2.0 FACILITY DESCRIPTION

This section describes the facility's location, past and present operations (including waste management practices), waste generating processes, release history, regulatory history, environmental setting, and receptors.

2.1 FACILITY LOCATION

The Akzo facility is located at 8401 West 47th Street in the Village of McCook, Cook County, Illinois. Northwest Quarter of Section 11, Township 38 North, Range 12 East of the Third Principal Meridian; latitude 41°, 48' 16.9" north and longitude 87°, 50' 00.0" west (See Figure 1). The facility occupies approximately 15 acres (USGS, 1981).

The Akzo facility is bordered on the north by Lyons Golf Range; on the west by Sante Fe railroad tracks, First Avenue (IL Route 171); on the south by vacant land (Akzo property), Public Service Co. of Northern Illinois (PSCNI), and residences; and on the east by the Akzo Chemical plant. The research center is surrounded by a security fence with two entrances.

2.2 FACILITY OPERATIONS

The primary activities performed at the Akzo facility are research and development of new products and processes. The facility also made limited quantities of products for orders which were not large enough for the production facility. The facility consists of a main building complex which includes laboratories, a pilot plant, a supply storage area, and an outside interim status RCRA storage pad (Figure 2). The facility occupies approximately 15 acres. There are presently three major categories of hazardous wastes stored at the facility: (1) Spent solvents generated by routine laboratory procedures and equipment cleaning are stored in the interim status RCRA storage pad; (2) Hazardous wastes considered hazardous due to ignitability, corrosivity, reactivity, or toxicity are stored in the interim status RCRA storage pad; (3) Off-specification or by-product chemicals are also stored in the interim status RCRA storage pad until disposed of offsite (Table 2). All wastes are disposed of offsite at various facilities. (Akzo 1990a, Akzo 1991a).

The facility has operated since 1961 and currently employs about 20 people. The facility employed approximately 120-140 people when in full operation (1982). The research site formally was engaged in research on new products, process improvements and applied research in the chemistry of fatty acids, esters, and the nitrogen derivatives thereof.

In 1990, the Chemicals division of Akzo decided to merge the two major research centers into a single location at Dobbs Ferry, NY. As a consequence, the McCook research center is in the process of closing (Akzo Chemicals, 1990d).

2.3 WASTE GENERATING PROCESSES

The Akzo Chemicals, Inc. McCook Research Center pilot plant and research laboratories have been operational since 1961. The facility is currently being shut down, with final closure anticipated in mid-1992. Regulatory closure of the interim status RCRA storage pad is also anticipated in 1992.

The McCook Research facility has conducted research and development for various Akzo Chemicals, Inc. product groups, including fatty acids, esters, and nitrogen derivatives; organic peroxides; polyurethane and other polymer-based paper chemicals; organic diisoyanate cross-linking agents for urethane elastomers; and other specialty organic chemicals. These R&D activities have included both product and process development via bench scale and pilot plant equipment.

Current Pilot Plant Activities

Pilot plant activities are currently focused on fatty chemistry, particularly fatty nitrogen derivatives. Chemical families produced include fatty nitriles, amines, substituted amines, amides, and quaternary ammonium compounds. Primary raw material feedstocks include fatty acids, fatty amines, fatty amides, and fatty alcohols. Reactants used to derivatize these feedstocks can include hydrogen, ammonia, ethylene oxide, propylene, oxide, methyl chloride, dimethyl sulfate, benzyl chloride, hydrogen peroxide, formaldehyde, acrylonitrile, acetic acid and sodium chloroacetate. Other materials used include metal-based catalysts and a variety of solvents, including alcohols, glycols, petroleum distillates, and acetone.

Much of the material produced by pilot plant activities are used by customers for trial purposes. Unused non-hazardous fatty nitrogen products are typically transferred to one of two 2,500-gallon pitch tanks at the facility and disposed of offsite. The currently operating fatty nitrogen processes do not routinely generate other by-products that must be disposed of as solid waste. Process wastewater is sent to the clarifier for gravity separation of floating fatty material and other solids. Effluent from the clarifier is discharged to a Publicly Owned Treatment Works (POTW).

A pilot plant built in 1985 for testing paper chemical additives is also currently in operation. The paper chemicals pilot plant performs physical testing of paper material for porosity, sizing response, tensile strength, and other characteristics.

Historical Pilot Plant Activities

Other pilot plant activities that have occurred during the history of the facility include the following:

1. Methyl alkyl ketone production (1970s), involving reaction of carboxylic acids and acetic acid to produce methyl alkyl ketone used by customers as animal repellents and as intermediates in flavoring and fragrance production.

2. Organic diisoyanate production (1980s), involving reaction of amides with chlorine to produce disubstituted ureas, followed by reaction with hydrochloric acid and ammonium hydroxide in the presence of perchloroethylene (PCE), to produce diisoyanates. These compounds were used by customers in urethane elastomer applications.

3. Polyurethane and other copolymer production (1980s and 1990s), involving reactions of diisoyanates with organic monomers in the presence of solvent to produce polymers used as paper sizing agents.

4. Isothioronium compound production (1960s and 1970s), involving the reaction of thiourea and alkyl halides. The isothiouronium compounds were used by customers in copper ore processing applications.

5. β-amine compound production (late 1960s to early 1980s), involving reactions of α-olefins in the presence of hydrofluoric or sulfuric acid, followed by hydrolysis with ethanol and caustic. The β-amines were used by customers in petroleum refining applications.

6. Miscellaneous other pilot plant processes, including oleic acid acylation, fatty ester sulfonation, fatty amine and fatty amine derivative distillation, ether amine production, and porous polymer manufacturing involving ethoxylated amines.

Laboratory Activities

Laboratory activities that have been conducted at the site can be broadly classified as organic synthesis, customer applications, and analytical support. Customer applications laboratories were operated for asphalt chemicals, mining surfactants, softeners and detergents, oil well chemicals, biocides (herbicides), agricultural products; paper chemicals, and organic peroxides.

Waste solvents generated by the laboratory activities have historically been segregated by category and disposed of offsite in accordance with applicable regulations. Hazardous laboratory chemicals disposed of as a result of the closure activates have been disposed of via labpack in accordance with EPA regulations. Non-hazardous laboratory chemicals have been disposed of via offsite landfill or offsite incineration.

Waste Stream Descriptions

Waste material categories generated at the McCook Research facility have included the following:

- Non-hazardous fatty materials (excess feedstock, product, distillation residues, etc.) accumulated in the pitch tanks (SWMU 6) and disposed of by incineration at an offsite Akzo facility.

- Non-hazardous solids, accumulated in the special waste dumpster (SWMU 3) and disposed of by offsite landfill. These include empty containers, non-hazardous laboratory chemicals, rags, and other non-hazardous materials.

- Spent pilot plant cleanup and laboratory solvents. These are currently segregated in the satellite spent solvent accumulation area (SWMU 2) into the following categories: chlorinated solvents, non-halogenated solvents, solvents with organic acids, and solvents with organic bases.

- Perchloroethylene-containing filtercake and still bottoms from pilot plant diisoyanate production are stored in drums in the interim status RCRA storage pad (SWMU 1).

- Waste acetone and xylene from polyurethane-based paper sizing agent production are stored in drums in the interim status RCRA storage pad (SWMU 1).

- Distillation residues from methyl alkyl ketone and β-amine production are stored in drums in the interim status RCRA storage pad (SWMU-1).

- Sludge from the wastewater clarifier (SWMU 4).

- Miscellaneous wastes for offsite disposal, including excess laboratory reagents and products, unused pilot plant raw materials, filter aid containing spent metal catalysts, and sodium chloride-based slat cake are stored in the interim status RCRA storage pad (SWMU 1).

All of the above materials have historically been disposed of offsite in accordance with applicable regulations. Wastes generated as a result of ongoing pilot plant and laboratory activities, as well as wastes generated as a result of the facility closure, will continue to be disposed of in accordance with current RCRA and other applicable solid waste regulations.

TABLE 2

SOLID WASTES

Waste/EPA Waste Code	Source	Primary Management Unit
Sludge contaminated with Perchloroethylene	Pilot Plant	1
Liquids containing 2,4-D	Laboratory	1, 2
Acid Chlorides, Corrosive Liquids, Reactive/D002, D003	Laboratory	1, 2
Listed spent solvents, Ignitable, from laboratory/D001, F003	Laboratory	1, 2
Acrylonitrile/U009	Laboratory	1
Corrosive Liquid Waste (Propylamines), Flammable/D001, D002	Pilot Plant	1
Ignitable mixture of spent acetonitrile, diglyme/D001	Pilot Plant	1
Ignitable mixture of spent IPA + glycol/D001	Pilot Plant	1
Ignitable mixture of Hexane + Diglyme /D001	Pilot Plant	1
Ignitable mixture of IPA + Acetic Acid /D001	Pilot Plant	1
E-P Toxic Mercuric Acetate/D009	Laboratory	1, 2
Excess Lab Product Containing Xylene, Ignitable/U239	Laboratory	1, 2
Waste reactive cyanide-containing liquid	Laboratory	1, 2
Excess formaldehyde solution/U122	Pilot Plant	1
Non-hazardous solids	Various	3
Wastewater clarifier sludge	Pilot Plant	4
Non-hazardous fatty materials	Pilot Plant	6

2.4 DOCUMENTED RELEASE HISTORY

This section discusses the history of releases to soil at the Akzo Chemicals, McCook Research Site facility.

In 1987, it was reported by Akzo to the IEPA that approximately 714 gallons of perchloroethylene (RCRA waste U210) had been leaking from an above ground storage tank for an unknown period of time. 700 gallons were recovered on site and reclaimed. Fourteen gallons were removed in 267 cubic yards of contaminated soil and gravel. No free liquid was observed migrating off site; however, approximately four cubic yards of contaminated soil and gravel were recovered from an area beyond the fence line (Akzo Chemicals, 1987 and IEPA, 1987d). The cleanup was inspected by the IEPA and found to be adequate.

No other releases have been reported or verified.

2.5 REGULATORY HISTORY

The facility submitted its first RCRA Part A permit application in November 1980. This application listed process codes for container storage (S01), tank storage (S02) and tank treatment (T01). Wastes that were included on the original application were F002 (halogenated spent solvents), F005 (non halogenated spent solvents), D001 (ignitable) and D009 (mercury). All wastes were listed under container storage (S01) (Akzo Chemicals, 1980). No wastes were listed under tank storage (S02) or tank treatment (T01). In 1987 the storage area (S01) was closed (IEPA, 1987c). The facility was inspected in November 1988 (IEPA) and found to be in accordance with approved closure plan dated 1987 (IEPA, 1987a). In 1988 a potential hazardous waste site, preliminary assessment concluded that the site had a low priority for potential of release of hazardous constituents to the environment (IEPA, 1988b).

In 1988 the facility submitted a RCRA Part B application (IEPA, 1990a). A Part B permit was issued for public comment in September (IEPA, 1990a). The permit application was withdrawn in October 1990 due to the planned closure of the facility (IEPA, 1990a and IEPA, 1990b). There have been no RCRA inspections.

The Akzo facility has been granted several air permits since 1980. In 1983, it was granted a permit for expansion of the Hofmann Pilot Plant (IEPA, 1983a). It was also granted a two year operating permit for emissions of organic material from the pilot plant expansion (IEPA, 1983b). In 1985 the operating permit for emissions of organic material from the Hofmann Pilot Plant was extended to 1988 (IEPA, 1985a).

Also in 1985 a construction and operating permit (5 yr.) was granted for the emissions of nitrogen oxides and carbon monoxide from a portable steam boiler (gas fired) (IEPA, 1985b). In 1987 the facility was inspected and found to be in compliance with the applicable air regulations and permits (IEPA, 1987d). In 1987 Akzo ceased operation of the Hofmann Pilot Plant and withdrew its operating permit in January 1988 (IEPA, 1988a). The facility was inspected in 1988 and was found to be in compliance with applicable air regulations (IEPA, 1988b). In 1989, Akzo was granted a joint construction and operating permit (89050080) for Pilot Plant Powder Blending with baghouses (IEPA, 1989). The operating permit was granted for emissions of particulates. There have been no violations of any air regulations or permits by the facility. The facility does not have any NPDES or water discharge permits.

2.6 ENVIRONMENTAL SETTING

This section describes the climate, flood plain and surface water, geology and soils, and ground water in the vicinity of the Akzo facility.

2.6.1 Climate

The climate in Cook county is classified as the humid continental type. The average daily temperature is 49.0°F. The lowest average daily minimum temperature is 13.3°F in January. The highest average daily maximum temperature is 82.4°F in July (U.S. Department of Agriculture, 1979).

The total annual precipitation is 33.34 inches. Of this, 22 inches, or about 67%, usually falls in April through September. Thunderstorms occur on about 37 days each year. The heaviest 24-hour rainfall was 9.35 inches in August, 1987 (National Weather Bureau, 1991). The mean annual lake evaporation for the area is 32 inches (IEPA, 1976).

The average seasonal snowfall is 39 inches. On the average, at least one inch of snow is on the ground for 32 days of the year.

The prevailing wind is from the west in winter, from the west and south-southwest in the spring, from the southwest in the summer, and from the south and southwest in the fall (Ruffner, 1977). The average wind speed is 10.3 mph.

RELEASED
DATE 10-22-96
RIN # 2944-96
INITIALS MU

ENFORCEMENT
CONFIDENTIAL

5.0 CONCLUSIONS AND RECOMMENDATIONS

The PA/VSI identified six SWMUs and no AOCs at the Akzo facility. Background information on the facility's location, operations, waste generating processes, release history, regulatory history, environmental setting, and receptors is presented in Section 2.0. SWMU-specific information, such as the unit's description, dates of operation, wastes managed, release controls, release history, and observed condition, is discussed in Section 3.0. AOCs are discussed in Section 4.0. Following are conclusions and recommendations for each SWMU and AOC. Table 3 identifies the SWMUs at the Akzo Chemicals, McCook Facility and suggested further actions.

SWMU 1 **Interim Status RCRA Storage Pad**

Conclusions: This concrete area is located outside in a remote corner of the facility. The possibility of spills or release to all environment media is low due to the concrete dike and sump. The area is fenced and locked regularly which limits entry to the drum pad. The condition of the area is good with no signs of leaks on the concrete base. The drums present in the area were in good condition.

Recommendations: No further action is suggested at this time.

SWMU 2 **Satellite Spent Solvent Accumulation Area**

Conclusions: This concrete area is located outside of the facility. This area is used for satellite accumulation of waste solvents from laboratory activities. The possibility of a spill or release to all environment media is low. In the event of flood or extreme rainfall (24 hr., 25-year storm event) the dike may overflow. There is a low potential for release to air because all drums have capped funnels.

Recommendations: No further actions are suggested at this time.

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TABLE 3

SWMU SUMMARY

SWMU	Operational Dates	Evidence of Release	Suggested Further Action
Interim Status RCRA Storage Pad	1987 to present	None	No Further Action
Satellite Spent Solvent Accumulation Area	1989 to present	None	No Further Action
Special Waste Dumpster	1961 to present	None	No Further Action
Wastewater Clarifier	1961 to present	None	No Further Action
Closed RCRA Storage Pad	1980 to 1987	None	No Further Action
Pitch Tanks	1961 to present	None	No Further Action

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SWMU 3 **Special Waste Dumpster**

Conclusions: This dumpster is located on a paved area outside the facility. There is a low potential for a release to all environmental media. The potential for release is dependant on the integrity of the dumpster and the amount of precipitation which falls on it.

Recommendations: No further actions are suggested at this time.

SWMU 4 **Wastewater Clarifier**

Conclusions: This unit is located outside the facility by the pilot plant. There is no potential for release to air because of the nature of the material. There is a low to moderate potential for release to the groundwater, surface water and onsite soils depending on the integrity of the unit. However, due to the nature of the materials handled by this unit (non RCRA waste), the overall significance of a release by this unit is low. The integrity of the unit appeared good.

Recommendations: No further actions are suggested at this time.

SWMU 5 **Closed RCRA Storage Pad Area**

Conclusions: This unit was located outside of the facility. In 1987, the unit went through formal closure procedures. No evidence of release was found during the closure. There is no potential for release to any environmental media.

Recommendations: No further actions are suggested at this time.

SWMU 6 **Pitch Tanks**

Conclusions: This unit is located on the pilot plant. The ground below it is concrete and diked to prevent any release in the event of a spill. The unit does not handle any hazardous materials. Therefore, there is a low potential for release to groundwater, surface water, and soil.

Recommendations: No further actions are suggested at this time.