

CONTROL TECHNOLOGY ASSESSMENT OF HAZARDOUS WASTE  
DISPOSAL OPERATIONS IN CHEMICALS MANUFACTURING

Walk-Through Survey Report

of

Allied Chemical Corporation  
Fibers and Plastics Company  
Baton Rouge, Louisiana

SURVEY CONDUCTED BY:  
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National Institute for Occupational Safety and Health  
Division of Physical Sciences and Engineering  
Engineering Control Technology Branch  
Chemical Industry Section  
Cincinnati, Ohio 45226

PURPOSE OF SURVEY:

To conduct a preliminary study of hazardous waste disposal operations in chemicals manufacturing with a view to documenting exemplary controls.

EMPLOYER REPRESENTATIVES CONTACTED:

Phil Sorbet, Manager, Environmental and Operational Services  
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EMPLOYEE REPRESENTATIVES CONTACTED:

None

STANDARD INDUSTRIAL CLASSIFICATION  
OF PLANT:

Chemical and Allied Products Sector  
(SIC 28)

## INTRODUCTION

The Resource Conservation and Recovery Act (RCRA) (PL-94-580) of 1976 was enacted to provide technical and financial assistance for the development of management plans and facilities for the recovery of energy and other resources from discarded materials, for the safe disposal of discarded materials, and to regulate the management of hazardous waste. Under Subtitle C of RCRA, the Environmental Protection Agency (EPA) was required to promulgate regulations on identification and listing of hazardous wastes and regulations affecting the generators, transporters, and owners/operators of facilities for the treatment, storage, and disposal of hazardous wastes. These regulations appeared in the Federal Register on May 8, 1980. Amendments affecting the listing of hazardous wastes appeared in the Federal Register November 12, 1980.

There are between 35 and 60 million tons of hazardous wastes generated annually, of which about 15 million are generated by industries in the Chemical and Allied Products Sector (SIC 28). These wastes contain toxic substances which may also be carcinogenic, mutagenic, and teratogenic. Some of the companies in SIC 28 treat, store, and dispose of the wastes that they generate. Wastes may also be transported to companies who specialize in the treatment, storage, and disposal of these wastes. This group of companies is classified as "Refuse Systems" (SIC 4953). It is estimated that about 6,200 workers are directly involved in the transportation, treatment, storage, and disposal of hazardous wastes from SIC 28.

There are many companies in both SIC 28 and SIC 4953 which are currently treating and disposing of hazardous wastes from chemicals manufacturing. Many of these companies have controls in place that are designed to protect the workers from known hazards, both during normal operations and during upsets or emergencies. The objective of this control technology study is to document and disseminate information on effective engineering controls, work practices, monitoring programs, and personal protective equipment. The NIOSH study will result in a technical report designed to assist hazardous waste operators in their efforts to prevent worker exposures to occupational health hazards.

Furthermore, an attempt will be made to present a spectrum of available alternatives for hazard control in various treatment and disposal operations.

The implementation of RCRA regulations has created business opportunities in the area of hazardous waste treatment and disposal. This has also created employment opportunities reflected by a steady rise in the number of workers who are involved in the treatment and disposal of hazardous wastes.

The Occupational Safety and Health Act of 1970 (PL-91-596) was enacted to "assure safe and healthful working conditions for men and women." The Act established the National Institute for Occupational Safety and Health (NIOSH) in the Department of Health and Human Services. NIOSH was charged by this Act with the duty and responsibility to conduct research and develop guidance for preventing exposure of workers to harmful chemical and physical agents. In response to this legislative mandate, NIOSH has conducted major programs to document, develop, and disseminate information regarding the health effects of such agents. To complement these ongoing programs, NIOSH has instituted a major effort to prevent occupational health and safety problems through the assessment and application of control technology in the workplace.

This preliminary survey was conducted as part of a NIOSH project to assess and document effective controls in the routine disposal of hazardous wastes from chemicals manufacturing.

## AUTHORITY

Two of the main policy objectives of the 1970 Occupational Safety and Health Act (PL-91-596) are to:

- o Encourage employers and employees in their efforts to reduce the number of occupational safety and health hazards at their places of employment, and to stimulate employers and employees to institute new and to perfect existing programs for providing safe and healthful working conditions.
- o Provide for research in the field of occupational safety and health with a view to developing innovative methods, techniques, and approaches for dealing with occupational safety and health.

Under Section 20 of the Act, the Secretary of Health and Human Services is authorized to conduct special research, experiments, and demonstrations relating to occupational safety and health as are necessary to explore new problems including those created by new technology.

Paragraph (d) requires the dissemination of the information obtained to employers and employees.

The National Institute for Occupational Safety and Health was established to perform the functions of the Secretary of Health and Human Services described in Sections 2 and 20 of the Act. The manner in which investigations of places of employment are conducted by NIOSH and its representatives is outline in the Code of Federal Regulations (Title 42, part 85a).

## PLANT DESCRIPTION

The Allied Chemical plant located in East Baton Rouge Parish, manufactures high density polyethylene by the Phillips Particle Form Process, Phillips Solution and Solvey et CIE License Process.

## HAZARDOUS WASTES

Hazardous wastes generated by the plant are mainly: (1) chromium catalyst rejects from the catalyst activation process (150 tons); (2) chromium-containing sludge from treatment of cooling tower blowdown (26 tons); (3) miscellaneous laboratory chemicals (5 tons); and (4) spent acids and alkalis used in clean-up of process equipment (50 tons).

## TREATMENT STORAGE AND DISPOSAL

The catalyst used in the polymerization process is a fine powder containing 2 percent chromium. It is activated in a high temperature process. Rejects from reactivation are continuously transported to a Rotoclone<sup>(R)</sup> in which the fine dry powder is mixed with water to produce a paste. The paste is packed in steel drums, temporarily stored on-site, and is eventually disposed of in a secure landfill off-site.

Because of environmental limitations on the daily amount of chromium that may be discharged (1 lb/day) cooling tower blowdown which contains chromate must be treated. The novel treatment technique is an electrochemical process in which the chromium is converted to the less hazardous Cr III. The resulting aqueous stream is then mixed with a polyelectrolyte to aid in precipitation of the chromium in the form of a sludge in one of two ponds. The company has plans for appropriate closure of these ponds at the end of their useful lives.

Waste oils, acids, and laboratory chemicals are temporarily stored on-site and are eventually disposed of by outside contractors.

The on-site storage facility is a diked concrete pad with a tin roof and open on all sides. It is divided into five cells. Drums containing chromic anhydride catalyst paste are stored in the first cell. Empty drums are stored in the second, waste laboratory solvents (hexane and toluene) in the third, and halogenated solvents in the fourth. The fifth is a spare.

## HAZARDS AND HAZARD CONTROL TECHNOLOGIES

### GENERAL CONSIDERATIONS

The basic elements of control technology which are implemented to minimize or eliminate hazards in the workplace are: (1) engineering controls; (2) environmental and medical monitoring; (3) training and education that results in effective work practices; and (4) personal protective equipment. Engineering controls include ventilation, enclosure or confinement of operation, substitution of hazardous agent, process modifications, and automation.

### THE HAZARDS

There is a potential for exposure to chromium-containing dust at the catalyst reactivation facility, and a potential for exposure to corrosive acid at the ANDCO electrochemical unit. The latter hazard may arise when checking the level of acid in a tank used as cell electrode backwash.

### ENGINEERING CONTROLS

Exposure to chromium-containing catalyst dust at the catalyst activation facility is reduced by the use of a device called "Rotocone" in which catalyst rejects are mixed with water to form a paste.

### WORK PRACTICES

The company has written procedures for all hazardous waste storage and handling operations. The manual lists the hazardous wastes including their EPA and State of Louisiana hazardous waste codes. Also included in the procedures are instructions on waste packaging labeling and hazardous waste storage facility operation. There are specific procedures and plans for spill prevention containment and control (SPCC).

All of the wastes generated at this site are eventually disposed of or treated off-site by contractors who specialize in such operations. Allied Corporation has instituted inspections of such operations to determine whether such operations are environmentally sound and whether they are safe from the point of view of the workers at those sites and the surrounding communities. Three inspection reports were made available to the NIOSH survey team.

#### MONITORING

Area sampling for chromium was performed in October 1981 in the Rotocone area. Measured levels were below 0.001 mg per cubic meter as Chromium VI. The company made a written report on the industrial hygiene sampling available to the NIOSH survey team.

#### PERSONAL PROTECTIVE EQUIPMENT

Half-mask air-purifying respirators are worn in the area of catalyst activation and in the vicinity of the Rotocone. A face shield and apron are worn in the ANDCO area when the workers check the level in the acid tank.

## CONCLUSIONS AND RECOMMENDATIONS

There are two novel hazardous waste treatments at this plant. From a control technology point of view, however, they are small scale and the hazards and hazard controls associated therewith are relatively few. No further study of these processes is recommended.