	1	SRB-7RS
0440-H	Mid Recov. Compr. 72-904		BS&B	S-90	150/200	150	OZ	N1	No	1	SRB-7RS
0440-H	S. Recov. Compr. 72-903		BS&B	S-90	150/200	150	OZ	N1	No	1	SRB-7RS
0352-A	N. KO Tank 45-761		BS&B	S-90	150/300	150	OZ	N1	Yes	2	SRB-7RS
0352-A	S. KO Tank 45-760		BS&B	S-90	150/300	150	OZ	N1	Yes	2	SRB-7RS
0352-B	Blowdown Tank 45-319		BS&B	S-90	150/300	150	OZ	N1	No	1 1/4	SRB-7RS
0440-P	D-741 Catalyst Pot		BS&B	S-90	330/300	--	OZ	N1	No	4	SRB-7RS
0440-P	D-742 Catalyst Pot		BS&B	S-90	330/300	--	OZ	N1	No	4	SRB-7RS

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TABLE 1 (Continued)

RUPTURE DISCS IN VCM SERVICE

STOCK NUMBER	RUPTURE DISC LOCATION	CONOCO VESSEL#	RUPTURE DISC			RUPTURE DISC				RD & HOLDER SIZE (INCHES)	HOLDER TYPE
			MFG.	TYPE	DESIGN PRES/TEMP. (PSIG/°F)	RV SET PRESSURE (PSIG)	RANGE	MAT'L OF CONST.	IS RD CODE STAMPED		
0440-F	D-743 Cat. Pot		BS&B	S-90	330/300		0Z	N1	No	4	SRB-7RS
0440-F	D-744 Cat. Pot		BS&B	S-90	330/300		0Z	N1	No	4	SRB-7RS
0436-D	D-745 Cat. Pot	45-784	BS&B	S-90	330/300		0Z	N1	Yes	6	SRB-7RS
0436-B	D-741 AMS K111 Pot		BS&B	S-90	400/720	400	0Z	N1	No	1	SRB-7RS
0436-B	D-742 AMS K111 Pot		BS&B	S-90	400/720	400	0Z	N1	No	1	SRB-7RS
0436-B	D-743 AMS K111 Pot		BS&B	S-90	400/720	400	0Z	N1	No	1	SRB-7RS
0436-B	D-744 AMS K111 Pot		BS&B	S-90	400/720	400	0Z	N1	No	1	SRB-7RS
0436-B	D-745 AMS K111 Pot	45-786	BS&B	S-90	400/720	400	0Z	N1	No	1	SRB-7RS