

"Hazardous Waste Treatment and Storage Considerations at PVC and EDC Plants"

Presented By:

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to

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(VCSA)

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PURPOSE

The purpose of this presentation is to explain:

1. The EPA Allegations
2. The Agreement between EPA and Formosa
3. The Corrective Action Process
4. The Design Criteria to Prevent Future Environmental Problems

BACKGROUND

In early October, 1990, EPA proposed a record \$8.3 million fine for Formosa Plastics Corporation, Texas. Five months later (February, 1991), Formosa and the EPA settled on a payment to the EPA of \$3.4 million and the establishment of a trust fund of \$1 million for environmental education and environmental projects.

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Notes

EPA Allegations:

In a "nutshell", EPA alleged Formosa Plastics Corporation, Point Comfort, Texas was an operator of a Hazardous Waste Treatment, Storage, and Disposal Facility (TSD) and therefore, subject to all the regulations (40 CFR 264 or 265) governing TSD facilities. Formosa claimed it was a generator of hazardous waste and subject to, and in compliance with, those regulations (40 CFR 262).

The allegation was an outgrowth of a \$237,000 fine which was proposed by the EPA in 1986 and dismissed "without prejudice" in 1989. In October 1990, the EPA reissued almost the same charges which had been dismissed, but the penalty had been boosted to \$8.3 million.

One of the main points of contention was the storage of by-products heavy ends from the distillation of ethylene dichloride and heavy ends from the distillation of VCM. By definition, these "heavy ends" are classified as Hazardous Wastes K019 and K020. However, these heavy ends are sold to another company for direct use as a feedstock. There was a formal request to the EPA by FPC's lawyer to reclassify this material as "solid wastes", but the EPA's ruling was still pending.

Formosa has, in the past, voluntarily manifested the materials as K019 and K020 wastes. These materials were routinely shipped off less than 90 days after they were generated and were stored in on-site tanks in accordance with 40 CFR 262.34.

The other EPA complaint was that Formosa's waste water treatment unit was also a Hazardous TSD because at times it treated hazardous wastes (EDC - U077, and the K019 and K020 wastes). Formosa contended the U077, K019 and K020 were only treated in the waste water treatment system during upset and/or emergency conditions (about 5 or 6 times between 1983 and 1990). The EPA claimed that FPC routinely treated hazardous waste due to spills and leaking equipment. FPC contended there were few and small leaks and they were therefore excluded from the RCRA TSD regulations because of the "de minimis" exemption 261.33 clause.

The 10 counts (overhead) of EPA's proposed assessment stem from EPA's finding that FPC should be a RCRA TSD Facility.

Formosa could not convince the EPA to withdraw the complaints and allegations. Rather than spending many months and dollars for lawyers arguing with the EPA over the interpretation and implementation of the regulations, Formosa's Chairman Y. C. Wang quickly decided to negotiate a settlement.

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It is the Chairman's philosophy to work with the EPA in a cooperative team approach to solve environmental problems. He instructed the FPC employees, "EPA is the teacher and you should be his best students."

EPA's penalty calculation discussion

EPA - Formosa agreement (overhead) discussion

R&S 148102

EPA's PROPOSED ASSESSMENT

<u>VIOLATION</u>	<u>AMOUNT (\$)</u>
COUNT I - Failure to submit a Part A and Part B Permit	925,000
COUNT II - Failure to prepare and follow a waste analysis plan	925,000
COUNT III - Failure to make an adequate hazardous waste determination	925,000
COUNT IV - Failure to use and maintain containers which are sturdy, leakproof, will not be deteriorated by their contents and are of sufficient strength and construction	925,000
COUNT V - Failure to maintain an inspection log and to keep records of inspections for at least threee years after the date of the initial inspection	925,000

COUNT VI -	Failure to develop and follow a written schedule of inspections of operating equipment, security devices, and operating and structural equipment used for prevention, detection, or response detection to human health hazards	925,000
COUNT VII -	Failure to comply with training requirements	6,500
COUNT VIII -	Failure to develop a written closure plan	925,000
COUNT IX -	Failure to demonstrate financial assurance for closure	925,000
COUNT X -	Failure to obtain a written tank integrity assessment	925,000
	TOTAL	8,331,500

EPA's PENALTY CALCULATION

- Brand new enforcement policy - on or about October, 1990

- Penalty Calculation Used For Formosa:

1. First day of violation: \$ 25,000

2. Six month violation:

180 days X \$5,000/day = \$900,000

TOTAL \$925,000

EPA'S PENALTY CALCULATION

Brand new enforcement policy -

In 1984, EPA was authorized to extract per day fines for the duration of the violation. EPA Regional Officers chose not to impose time based penalties

On or about October, 1990, EPA's new policy made it a requirement to impose time based penalties.

The new formula determines fines based on the gravity of the violation.

Sample calculation included in the EPA policy statement uses a case of a company failing to completely fence in a hazardous area. Under the old policy, the penalty would total about \$24,240. Under the new policy, it would reach \$401,576.

PENALTY CALCULATION USED FOR FORMOSA

Even though EPA felt Formosa was in violation for several years, they arbitrarily picked a six month period for penalty calculations. They also reduced the fine from \$25,000 per day to \$5,000 per day. This resulted in the \$925,000 for each penalty, as follows:

R&S148106

1.	First day of violation:	\$ 25,000
2.	Six month violation: 180 days X \$5,000/day =	<u>\$900,000</u>
	TOTAL	\$925,000

EPA indicated they could have fined FPC over \$90,000,000 if they chose a \$25,000 per day fine for a longer period than 6 months.

R&S148107

EPA - FORMOSA AGREEMENT

- | | |
|---|-------------|
| 1. Civil Penalty | \$3,375,000 |
| 2. Trust Fund | \$1,000,000 |
| 3. Four (4) Annual Environmental Audits | |
| 4. Pollution Prevention Projects | |
| 5. Corrective Action Plan | |

PURPOSE OF TRUST

The purpose of the Trust is:

- to support the local community environmental awareness and education through the creation of a community outreach program
- to educate the community about the plant and the compliance efforts of the plant
- to purchase and donate to local government real property in South Texas for public benefit

- to provide funds to approved organizations and institutions for projects, programs, and academic awards associated with conservation, preservation, protection, and restoration of the environment, wildlife and natural resources of South Texas
- to provide funds to approved organizations or institutions for research, development and implementation of projects and programs for:

industry waste minimization and pollution control;

waste treatment technology projects and programs; and

the impact of hazardous waste TSD operations on the surrounding public community of chemical manufacturing facilities in Texas.

THIRD-PARTY AUDITOR

The auditor, approved by the EPA and paid for by Formosa Plastics Corporation, Texas, is required to:

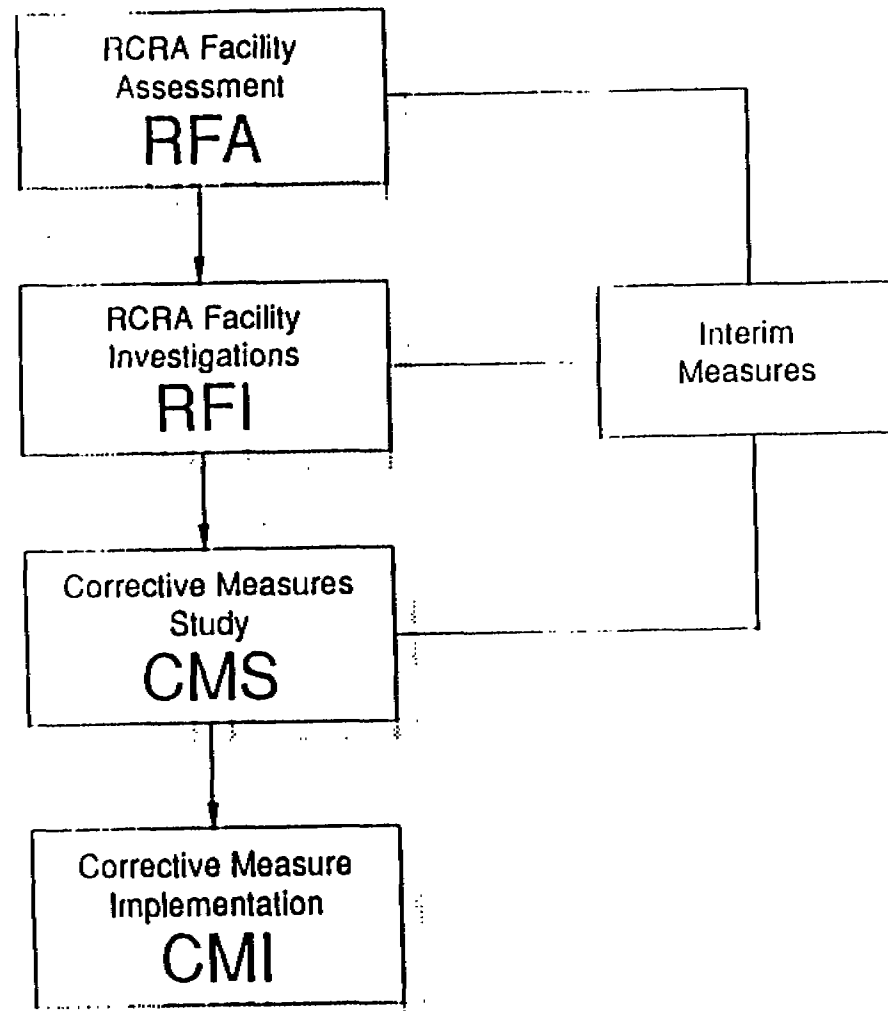
- provide a report that assesses and evaluates FPC compliance with applicable environmental statutes and regulations, including RCRA, CAA, EPCRA, and CWA, as well as the comparable Texas regulation and statutes;
- provide FPC with recommended procedures for dealing with environmental hazards that may not be specifically addressed in the above statutes and regulations;

provide FPC with written training procedures to teach and motivate FPC personnel and FPC contractors to work in an environmentally sound manner, and to know, understand, and comply with environmental statutes, environmental regulations, and FPC environmental policies;

- communicate to FPC upcoming changes and developments in environmental laws and waste management procedures;
- provide recommendations on incorporation of environmental measures into FPC written operating procedures;
- provide FPC with recommendations of best waste management techniques;

- provide FPC with recommendation for improving preventative and corrective maintenance systems;
- provide FPC with recommendations for the use of most-effective sampling and monitoring techniques, test methods, record keeping systems, and reporting protocols;
- evaluate any environmentally harmful incidents and recommend procedures to avoid reoccurrences; and
- demonstrate to FPC waste reduction, recycling and reuse practices as well as material and process substitution.

CORRECTIVE ACTION PROGRAM



Formosa Plastics Corporation Corrective Action Plan

ACCELERATED RCRA FACILITY ASSESSMENT (ARFD)

- Task I: Installation of Additional Wells
- Task II: Sampling of Monitoring Wells
- Task III: Waste Water Outfall Monitoring
- Task IV: Accelerated RCRA Facility Assessment Report
- Task V: Sludge/Solid/Liquid

INTERIM MEASURES STUDY

- Task I: Identification and Development of the Interim Measures Alternatives
- Task II: Evaluation of the Interim Measure Alternative
- Task III: Justification and Recommendation of the Interim Measure
- Task IV: Interim Measure Workplan
- Task V: Interim Measure Construction
- Task VI: Reports

RCRA FACILITY INVESTIGATION (RFI)

Task I: Preliminary Report: Description of Current Conditions

Task II: RFI Workplan Requirements:

- A. Project Management Plan
- B. Data Collection Quality Assurance Plan
- C. Data Management Plan
- D. Health and Safety Plan
- E. Community Relations Plan

Task III: Facility Investigation:

- A. Environmental Setting
- B. Source Characterization
- C. Contamination Characterization
- D. Potential Receptors

Task IV: Investigative Analysis

Task V: Laboratory and Bench-Scale Studies

Task VI: Reports

CORRECTIVE MEASURE STUDY (CMS)

- Task I: Identification and Development of the Corrective Action Alternative or Alternatives
- Task II: Evaluation of the Corrective Measure Alternative or Alternatives
- A. Technical/Environmental/Human Health/Institutional
 - B. Cost Estimate
- Task III: Justification and Recommendation of the Corrective Measure or Measures
- Task IV: Reports

CORRECTIVE MEASURE IMPLEMENTATION (CMI)

Task I: Corrective Measure Implementation Program Plan

Task II: Corrective Measure Design

- A. Design Plans and Specifications
- B. Operation and Maintenance Plan
- C. Cost Estimate
- D. Project Schedule
- E. Construction Quality Assurance Objectives
- F. Health and Safety Plan
- G. Design Phases

Task III: Corrective Measure Construction

- A. Responsibility and Authority
- B. Construction and Quality Assurance Personnel
- C. Inspection Activities
- D. Sampling Requirements
- E. Documentation

Task IV: Reports

- A. Progress Report
- B. Draft Report
- C. Final Report

Formosa Plastics Corporation

Corrective Action Plan

1. Accelerated RCRA Facility Investigation
(ARFI)
2. Interim Measures Study
3. RCRA Facility Investigation (RFI)
4. Corrective Measures Study (CMS)
5. Corrective Measure Implementation
(CMI)

RCRA FACILITY ASSESSMENT

A RCRA Facility Assessment (RFA) embraces the identification of past, present or potential releases of hazardous wastes or hazardous constituents into the environment from any unit or activity that involves management of solid wastes as defined in 40 CFR 261.2 in a facility operating under interim status as per 40 CFR 265 or under a permit as per 40 CFR Parts 270, 264. The Assessment shall address releases of hazardous wastes or constituents to all media including soil, groundwater, surface water, air, and the generation of subsurface gas. Any release that has migrated beyond the facility boundaries shall also be considered. The ulterior purpose of a RFA will be the implementation of corrective actions where necessary as mandated by the 1984 Hazardous and Solid Waste Amendments (HSWA) made to the Resource Conservation and Recovery Act. (RCRA).

The present project is intended to identify the Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) that could have potential or a history of hazardous waste releases at Formosa Plastics Corporation, Point Comfort, Texas .

A Solid Waste Management Unit is defined as:

Any discernible unit at which solid or hazardous wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. It would include any area at which hazardous waste or hazardous constituents have been routinely and systematically released; but, it would not include accidental spills from production areas and units in which wastes have not been managed.

On the other hand, an Area of Concern is defined as:

Any area at which hazardous waste or hazardous constituents have been released but such release is not routinely and systematically done. An AOC also includes any area for which there is a suspicion that a release occurred.

RCRA FACILITY ASSESSMENT

EPA determines if there is evidence of a release from a SWMU or from an "Area of Concern" or area of environmental concern (AOC/AEC).

Establishes scope of your corrective action responsibilities

Considers historical information

- Waste generation**
- SWMU or AEC characteristics**
- Waste characteristics**
- Media and migration**
- Evidence of releases**
- Environmental setting**
- Exposure**

Should be complete before the permit or order

Guidelines To Basic Environmental Design Criteria

1. EDC Storage Tanks (Aboveground)
 - double steel bottom design
 - all tanks designed to handle chemicals on the
Toxicity Characteristic List
2. Hazardous Waste Storage Tanks
 - secondary containment design
 - leak detection system
3. EDC Chemical Sewer System
 - pipe within a open ditch

4. Paving And Equipment Containing Hazardous Chemicals

5. Preliminary Treatment of Waste Water

- all waste water is pretreated to the TCLP levels
- waste water tanks that may contain hazardous materials due to upset conditions are designed to meet RCRA requirements

TRUE CONFESSIONS

SAFETY1

FACTS

SAFETY11

BURST OF 26 RUPTURE DISCS

AND

OPENNING OF RELIEF VALVES

SO

50 TONS OF VCM AND PVC

TO THE ATMOSPHERE

SAFETY2

WE HAD TWO IMPORTANT CHANGES
IN OUR PROCESS

**1.- CHANGE IN THE OPERATING PRESSURE
OF OUR RECTORS.**

**2.- CHANGE IN THE OPERATING PRESSURE
AND IN THE CONTROL OF THE OPERATING
CONDITIONS OF THE REACTORS**

SAFETY4

FIRST CHANGE
CONDITIONS BEFORE:

OPERATING PRESSURE: 9.5 KGS/CM2 (135 PSIG)

RUPTURE DISC INSTALLED: FORWARD ACTING
RUPTURE DISC

BURST PRESSURE: 14 KGS/CM2 (200 PSIG)

RATIO OPERATING P./ BURST P.: 0.7 (9.8 KGS/CM2
140 PSIG)

CONDITIONS AFTER:

OPERATING PRESSURE: 11.5 KGS/CM2 (163 PSIG)

RUPTURE DISC INSTALLED: FORWARD ACTING
RUPTURE DISC

BURST PRESSURE: 14 KGS/CM2 (200 PSIG)

RATIO OPERATING P./ BURST P.: 0.7 (9.8 KGS/CM2
140 PSIG)

SAFETY3

SECOND CHANGE
CONDITIONS BEFORE:

OPERATING PRESSURE: 11.5 KGS/CM2 (163 PSIG)

RUPTURE DISC INSTALLED: FORWARD ACTING
RUPTURE DISC

BURST PRESSURE: 14 KGS/CM2 (200 PSIG)

RATIO OPERATING P./ BURST P.: 0.7 (9.8 KGS/CM2
140 PSIG)

CONDITIONS AFTER:

OPERATING PRESSURE: 12.5 KGS/CM2 (178 PSIG)

RUPTURE DISC INSTALLED: FORWARD ACTING
RUPTURE DISC

BURST PRESSURE: 14 KGS/CM2 (200 PSIG)

RATIO OPERATING P./ BURST P.: 0.7 (9.8 KGS/CM2
140 PSIG)

SAFETY6

AFTER FIRST CHANGE

5 DISCS BURST

AFTER SECOND CHANGE

21 DISCS BURST

SAFETY7

CAUSES

SAFETY8

- 1.- CHANGES MADE IN THE PROCESS WITHOUT TAKING INTO ACCOUNT SAFETY DEVICES.**
- 2.- THE RUPTURE DISCS INSTALLED WERE NOT THE SPECIFIED TO THE NEW OPERATING CONDITIONS OF THE REACTORS.**
- 3.- NOT TO TAKE INTO ACCOUNT TECHNICAL ADVISE OF THE MANUFACTURERS IN ORDER TO AVOID PULSES GREATER THAN 10 % IN THE OPERATING PRESSURE OF THE REACTORS.**

SAFETY9

CORRECTIVE

ACTIONS

SAFETY10

1.- SELECTION OF NEW RUPTURE DISC

**INSTALATION OF "COMPOSITE RUPTURE DISC
WITH VACCUM SUPPORT" . ZERO MFG RANGE
DESIGNED TO PREVENT METAL FRAGMENTATION**

BURST PRESSURE 15.4 KGS/CM² (220 PSIG)

RATIO O.P./ B.P. = 0.85 (13.0 K/CM², 187 PSIG)

(DESIGN PRESSURE OF REACTORS 14 K/CM², 200 PSIG)

2.- CONTROL OF THE OPERATING CONDITIONS

**WE MADE ALL THE TECHNICAL MODIFICATIONS
REQUIRED IN THE CONTROL OF THE REACTORS
IN ORDER TO REDUCE THE VARIATIONS IN THE
OPERATING PRESSURE. (AVOID PULSES**

GREATHER THAN 10 %)

**(NEW CALCULATION CRITERIA IN CHEMICALS
USED IN THE FORMULATION)**

(NEW CHEMICALS USED IN THE FORMULATION)

(BETTER INSTRUMENTATION CONTROL ADJUSTMENT)

(MAINTENANCE-SAFETY AUDIT PROGRAM)

SAFETY12

CONCLUSIONS

AND

SUGGESTIONS

SAFETY13

**SAFETY MUST BE THE MOST IMPORTANT TOPIC
TO TAKE INTO ACCOUNT WHEN:**

- 1.- MANAGEMENT HAS TO TAKE DECISIONS
ON WHICH COSTS, QUALITY AND
PRODUCTIVITY ARE INVOLVED
- 2.- PROJECT ENGINEERS ARE LOOKING FOR
IMPROVEMENTS IN THE PROCESS.
- 3.- PROCESS ENGINEERS MAKE CHANGES IN
THE PROCESS OPERATING CONDITIONS,

**SAFETY MUST BE THE MOST IMPORTANT TOPIC
TO TAKE INTO ACCOUNT WHEN:**

4.- ALWAYS WHEN YOU HAVE TO MAKE ANY
CHANGE ON PROCESS, FORMULATIONS,
EQUIPMENT, INSTRUMENTATION, CONTROL
CALCULATIONS, ETC.

**IF SAFETY IS NOT THE MOST IMPORTANT ITEM
IN THE MANAGEMENT DECISIONS YOU HAVE
HIGH PROBABILITY TO CAUSE DAMAGE TO
THE RESOURCES OF THE COMPANY.**