APPENDIX XII

American Risk Management Corp.

RBC Plaza
465 Union Avenue
Bridgewater, New Jersey 08807
(201) 722-7980
Telex 855432

April 15, 1989

RECEIVED

MAY 1 1989

R.I.S. INC.

Mr. John Fletcher, Plant Engineer
B. F. GOODRICH COMPANY
Geon Vinyl Division
P. O. Box 400
Pedricktown, NJ 08067

RE: ARM File No. 1428210
Boiler & Machinery Survey

Dear Mr. Fletcher:

This will confirm my visit to your location on March 30, 1989, for the purpose of updating the underwriting information, reviewing the operating and maintenance procedures, and evaluating boiler and machinery exposures.

You and I met first to outline my objectives and to arrange for a plant tour, and also to meet with other appropriate personnel. Mike Daly, Associate Engineer, was my guide.

This survey included the visual observation of major equipment throughout the facility with regards to operation and maintenance. The general condition of equipment inspected was found to be satisfactory.

The safety/relief valve inspection and testing program for the plant as a whole was reviewed with John Shoemaker. The program was found to be up-to-date except for a few minor items which will be handled before June, 1989.

Since my last visit, a new 800 HP ammonia chiller has been installed. This became necessary due to the installation of two additional reactors in the large poly area. The total capacity of the ammonia cooling system is now 3600 HP.

A review was made of electrical distribution system components, ie: transformer oil analyses and gas-in-oil test results with Harold Kline. No adverse conditions were noted.

I also discussed pressure vessel repair documentation with Ed McKinley and provided him with an inspection program for autoclaves, hydroclaves, and autoclave closures.

As a result of this visit, one recommendation is being submitted for your consideration in an effort to reduce the possibility of an unscheduled outage.

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The cooperation I received from your staff was greatly appreciated. If there are any questions or comments after reading this report, please call me.

I remain,

Yours very sincerely,

Ron Teague

Ronald S. Teague
Senior Engineering Consultant
Boiler and Machinery

RST/cs
Enc.

cc: P. Gaydos - BFG/Cleveland (6)
D. Hatch - BFG/Akron
J. McNamee - A&A/Houston
D. Livingstone - CIGNA/N.Y.
M. F. Colaric - IRI/Chicago
H. Arch - ARM/Cleveland
B&M Dept. - ARM/Cleveland
Files

B & M REPORT SUPPLEMENT

CLIENT: B. F. Goodrich Co.
Geon Vinyl Division

LOCATION: Pedricktown, N.J.

ARM File No. 1428210

DATE: March 30, 1989

Based on annual B.I. value of $29,200,000

BY: R. S. Teague

Probable Maximum Loss Scenario

P. D. - $300,000
B. I. - $568,000
TOTAL - $868,000

Failure of one of the 3750 KVA power centers supplying the refrigeration equipment during the high demand period. Time required to replace equipment is estimated at 7 working days. These figures are based on the above B.I. value and 360 working days per year.

Maximum Foreseeable Loss Scenario

P. D. - $ 500,000
B. I. - $4,785,000
TOTAL - $5,285,000

A catastrophic failure of one reactor with concomitant circumstances could result in a 100% shut-down for a period of 14 working days. A further period of 90 days at 50% can also be anticipated. Reactor repairs would take place during this time. These figures are based on the above B.I. value and 360 working days per year.

Comments:

Another area that could result in an MFL loss would be failure of the waste water stripping column. This could result in a 100% plant shut-down for a period of about 30 days.

Comment for Risk Management:

None

Do Advisory Recommendations exist for this location? ____Yes __X__No

Last Underwriting Report dated __February, 1987

Major changes attached ____Yes __X__No

Complete update attached __X__Yes ____No

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#1428210

INTERNATIONAL RISK MANAGEMENT GROUP

# BOILER & MACHINERY LOSS POTENTIAL STUDY

and

# PREVENTIVE MAINTENANCE PROGRAM EVALUATION

NAME: THE B. F. GOODRICH COMPANY

LOCATION: Chemical Plant
P.O. Box 400
U.S. 130 and Porcupine Road
Pedricktown, N.J. 08067

DATE: March 30, 1989

SURVEY BY: R. S. Teague (Bridgewater, N.J.)

## GENERAL

This is a large Chemical Plant which produces polyvinyl chloride (PVC) resins. This material is primarily used to produce PVC molded products. The raw material is vinyl chloride monomer, most of which comes from the Calvert City Plant. There are no interdependencies with other BFG locations, either for raw materials or products being shipped from Pedricktown. Production operations are continuous, 24 hours per day, 7 days per week, with perhaps a 5-day shut-down per year for major maintenance. The plant was originally built in 1969 with additions at various times since then, and operates with approximately 320 salaried and hourly personnel.

## PROCESSES

Suspension Resin (Bldg. 531): The Suspension area polymerizes vinyl chloride in six 18,600 gallon reactors. The resulting polyvinyl chloride (PVC) is transported in a water slurry containing residual monomer to downstream holding tanks. From these tanks the slurry is pumped through a stripping column where the residual vinyl chloride is recovered from the slurry. The Suspension Resin Process is fully automatic using a process control computer. The slurry stream from the column is then sent through a centrifuging and drying process to obtain the desired product, a dry PVC resin. This resin is stored in silos and sent to customers by railcar, bulk truck, or in bags.

PROCESSES - Continued

Acrylic Latex (Bldg. 502): Hycar Latex is manufactured via a batch emulsion polymerization process. Bulk monomers are stored in the plant tank farm. Bulk emulsifier is stored in 2 tanks next to Process Building 502. Drum and bag raw materials for this process are stored in the Latex Warehouse which is part of Building 502.

The reactor vessels (Polys) are nominal 4,000 gallon jacketed pressure vessels provided with agitators and internal cooling surfaces to remove the heat of reaction. The monomers (various acrylates, styrene and acrylonitrile) are mixed with emulsifier and water in a Premix Tank. This mixture is then metered to a polymerizer where a catalyst is introduced to start the reaction. The reaction proceeds at a controlled temperature. The reaction ends at greater than 99% conversion and is finished later in a chemical stripping step. Reaction mixture and control is accomplished by a Fisher ProVox process computer system. The latex is stored in blend tanks ranging from 12,000 to 25,000 gallon size. Tanks are either cement tanks with tile or epoxy lining, or fiberglass. The finished products are loaded to 4,000 or 5,000 gallon trucks, railcars, and drums from blend tanks.

Mass Resin (Bldg. 512): The Mass Resin area employs a 2-step bulk polymerization process in which vinyl chloride monomer, catalyst, and other additives are used to manufacture polyvinyl chloride resin. The reactions are run batchwise starting with a vertical pre-polymerizer and going to full conversion in one of four horizontal autoclaves. The Mass Resin Process is fully automated using a process control computer. Raw material addition and resin transfer are the only manual tasks involved in the process.

Upon completion of the polymerization, the resin is transferred by a suction air transfer unit. Transferred material is then dropped through a series of mechanical screeners and separators to classify the resin.

Finished product is shipped to the individual customers in bulk truck, bulk railcar, or bag form, depending on the specific needs of the customer.

Dispersion Resin (Bldg. 513): The production of Dispersion Resin begins in a remix vessel. This vessel is charged with water, vinyl chloride monomer, emulsifiers, and catalyst. The mixture is homogenized to uniformly distribute the raw materials and is then transferred to a polymerization reactor. Polyvinyl chloride (PVC) is dispersed in a water carrier. This slurry is transferred to a stripping system where residual vinyl chloride monomer is removed and recovered.

The stripped slurry is concentrated to reduce the water content and transferred to a spray dryer. The dryer atomizes the slurry into a hot air stream to flash out the remaining water. The resin is ground to break up any agglomerated particles produced in the drying step and the finished product is now packaged in bags and shipped to customers.

## SERVICES

Steam: Steam is used for process, heating, and small turbine power applications. There are two Riley water tube package steam generators connected to a 200 PSI system. Each unit is gas/oil fired and capable of producing 75,000 lbs/hr. The winter requirement is 85,000 lbs/hr. and the summer load ranges from 40,000 to 50,000 lbs/hr. There are numerous pressure reducing stations (200 PSI to 60 PSI) servicing the process equipment. A sustained business interruption due to loss of steam is not likely as rental units are available and could be installed within a 7 or 8 day period.

Electricity: Power is supplied to the plant by Atlantic City's electric "old man" switching station that is fed from a utility grid by two 69 KV feeders from the Deepwater substation and the Paulsboro substation. Both of these suppliers are continuously energized. The 69 KV is reduced to 13.8 KV by two BFG 10,500 KVA, mineral oil cooled, power transformers. The 13.8 KV is distributed by overhead cables in trays to the plant's various main transformer power centers. The main transformers are connected by a normally open tie breaker. The main substation has a built-in disconnect switch to accommodate a mobile power supply if required. Present load conditions are such that one of the main units can maintain full plant production. Most plant power centers have secondary bus tie switches that will insure uninterrupted power supply. The two exceptions are the 3750 KVA, 2400 volt systems to the ammonia compressors, and the freon refrigeration systems. There are two emergency diesel driven generators (1000 KW and 750 KW) to insure a continuous power supply to the reactor agitators, control rooms, and critical process equipment. All transformers are mineral oil cooled and have been tested for PCB contamination. The plant has a procedure for handling the repair and disposal of PCB filled capacitors. The system is well designed with adequate capacity and would not present a serious business interruption or property loss. The estimated time to complete temporary repairs would be one to five days.

Compressed Air: Plant air is supplied by one 100 PSI instrument, factory and breathing air system. There are two Elliott centrifugal compressors, one of which is a 300 HP, motor driven, 1200 CFM unit, and the other a 450 HP, motor driven, 2100 CFM unit. Both units are required to supply the total air demand. A new 3100 CFM air compressor is to be installed this year. The 2100 CFM unit will then be removed. A sustained outage or business interruption loss due to compressed air is not likely as rental units are readily available within a 24 hour period.

Water: Plant water is supplied by three 30 HP deep well pumps, all located on BFG property. One treatment system is located in the boiler room supplying an 80,000 gallon reservoir. The second treatment system is used for process water, domestic water supply, and make-up to the plant's two large cooling towers. This system has a 50,000 gallon reservoir. The pumping and circulation systems have built-in spares insuring uninterrupted service. Exposure would be in the piping underground distribution system. A broken main would require approximately one day to repair.

SERVICES - Continued

Nitrogen Gas: Nitrogen gas is purchased from Airco via pipeline at a rate of 1,000,000 cubic feet per month. Nitrogen is used for product blanketing and seals. This source is very dependable and could be supplemented by truck delivery. The nitrogen supply does not present a serious exposure.

Propane. Two horizontal propane storage tanks were installed during the third quarter of 1987. They are used as a secondary fuel supply for the three dryers located in Building 515. Approximate physical dimensions are 8' x 40'. There are also two direct-fired vaporizers in the system.

Refrigeration: Presently, there are two systems; one of which is a 1850 HP, freon, indirect chilled water system (this system is now idle), and the other is a 3600 HP, direct ammonia system used exclusively for reactor cooling. A stand-by unit is always available in each system.

Chilled water freon units are:

Two - 600 HP units
One - 350 HP unit - hermetic
One - 300 HP unit

Direct ammonia system units are:

Four - 700 HP units
One - 800 HP unit (this unit was installed in 1988)

Both systems have a built-in spare. A sustained business interruption loss due to refrigeration failure is not likely.

## EQUIPMENT EXPOSURE

As with any other operation of this kind, there is a variety of critical items such as reactor vessels, autoclaves, compressors, motors, etc. For the most part, there are a number of such items. This, in itself, reduces the exposure. However, the lead time required to replace any of these items can be at least six months.

## GENERAL MAINTENANCE AND OPERATING PHILOSOPHIES

There are good preventive maintenance programs in all areas of this operation. The safety/relief valve inspection and testing program is well managed. The electrical distribution system components are also provided with excellent P.M. programs. General maintenance is performed under contract by the "Allied Maintenance, Inc." under the direction of BFG Management. The status of the Pre-emergency and Recovery Plans has not changed since our last visit. It is constantly updated.

## SPARE PARTS

The availability of spare parts for auxiliary equipment is acceptable. Spares for major equipment and stand-by equipment, including excess capacity, is also good.

## UNIQUE EXPOSURES

Exposures presented by this location are common to this industry. There is no unique equipment.

## SUMMARY

The large specialized equipment at this plant presents a number of exposures. However, due to the in-line, stand-by equipment, spare parts inventory, and preventive maintenance programs, reasonable steps are being taken to minimize unscheduled outages. Plant management is aware of the necessity of on-going training programs, both formal and on-the-job, with particular attention being paid to operator awareness.

The following recommendation is being submitted as a result of this visit and in an attempt to reduce the possibility of an unscheduled outage.

Recommendation BM89-1

The battery banks (UPS) which provide power to the computer control system for the Mass, Paste, and large Poly areas, are included in a preventive maintenance program. Due to the importance of these battery systems should there be a power interruption, we would recommend more frequent inspections and testing. Initially, the testing and maintenance should be in accordance with IEEE Standard 450. Specific test procedures should include, on a weekly basis, a general inspection, check on charger current and voltage, pilot cell voltage, and electrolyte level. In addition, the voltage, specific gravity and temperature of cells should be noted and recorded, monthly. Twice a year, the resistance of all cell connections should be checked, and a load test performed yearly.

Discussion: Examination revealed signs of sulfates on some connections. These should be cleaned off and greased.