



FORMOSA PLASTICS CORPORATION DELAWARE

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CERTIFIED MAIL
RETURN RECEIPT REQUESTED

June 18, 1985

Mr. Robert R. French, P.E.
State of Delaware
Department of Natural Resources
and Environmental Control
Air Resources Section
P. O. Box 1401
Dover, Delaware 19903

RE: AIR EMISSIONS CONSENT ORDER 84C-DE-73

Dear Mr. French:

As part of Formosa Plastics Corporation's obligations under the Consent Order, there is a requirement that within ninety (90) days a preliminary design for a vinyl chloride monomer (VCM) containment system shall be submitted for approval.

Formosa has completed its preliminary design and is submitting it for approval. Please find enclosed three process flow diagrams which each cover one of the processing units (S1, S2 and E2), and a copy of the containment system design and operation description.

If you have any questions concerning this matter, please call me at (302)836-2211.

Sincerely,

R. W. Boyer
Plant Manager

RWB/ab
Attachments: (4)
cc: J. Hardman

CTL020091

VINYL CHLORIDE CONTAINMENT SYSTEM

PRELIMINARY DESIGN PROPOSAL

BY

FORMOSA PLASTICS CORPORATION, DELAWARE

FOR ITS

DELAWARE CITY PVC PLANT

CTL020092

I. INTRODUCTION

The Formosa Plastics Corporation Delaware City PVC plant is committed to preventing the release of vinyl chloride to the atmosphere through safety relief valve discharges from reactors and other vessels in vinyl chloride service. A number of capital and management projects have already been completed and more have been initiated to minimize the possibility of this occurrence. Most of these efforts are designed to prevent abnormal or emergency conditions that can cause high pressure conditions that result in relief valve discharges. The remaining possibility of equipment malfunction or human error requires that an early pressure relief system be installed to safely contain high pressure conditions that may be caused by abnormal or emergency situations without releasing vinyl chloride to the atmosphere.

The following proposal has been prepared to ensure that vinyl chloride is properly contained and not released to the atmosphere through pressure vessel safety valves.

CTL020093

II. BASIS FOR VINYL CHLORIDE CONTAINMENT SYSTEM

The Formosa Plastics Corporation Delaware City PVC plant consists of three separate processing units for the polymerization of vinyl chloride into PVC resins. The combined operation has thirty-one reactors and over forty vessels in vinyl chloride service. Each of these vessels are equipped with safety relief valves to prevent catastrophic failure if the pressure exceeds vessel design. In the course of operation of reactors and vessels, human error or mechanical failure can result in pressures exceeding design causing the relief valve to operate which results in a release of vinyl chloride to the atmosphere. The large number of reactors and vessels in vinyl chloride service presents a high potential for relief valve discharges at the Delaware City plant.

The National Emission Standards for Hazardous Air Pollutants (NESHAP) for vinyl chloride prohibits relief valve discharges unless they are not preventable. Over the past few years, Formosa experienced a high number of relief valve discharges resulting in a suit filed by the State of Delaware. Although Formosa's position is that the releases were not preventable, Formosa and the State agreed to settle the suit out of Court in the form of a Consent Order. The Out of Court Settlement is embodied in Consent Order C. A. 84C-DE-73 by The Superior Court of The State of Delaware between The State of Delaware and Formosa Plastics Corporation, Delaware. Part of the Consent Order agreement provided for a system to control relief valve discharges referred to as a containment system, specifically recorded in Section I.B. of the Order.

A preliminary design for the containment system has been developed that provides an early pressure relief for reactors and vessels in vinyl chloride service without interfering with the safety relief valve system. The design also integrates the containment system equipment with normal operation to assure continuously usable and reliable equipment and personnel familiarity in case of emergency needs. This proposal is described herein and is provided according to the Consent Order. CTL020094

III. OPERATING SYSTEM DESCRIPTION

A. SPVC AREA

The current 12,000 gallon degassing tanks will be converted to knock out pots and degassing will take place in reactors. This will provide 48,000 gallons of contained vapor space to receive reactor and other vinyl chloride vessel pressure should the need arise. Piping to and from the degassing tanks will be modified so they can be utilized as VCM vapor containment tanks rather than slurry degassing tanks. Reactor slurry discharge piping will be modified to allow direct transfer of PVC slurry to the new stripping column slurry surge tanks.

A new emergency vent line with automatic pressure relief valve will be provided on each reactor to vent into the monomer recovery header to prevent relief valve discharges from reactors. The automatic early pressure relief valves will be set to relieve pressure 5% below the safety relief valve setting.

A new emergency vent line with automatic early pressure relief valve will be provided on vessels in vinyl chloride service with these vent lines tied to the vinyl chloride vapor containment tanks. The early pressure relief valves will be set 5% below the safety relief valve setting.

In the event of a power failure, the vinyl chloride containment system will provide backup for the emergency generators. Manual venting can be utilized to help mix in the short stop for terminating batches should the emergency generator fail to energize and provide power for reactor agitators.

The vinyl chloride recovery system operation will be modified to provide vapor surge capacity to maintain the containment vessels at a constant 5 to 10 psig pressure. This will require just over one fast vent compressor. Five are currently used on a demand basis. Extra compressors will be instrumented to come on automatically if system pressure exceeds 10 psig. Thirty thousand gallon bullets will be added to stabilize the recovery system by providing adequate surge capacity during normal vinyl chloride recovery operations.

The new lines and tanks will be used routinely during the polyvinyl chloride manufacturing process for the recovery of unreacted vinyl chloride. Monomer will be vented from reactors and stripping area slurry surge tanks to the containment vessels and from the containment vessels vinyl chloride vapor will be recovered by the recovery system. The routine use of this system not only assures equipment reliability but also operator training and familiarity with the equipment is maintained. Process flow diagrams 2-22 and 2-23 for the proposed system in the SPVC area are attached for reference.

B. EPVC AREA

A new knock out pot will be added to the E-2 reactor area. This vessel will serve as a vapor surge tank for receiving early pressure relief from reactors and other vessels in vinyl chloride service should the need arise. Piping will be added to connect early pressure relief vents from reactors and vessels in vinyl chloride service to the new vapor surge tank.

A new emergency vent line with automatic early pressure relief will be provided on each reactor to vent into the monomer recovery header to prevent safety relief valve discharges from reactors. The automatic early pressure relief valves will be set to relieve pressure 5% below the safety relief valves.

A new emergency vent line with automatic early pressure relief valve will be provided on vessels in vinyl chloride service with these vent lines tied to the vapor surge tank. The early pressure relief valves will be set to relieve pressure 5% below the safety relief valves.

The vinyl chloride recovery system operation will be modified to provide vapor surge capacity to maintain the recovery system compressor inlet pressure at a constant 5 to 10 psig pressure. Existing compressors will be instrumented to start automatically if the system pressure exceeds set point. One 30,000 gallon bullet will be added to provide the recovery system with adequate surge capacity for normal vinyl chloride recovery operations.

The new lines and vapor surge tanks will be integrated into the normal process which will provide assurance of equipment reliability and personnel familiarity with the system.

Attached is Process Flow Diagram 2-24 which presents the proposed system for the EPVC area. This flow diagram also includes preliminary design for upgrading the E-2 latex stripping process, which is exclusive of the containment system. Latex stripping is currently carried out in the E-2 reactors.