

PART PX 2207

WALD WAT ENV. PRNT
GUIDANCE RHW

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Monsanto

FROM (NAME & LOCATION) M. A. Pierle - EISA General Offices

DATE December 29, 1976
SUBJECT ENVIRONMENTAL ASSESSMENT -
REFERENCE W. G. KRUMMRICH PLANT
TO R. E. Bilger - E3NA

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Attached is your copy of the subject assessment report. As you know, such a document is being prepared for all MIC-MCI plants in 1976, with the objective of:

- 1) Documenting the basic environmental and occupational health information;
- 2) Identifying potential problems which might require corrective action;
- 3) Characterizing the environmental advantages and disadvantages of each site; and
- 4) Recommending specific actions where appropriate.

The report has been reviewed by plant, Legal, Research, and CED personnel.

We will be glad to discuss the findings and recommendations further at your convenience.

M. A. Pierle
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SUMMARY

General

The plant must conduct its business in a state that is one of the most difficult, environmentally, in the United States. The basic difficulty is a very stringent and comprehensive Environmental Protection Act. This is further complicated by an Administrative Agency that is slow in making decisions and tends to apply seemingly inapplicable, stringent regulations to areas that are not clearly specified by law. Considerable resources are required to meet environmental challenges. This will continue as several of the plant's processes and materials handled are environmentally suspect.

The majority of the plant operations are in compliance with regulatory requirements. However, the plant has several legal matters pending before the Illinois Agencies. Among these are rule change requests for mercury and total dissolved solids water discharges, variance requests from sulfur dioxide and particulate emission rules, and an enforcement action for operating coal-fired boilers without permits. Satisfactory resolution of all issues is expected in 1977.

The plant's location is particularly attractive, especially from a water pollution viewpoint. Ultimate discharge into the Mississippi River of plant wastewaters and a future Regional Municipal Waste Treatment Plant should serve to minimize water pollution requirements. The plant should be a priority location for the placement of new processes with high dissolved solids in their discharges. Air pollution requirements will remain stringent as air quality for most designated air pollutants is marginally in compliance. This should not be a constraint on site expansion.

The overall environmental posture is good.

Compliance Cost Projections

Environmental expenditures approximating \$35-50M NFC are projected over the next 6-8 years in order to continue manufacturing operations in compliance with environmental regulations. OSHA compliance could add additional expenditures. Operating expenses totaled ~\$5.2M in 1976 and are expected to increase to \$9.6M in 1977. These expenditures should not be a constraint on the site's viability.

Air Pollution

Past difficulties with the Illinois Regulatory Agencies concerning compliance with air regulations at the powerhouse should be resolved by installation of electrostatic precipitators in 1978. The most significant problem remaining is the inability to reach agreement with Illinois on organic emission regulations.

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The Agency's interpretation of organic emission requirements is negatively impacting virtually all state industry which uses or manufactures organic chemicals. This, coupled with present ambient air quality for hydrocarbons, could cause some difficulty in obtaining approval for new construction. Favorable resolution of this issue should be a major result to be attained in 1977.

The plant's relative open location and experience in handling chlorine makes it a prime site for future chlorination processes.

Water Pollution

Total plant discharge presently receives primary treatment at the Sauget Village Waste Treatment Plant. This system is being upgraded to a chemical treatment facility with start-up completion scheduled for May, 1977. The plant and Village are participating in a program to provide biological treatment on a regional basis for the City of East St. Louis and Villages of Sauget and Cahokia. It is anticipated that such a system would satisfy Monsanto's long term treatment needs. With increasing emphasis on removal of refractory organic compounds from wastewater discharges, the removability of such compounds discharged from the plant into a regional system requires further assessment.

The Sauget Village is operating at maximum flow. Any new flow additions to the plant will require a comparable sewer flow reduction project somewhere in the plant.

Due to the particular processes at the plant, an increased level of in-plant treatment (pretreatment) will be required for materials which will not be removed in the Village or Regional Treatment Systems. Materials such as mercury and possibly arsenic and elemental phosphorus are examples. As part of the program to define pretreatment needs, it will be necessary to develop analytical techniques capable of detecting specific compounds which are not removed in the end-of-pipe treatment systems.

A possibility still exists that biological end-of-pipe treatment will not be required on discharges to the Mississippi River. Federal agencies have concluded that treatment is not cost effective; however, a change in the existing law is required to remove the present requirement. The possibility of such a change is considered low. Benefits would be lower costs for ultimate treatment.

Land-Destined Waste

Recently enacted Federal Solid Waste Legislation and increased State pressure on the existing landfill necessitates that its operation be discontinued. This will require the development of an alternate plant site or location of an acceptable contract site. Additional approved contract sites are desirable to increase the plant's disposal flexibility.

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5. ACL

- a. Complete noise and dust exposure survey.
- b. Define and execute a compliance program if OSHA standards are exceeded.

6. Benzene

- a. Quantify plant-wide compliance cost to achieve a 1 ppm exposure standard.

7. Chlorophenols

- a. Implement recommendations developed by special task force reviewing process for dioxin formation potential.

8. General

- a. Define program limitations (sampling equipment, analytical procedures, etc.) and establish priority for acquiring needs.
- b. Establish priorities for completing monitoring schedule. Complete program.

Ambient Noise

- 1. Utilizing the personnel and equipment of the Department of Medicine and Environmental Health, conduct a comprehensive survey of property line sound levels including "normal", impulse, and prominent discrete tone during daytime hours.
- 2. Define problem areas and sources, if any, which exceed regulations.
- 3. Prepare plan to achieve compliance, if necessary.

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4. U. S. Coast Guard

Since the plant moves "oils" across its barge docking facilities, it is subject to Coast Guard Spill requirements (33 CFR 153-6). Among the requirements are:

- a. preparation of a terminal operation manual;
- b. a dock fully equipped with spill containment equipment, or membership in an oil spill clean-up cooperative.

Oil spills carry a \$5000 fine, in addition to that in No. 3 above.

D. Effluents

1. Raw Waste

The plant presently discharges approximately 4,600 gpm of wastewater containing 500 mg/l COD, 1-1.5 lbs/day polychlorinated biphenyls, 0.25 lbs/day mercury, and over 120,000 lbs/day acidity (HCl, H₂SO₄, H₃PO₄). Specific analyses of the COD components has been undertaken. Some of the major components are: NCB's - 2,000 lbs/day; phenols - 1,000 lbs/day; nitrophenols - 1,000 lbs/day; nitroanilines - 500-1,000 lbs/day; chlorophenols - 700 lbs/day; aniline - 700 lbs/day, and xylene - 400 lbs/day. Dissolved solids total in excess of 500,000 lbs/day.

All plant wastes enter the Sauget Village sewer system, combine with wastes from other industries and the sanitary waste from the 300 Village residents, and pass through a primary treatment plant prior to discharge into the Mississippi River.

2. Description of Existing Treatment Facilities

a. Plant

Pretreatment facilities are in place at the chlor-alkali and PCB departments. The chlor-alkali department is equipped with a closed sewer system which collects all process and rainfall run-off wastewaters. These combined wastes are pumped to treatment system consisting of primary sedimentation, sulfide addition, and mercury sulfide precipitation and clarification. Mercury contaminated sludge is dewatered and landfilled. Treated wastewater containing 40-50 ppb mercury is discharged. A schematic is shown in Figure 3.

The PCB Manufacturing and Incineration Departments are totally curbed and sumped. All contaminated wastewater passes through sumps for separation of insoluble PCB's. Solubility losses of 1-1.5 lbs/day are discharged. Removed PCB's are incinerated.

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4. Arsenic

Pretreatment standards for the discharge of arsenic from phosphorus trichloride production have been proposed by the U. S. EPA. Although they are not adopted yet, it is likely that they will be. At that time, arsenic removal facilities will be required before ultimate discharge. It has been shown that sufficient removal will occur in the Village chemical treatment plant. If standards are not met, removal at the PCl_3 and P_2S_5 department will be required.

5. Phosphorus

Elemental phosphorus is receiving increased attention as a possible fish toxin. Indications also exist that it is bio-accumulated. The plant has the potential to discharge elemental P from all phosphorus handling departments. Data on the presence or absence of P in the discharge need to be obtained. Pretreatment standards for P will likely be established for PCl_3 , P_2S_5 , and POCl_3 in 1977.

6. Pretreatment/ Toxic Pollutants

EPA may adopt regulations requiring source pretreatment of EPA designated toxic pollutants. The extent of pretreatment for organic materials may be dependent upon the biodegradability of the substance in a municipal regional treatment system. EPA has targeted 124 inorganic and organic compounds and families of compounds for initial coverage of these, 23 are possibly present in the total plant discharge. These are itemized in Table 7.

Internal capabilities to monitor for these specific compounds are not developed yet.

TABLE 7.
EPA DESIGNATED TOXIC POLLUTANTS
IN W. G. KRUMMRICH PLANT EFFLUENT

Arsenic Compounds	Nitrophenols
Benzene	Pentachlorophenol
Biphenyl	Phenol
Chlorine	PCB's
1, 2, 4-trichlorobenzene	2, 3, 7, 8-TCDD
2, 4, 6-trichlorophenol	Toluene
Chromium Compounds	Zinc Compounds
Dibenzofurans	
Dichlorobenzenes (1, 2; 1, 3; 1, 4)	
Methylethyl Ketone	
Mercury Compounds	
Nitrobenzene	

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6. Benzene

NIOSH has recommended that OSHA lower its TWA from 10 ppm to 1 ppm. The available benzene data indicate compliance with the existing limit but a 1 ppm standard would be exceeded. The impact of this change should be determined.

7. Chlorophenol

Special concern due to the existence of longstanding chloracne problem and also the concern about the possible presence of chlorodioxin.

8. PCl₃/POCl₃

Frequent release of irritating fumes with concern about aggravation of individuals with respiratory problems related to the aging process.

9. Santoflexes

Although existing TLV's are being met, there is concern about potential long range problems resulting from ketone exposure.

10. General exposure levels of regulated materials are documented in many departments. In some cases, analytical and sampling techniques are not developed. Such information must be generated to substantiate compliance or, alternatively, define areas requiring improvement. Special handling procedures will be required for toluene when it commences in the new BzCl/S-160 process.

F. Recommendations

1. Chlor-Alkali

- a. Determine the technical feasibility and associated cost of complying with NIOSH recommended standards for Cl₂ and mercury.

2. Santosite

- a. Design and install projects necessary to achieve nuisance dust standard as soon as possible.

3. Phosphorus Pentasulfide

- a. Install dust control equipment as part of modernization project. This area should be given priority, if possible, during construction phase.

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4. Para-Nitroaniline

- a. Resolve problems with analytical methods and redetermining exposure levels.

5. ACL

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- b. Define and execute a compliance program if OSHA standards are exceeded.

6. Benzene

- a. Quantify plant-wide compliance cost to achieve a 1 ppm exposure standard.

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